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# CUMULATIVE Index to NASA Tech Briefs

1963-1967

FACILITY FORM 502

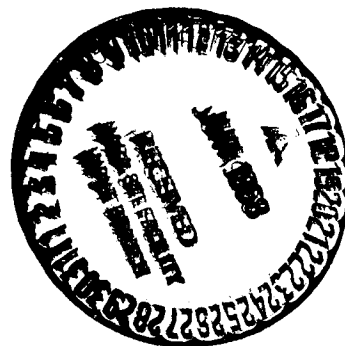
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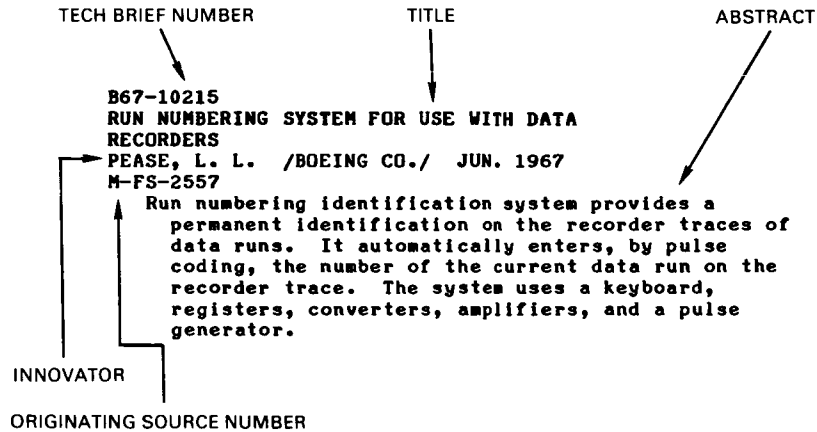
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National Aeronautics and Space Administration

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# Introduction

This *Cumulative Index to NASA Tech Briefs* lists the technological innovations published in this form during the period from 1963 through 1967. The main section is arranged in six categories: Electrical (including Electronic); Physical Sciences (Energy Sources); Materials (including Chemistry); Life Sciences; Mechanical; and Computer Programs. A typical entry has these elements.



To help users locate information of value, three indexes are provided. The first is a subject index, arranged alphabetically:



Note that in this index several routes are opened for obtaining further information. If the title seems promising, the Tech Brief number and category may be used to locate the abstract, which will be found in the main section arranged sequentially by Tech Brief number

within each category. Further, the Tech Brief number can of course be used for obtaining a copy of the original Tech Brief.

The second index relates all items by the originating source and number to the Tech Brief number and category.

The third index relates all items by the Tech Brief number and category to the originating source and number.



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This *Cumulative Index* replaces all previous issues of the *Index to NASA Tech Briefs* (NASA SP-5021) and supplements.

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## 01 ELECTRICAL (ELECTRONIC)

actuator with a maximum number of wipers has been incorporated into a compact assembly. This small sized unit is inexpensive to fabricate.

B63-10174

MODULAR CHASSIS SIMPLIFIES PACKAGING AND INTERCONNECTING OF CIRCUIT BOARDS

ARENS, W. E. BOLINE, K. G. MAY 1964

JPL-236A

A system of modular chassis structures has simplified the design for mounting a number of printed circuit boards. This design is structurally adaptable to computer and industrial control system applications.

B63-10193

REMOVABLE PREHEATER ELEMENTS IMPROVE OXIDE INDUCTION FURNACE

LEIPOLD, M. H. JAN. 1964

JPL-288

Heat and corrosion resistant preheater elements are used in oxide induction furnaces to raise the temperature to the level for conducting electricity. These preheater elements are then removed and the induction coil energized.

B63-10227

ELECTROMECHANICALLY OPERATED CAMERA SHUTTER PROVIDES UNIFORM EXPOSURE

FORD, A. G. MAR. 1964

JPL-357

A unidirectional camera shutter employing a solenoid and mechanical linkages permits uniform exposure and minimizes distortion of the image formed in the camera.

B63-10229

FLANGE ON MICROWAVE ANTENNA SUBREFLECTOR CUTS GROUND NOISE

POTTER, P. D. MAY 1964

JPL-362

The subreflector of a microwave antenna has been redesigned so that its outer edge has a conical flange. This reduces noise by causing ground energy radiation to cancel out before entering the antenna.

B63-10238

SHAPED SUPERCONDUCTOR CYLINDER RETAINS INTENSE MAGNETIC FIELD

HILDEBRANDT, A. F. WAHLQUIST, H. MAY 1964

JPL-381

The curve of the inner walls of a superconducting cylinder is plotted from the flux lines of the magnetic field to be contained. This shaping reduces maximum flux densities and permits a stronger and more uniform magnetic field.

B63-10250

LEVEL OF SUPER-COLD LIQUIDS AUTOMATICALLY MAINTAINED BY LEVELOMETER

TENER, W. M. MAR. 1964

JPL-397

A levelometer system, in which the level of cryogenic liquid to be controlled affects the level of an electrolyte, automatically switches a pump on and off. A pressure sensitive diaphragm can also throw a microswitch to start or stop the pump.

B63-10255

TRANSFLUXOR CIRCUIT AMPLIFIES SENSING CURRENT FOR COMPUTER MEMORIES

MILLIGAN, G. C. MAR. 1964

JPL-406

To transfer data from the magnetic memory core to an independent core, a reliable sensing amplifier has been developed. Later the data in the independent core is transferred to the arithmetical section of the computer.

B63-10258

DOUBLE-THROW MICROWAVE DEVICE SWITCHES TWO LINES QUICKLY

CLAUSS, R. STELZRIED, C. T. FEB. 1964

JPL-410

By combining a single-throw microwave switch with a microwave circulator in a circuit, two input lines can be switched quickly. There is only a

B63-10006

SETTING OF ANGLES ON MACHINE TOOLS SPEEDED BY MAGNETIC PROTRACTOR

VALE, L. B. MAY 1964

ARC-5

An adjustable protractor facilitates transference of angles to remote machine tools. It has a magnetic base incorporating a beam which can be adjusted until its shadow coincides with an image on the screen of a projector.

B63-10024

SOLENOID PERMITS REMOTE CONTROL OF STOP WATCH AND ASSURES RESTARTING

KODAI, C. JUN. 1964

FRC-17

A stop watch which may be remotely controlled by the use of a solenoid mechanism is described. When the solenoid is energized the coil spring pulls the lever arm and starts the balance wheel. When it is not energized, the spring pulls the lever and stops the watch.

B63-10027

INCREASED PERFORMANCE RELIABILITY OBTAINED WITH DUAL /REDUNDANT/ OSCILLATOR SYSTEM

NOLIS, W. M. /IBM/ MAR. 1964

GSFC-36

Two crystal-controlled oscillators, each with an associated buffer stage, provide an output at a common point. The circuit design gives high reliability control of output frequency and amplitude.

B63-10033

INDIUM FOIL WITH BERYLLIA WASHER IMPROVES TRANSISTOR HEAT DISSIPATION

HILLIARD, J. JOHN, J. E. A. APR. 1964 /SEE

NASA-TN-D-1753/

GSFC-42

Indium foil, used as an interface material in transistor mountings, greatly reduces the thermal resistance of beryllia washers. This method improves the heat dissipation of power transistors in a vacuum environment.

B63-10091

MODIFIED FILTER PREVENTS CONDUCTION OF MICROWAVE SIGNALS ALONG HIGH-VOLTAGE POWER SUPPLY LEADS

MATHISON, R. P. MAY 1964

JPL-63

Very lossy powdered iron material, in the lining of a polyester resin, replaces the dielectric material in the short coaxial transmission line of a simple filter. The lossy material absorbs microwave signals along high voltage power supply leads.

B63-10118

STEPPING SWITCH WITH SIMPLE ACTUATOR PROVIDES MANY CONTACTS IN SMALL SPACE

MILLER, J. V. MAY 1964

JPL-122

To reduce the space required for a stepping switch with many contacts, a simple electromechanical

brief transition time when both /or neither/ of the two lines are connected to an output line.

**B63-10262**  
IGNITING SYSTEM FOR MERCURY VAPOR LAMPS PROTECTS  
TRANSISTORIZED SUSTAINING SUPPLY  
GUISINGER, J. E. JUL. 1964  
JPL-421

A current from a sustaining power supply flows through the mercury vapor lamp and, as there are no resistors in series with this supply, the power is efficiently used. This high voltage igniting device protects the transistorized high current, low voltage power supply.

**B63-10264**  
NOVEL HORN ANTENNA REDUCES SIDE LOBES,  
IMPROVES RADIATION PATTERN  
POTTER, P. D. APR. 1964  
JPL-425

A horn antenna, combining two propagation modes at selected power ratios, reduces side lobes, and improves the radiation characteristics. Noise and unwanted signals are considerably suppressed.

**B63-10280**  
METER ACCURATELY MEASURES FLOW OF LOW-CONDUCTIVITY  
FLUIDS  
LOVE, E. G. MAY 1964  
JPL-0021

An electromagnetic flowmeter has been adjusted to minimize the errors inherent in measuring the flow of low conductivity fluids. This is done through use of a direct-coupled, differential cathode-follower, whose grid potential is adjustable with respect to ground levels.

**B63-10284**  
SMALL DIGITAL RECORDING HEAD HAS PARALLEL BIT  
CHANNELS, MINIMIZES CROSS TALK  
ELLER, E. E. LAUE, E. G. MAY 1964  
JPL-0029

A small digital recording head consists of closely spaced parallel wires, imbedded in a ferrite block to concentrate the magnetic flux. Parallel-recorded information bits are converted into serial bits on moving magnetic tape and cross talk is suppressed.

**B63-10321**  
IMPROVED VARIABLE-RELUCTANCE TRANSDUCER MEASURES  
TRANSIENT PRESSURES  
MORTON, R. W. PATTERSON, J. L. MAY 1964  
LANGLEY-10

A flush-diaphragm pickup and a feedback-stabilized carrier amplifier are among the features incorporated into an improved variable-reluctance transducer. This low-impedance device responds to steady-state as well as transient pressures.

**B63-10338**  
OPTICS USED TO MEASURE TORQUE AT HIGH  
ROTATIONAL SPEEDS  
KRSEK, A., JR. TIEFERMAN, M. DEC. 1964  
LEWIS-13

In measuring torque transmitted by a high speed rotation shaft, an apparatus has been devised which includes a shaft, an optical system and readout servomechanism. This highly accurate method uses only optical contact with moving part and is statically calibrated.

**B63-10342**  
RADIANT HEATER FOR VACUUM FURNACES OFFERS HIGH  
STRUCTURAL RIGIDITY, LOW HEAT LOSS  
VARY, A. MAY 1964  
LEWIS-39

Some problems associated with high temperature heaters for vacuum furnaces have been eliminated by the use of shaped filaments of refractory metal. These filaments, supported in cylindrical array by ceramic spacers, operate with high voltage, low current power.

**B63-10440**  
NEW APPARATUS INCREASES ION BEAM POWER DENSITY  
BALDWIN, L. V. SANDBORN, V. A. JUN. 1964  
LEWIS-73

To increase ion engine or rocket power, an ion source and emitter, an ion beam focusing electrode, and an ion accelerator are incorporated into the system. In operation the space charge surrounding the ion emitter decreases, the ion beam density accelerates, and engine power increases.

**B63-10443**  
IMPROVED SENSOR COUNTS MICROMETEOROID  
PENETRATIONS  
DAVISON, E. H. MAY 1964  
LEWIS-76

A sensor, consisting of a thin dual-capacitor assembly with an outer film of thermal-control material, is used to detect micrometeoroid particles. A coincidence counting circuit is used to count the penetrations.

**B63-10493**  
TWO-STAGE EMITTER FOLLOWER IS TEMPERATURE  
STABILIZED  
SCHMIDT, M. H. /MCDONNELL AIRCRAFT CORP./ MAY 1964  
MSC-20

Two-stage temperature stabilized circuit using two transistors is described. Increase in temperature causes the base-to-emitter voltage of n-p-n transistor to become less positive whereas the base-to-emitter voltage of p-n-p transistor becomes less negative, so the temperature-induced variation in  $V_{sub 1}$  and  $V_{sub 2}$  cancel out.

**B63-10508**  
CIRCUIT SWITCHES LATCHING RELAY IN RESPONSE TO  
SIGNALS OF DIFFERENT POLARITY  
SMITH, L. S. /ELECTRO-OPTICAL SYSTEMS, INC./ MAY 1964  
WOO-055

A circuit using one power supply and two storage capacitors, which may be separately discharged in opposite directions through a relay in response to change in polarity of a signal, is described.

**B63-10511**  
FREQUENCY-SHIFT-KEYER CIRCUIT IMPROVES PCM  
CONVERSION FOR RADIO TRANSMISSION  
MKSZAN, D. P. /WESTINGHOUSE ELEC. CORP./ JUN. 1964  
GSFC-80

A data logic circuit employing a fixed frequency, square-wave oscillator and flip-flop gates allows for the shifting from one frequency to the other at the end of a whole number of cycles of one shift frequency and at the beginning of a cycle of the second shift frequency.

**B63-10512**  
LOW-COST TAPE SYSTEM MEASURES VELOCITY OF  
ACCELERATION  
HARTENSTEIN, R. JUN. 1964  
GSFC-85

By affixing perforated magnetic recording tape to the falling end of a body, acceleration and velocity were measured. The measurement was made by allowing the tape to pass between a light source and a photoelectric sensor. Data was obtained from a readout device.

**B63-10514**  
COMPUTER CIRCUIT WILL FIT ON SINGLE SILICON  
CHIP  
SMITH, C. JUN. 1964  
JPL-513

A simplified computer logic circuit of two NAND/NOR gates and three additional inputs to accomplish the count and shift function is described. The circuit has capacity for parallel read-in, counting, serial shiftout, complement input and set and reset.

**B63-10529**  
CONNECTOR FOR THERMOCOUPLE LEADS SAVES COSTLY  
WIRE, MAKES RELIABLE CONNECTORS  
MILLER, H. B. APR. 1964  
LANGLEY-26

A connector for use in the thermocouple circuits which is silver-brazed to the metal thermocouple sheath on one end and crimped over the insulation

of the flexible lead on the other, assures protection against breakage and abrasion. A moisture-proof insulating material is used to encapsulate the wire junctions.

**B63-10536**  
HOT-AIR SOLDERING TECHNIQUE PREVENTS OVERHEATING  
OF ELECTRICAL COMPONENTS  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ FEB.  
1964  
GSFC-91

By using a hot-air gun with a small orifice, heat may be localized to the soldering area of the chassis. The solder is placed around the capacitor which is inserted in the mounting hole so the ring is in contact with the chassis.

**B63-10537**  
SIMPLE CIRCUIT PROVIDES ADJUSTABLE VOLTAGE  
WITH LINEAR TEMPERATURE VARIATION  
MOEDE, L. W. /DATAMETRICS CORP./ MAR. 1964  
JPL-W00-029

A bridge circuit giving an adjustable output voltage that varies linearly with temperature is formed with temperature compensating diodes in one leg. A resistor voltage divider adjusts to temperature range across the bridge. The circuit is satisfactory over the temperature range of -20 degrees centigrade to +80 degrees centigrade.

**B63-10551**  
UNMANNED SEISMOMETER LEVELS SELF, CORRECTS  
DRIFT ERRORS  
SUTTON, G. /COLUMBIA U./ MAY 1964  
GSFC-100

An unmanned, self-leveling seismometer is developed which contains three subsystems, a mechanical, an electronic pickoff and feedback, and a leveling and vertical centering subsystem. Earth motions are detected by means of a seismic mass coupled to a coil-magnet assembly and a differential capacitor plate assembly.

**B63-10553**  
TRANSISTORIZED TRIGGER CIRCUIT IS FREQUENCY-  
CONTROLLABLE  
MOORE, E. T. /DUKE U./ JUN. 1964  
GSFC-111

A trigger circuit employing two unijunction transistor oscillators, whose frequency is varied by changing the base-to-base voltage, provides variable electrical control of the frequency.

**B63-10554**  
HIGHLY EFFICIENT SQUARE-WAVE OSCILLATOR OPERATOR  
AT HIGH POWER LEVELS  
HALL, J. E., JR. /DUKE U./ JUN. 1964  
GSFC-112

A square-wave oscillator circuit containing only simple resistor-capacitor combinations and transistors operates with high efficiency at relatively high power levels.

**B63-10555**  
COMPUTER DETERMINES HIGH-FREQUENCY PHASE  
STABILITY  
NICHOLS, G. B. JUL. 1964  
GSFC-113

Determination of phase stability of a high frequency signal using a computer is accomplished by a circuit using two auxiliary oscillators, multipliers and low-pass filters in cross correlation with the oscillator producing the signal of interest.

**B63-10561**  
TINY SENSOR-TRANSMITTER CAN WITHSTAND EXTREME  
ACCELERATION, GIVES DIGITAL OUTPUT  
MOSSINO, R. L. ROBINSON, G. NOV. 1964  
ARC-22

A self-pulsing oscillator transmits a pulsed signal. The time between pulses and the frequency are controlled by two networks. Variations in the component values in each of the two networks, due to environmental changes, appear as changes in frequency and time between pulses in the transmitted signal. Such a sensor is used to measure physical magnitudes.

**B63-10567**  
SIMPLE CIRCUIT CONTINUOUSLY MONITORS  
THERMOCOUPLE SENSOR  
GREENWOOD, T. L. AUG. 1964  
M-FS-61

A series circuit was developed to check the continuity in thermocouple sensors. This method may be used in monitoring continuity in any dc voltage-operated control circuit.

**B63-10572**  
DEVICE CALIBRATES VIBRATION TRANSDUCERS AT  
AMPLITUDES UP TO 20G  
GREENWOOD, T. L. AUG. 1964  
M-FS-86

A piezoelectric transducer provides accurate calibration of vibration amplitudes to 20 G. The calibration system uses an electromagnetically driven resonant beam to generate mechanical vibrations at a fixed frequency.

**B63-10579**  
SMALL FOAMED POLYSTYRENE SHIELD PROTECTS LOW-  
FREQUENCY MICROPHONES FROM WIND NOISE  
TEDRICK, R. N. MAY 1964  
M-FS-123

A foamed polystyrene noise shield for microphones has been designed in teardrop shape to minimize air turbulence. The shield slips on and off the microphone head easily and is very effective in low-frequency sound intensity measurements.

**B63-10596**  
FRONT AND BACK PRINTED CIRCUIT LAYOUTS  
PRESENTED ON SINGLE SHEET  
PERRY, J. OCT. 1964  
GSFC-93

A diazo photographic process of clear plastic masters is used in reproducing front and back printed circuit layouts of differing intensity on a single sheet.

**B63-10597**  
PRECISION GAGE MEASURES ULTRAHIGH VACUUM  
LEVELS  
HUDSON, J. B. SEARS, G. W. /GEN. DYN. CORP./  
JUN. 1964  
GSFC-114

An ionization gauge in which internally generated X-rays are minimized is described. This gauge permits the measurement of gas pressures in ultrahigh systems of micro-pico torr /10 -18/.

**B63-10599**  
LIQUID SWITCH IS REMOTELY OPERATED BY LOW DC  
VOLTAGE  
MOORE, E. T. /DUKE U./ MAY 1964  
GSFC-119

A liquid switch which does not depend on any mechanical, gravitational, or inertial actuation is developed for use in space environments. It may be remotely operated on low dc voltage.

**B63-10600**  
CIRCUIT CONTROLS TRANSIENTS IN SCR INVERTERS  
MOORE, E. T. WILSON, T. G. /DUKE U./ JUN. 1964  
GSFC-120

The elimination of starting difficulties in SCR inverters is accomplished by the addition of two taps of the output winding of the inverter. On starting or under transient loads the two additional taps deliver power through diodes without requiring quenching of SCR currents in excess of normal starting load.

**B63-10603**  
MONOSTABLE CIRCUIT WITH TUNNEL DIODE HAS FAST  
RECOVERY  
HEFFNER, P. MAY 1964  
GSFC-132

A monostable multivibrator circuit using a tunnel diode makes it possible for the MSMV to exceed the performance of present multivibrators in two respects. The rise time of the output voltage is faster and the duty cycle is raised to approximately 95 percent.

**B63-10606**  
NEW SINTERING PROCESS ADJUSTS MAGNETIC VALUE

OF FERRITE CORES

VINAL, A. W. /IBM/ MAY 1964  
GSFC-129

A two-phase sintering technique based on time and temperature permits reversible control of the coercive threshold of sintered ferrite cores. Threshold coercivity may be controlled over a substantial range of values by selective control of the cooling rate.

B63-10609  
TEMPERATURE-SENSITIVE NETWORK DRIVES ASTABLE MULTIVIBRATOR  
INNOVATOR NOT GIVEN /RCA/ OCT. 1964  
GSFC-137

The development of a simple circuit using two zener diodes and five resistors, which provides a temperature-sensitive voltage to drive the astable multivibrator, is described.

B63-10613  
CRYOGENIC WAVEGUIDE WINDOW IS SEALED WITH PLASTIC FOAM  
CLAUSS, R. STELZRIED, C. T. JUN. 1964  
JPL-559

Waveguide windows made with polystyrene preformed plastic and sealed with foamed-in-place plastic are useful in any microwave waveguide system using cryogenic cooling.

B64-10002  
CIRCUIT RELIABILITY BOOSTED BY SOLDERING PINS OF DISCONNECT PLUGS TO SOCKETS  
PIERCE, W. B. MAR. 1964  
JPL-447

Where disconnect pins must be used for wiring and testing a circuit, improved system reliability is obtained by making a permanent joint between pins and sockets of the disconnect plug. After the circuit has been tested, contact points may be fused through soldering, brazing, or welding.

B64-10004  
ULTRA-SENSITIVE TRANSDUCER ADVANCES MICRO-MEASUREMENT RANGE  
ROGALLO, V. L. MAY 1964  
ARC-26

An ultrasensitive piezoelectric transducer, that converts minute mechanical forces into electrical impulses, measures the impact of micrometeoroids against space vehicles. It has uniform sensitivity over the entire target area and a high degree of stability.

B64-10007  
LOW-POWER TRANSISTORIZED CIRCUIT PROVIDES STAIRCASE WAVEFORM  
BREEN, G. D. JUL. 1964  
GSFC-48

A low input power transistorized circuit is used to generate a staircase waveform of high step uniformity. Other characteristics are low step droop, fast transition time, and no feedback.

B64-10010  
MODIFIED RF COAXIAL CONNECTOR ENDS VACUUM CHAMBER WIRING PROBLEM  
WEINER, D. MAY 1964  
GSFC-150

A standard radio frequency coaxial connector is modified so that a plastic insulating sleeve can be mounted in the wall of a vacuum chamber. This eliminates ground loops and interference from cable connections.

B64-10016  
COMPACT COAXIAL CONNECTOR FOR PRINTED CIRCUIT ADDS RELIABILITY  
RADECKE, T. F. MAY 1964  
MSC-57

Soldering and welding techniques are used to connect a coaxial cable to a printed circuit board. This device aids reliability control of equipment as standard connectors are bulky and heavy.

B64-10017  
BLOCKING OSCILLATOR USES LOW TRIGGERING VOLTAGE

INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
DEC. 1964  
MSC-58

To prevent premature triggering of a blocking oscillator, a smaller magnetic core is added to the conventional oscillator circuit. This serves as a second blocking oscillator and has a lower triggering threshold.

B64-10019  
NEW METHOD USED TO FABRICATE GALLIUM ARSENIDE PHOTOVOLTAIC DEVICE  
ELLIS, S. G. /RCA/ JUN. 1964  
WOO-062

A new method for fabricating photocells, or solar cells, substitutes copper iodide for zinc diffusion. This produces a p-type surface layer and a photovoltaic junction.

B64-10024  
EFFICIENT CIRCUIT TRIGGERS HIGH-CURRENT, HIGH-VOLTAGE PULSES  
GREEN, E. D. /WESTINGHOUSE ELEC. CORP./ JUN. 1964  
MSC-14

A modified circuit uses diodes to effectively disconnect the charging resistors from the circuit during the discharge cycle. Result is an efficient parallel charging, high voltage pulse modulator with low voltage rating of components.

B64-10042  
OHMMETER SENSES DEPLETION OF LUBRICANT IN JOURNAL BEARINGS  
ROSS, A. O. DEC. 1964  
LEWIS-37

An ohmmeter is used as a sensor to determine when the lubricating oil in a high speed journal bearing becomes depleted.

B64-10064  
DIGITAL LOGIC ELEMENTS PROVIDE ADDITIONAL FUNCTIONS FROM ANALOG INPUT  
MATTY, T. C. /MCDONNELL AIRCRAFT CORP./ JUN. 1964  
MSC-64

A dc analog input can be used to produce an integrator with high dynamic range or a position servo with inherent stability. This is done by a switching system using digital-to-analog converters and an electronic switch to obtain the desired outputs.

B64-10065  
CONTINUITY TESTER SCREENS OUT FAULTY SOCKET CONNECTIONS  
GOLDING, G. MAY 1964  
JPL-596

A device, used before and after assembly, tests the continuity of an electrical circuit through each pin and socket of multiple connector sockets. Electrically insulated except at the contact area, a test probe is dimensioned to make contact only in properly formed sockets.

B64-10080  
IMPROVED INSERTION-LOSS TESTER  
FINNIE, C. J. SCHUSTER, D. JUN. 1964  
JPL-358

An improved test method accurately measures the insertion loss of RF components while avoiding amplifier drift. Currents are balanced across a bridge transformer with shorted probes and then with each component to be tested. Differences in adjustments indicate the loss.

B64-10109  
ANALOG DEVICE SIMULATES PHYSIOLOGICAL WAVEFORMS  
HICKMAN, D. M. NOV. 1964  
MSC-51

An analog physiological simulator generates representative waveforms for a wide range of physiological conditions. Direct comparison of these waveforms with those from telemetric inputs permits quick detection of signal parameter degradation.

B64-10114  
AUXILIARY SILVER ELECTRODE ELIMINATES TWO-STEP  
VOLTAGE DISCHARGE CHARACTERISTIC OF SILVER-  
ZINC CELLS  
CHREITZBERG, A. M. /ELEC. STORAGE BATTERY CO./  
JUN. 1964  
GSFC-169

In silver-zinc cells, an auxiliary silver electrode is electrically connected to the positive terminal only during discharge. This eliminates the two-step discharge characteristic of such cells.

B64-10118  
USE OF PHOTOGRAPHS SPEEDS INSPECTION OF  
PRINTED-CIRCUIT BOARDS  
STARK, E. /IBM/ JUL. 1964  
MSC-72

The projected images of a printed circuit board and the engineering drawing are superimposed on a screen for visual comparison. This technique speeds inspection, reduces the incidence of error.

B64-10122  
SIMPLE TRANSDUCER MEASURES LOW HEAT-TRANSFER  
RATES  
LAUMANN, E. A. OCT. 1964  
JPL-466

A simple transducer is used to measure low rates of convective and conductive heat transfer from a fluid to a cooled surface under steady-state conditions. Temperature drop is measured by two thermocouples imbedded in a rod of low thermal conductivity.

B64-10143  
FIELD-EFFECT TRANSISTOR IMPROVES ELECTROMETER  
AMPLIFIER  
MUNOZ, R. NOV. 1964  
ARC-36

An electrometer amplifier uses a field effect transistor to measure currents of low amperage. The circuit, developed as an ac amplifier, is used with an external filter which limits bandwidth to achieve optimum noise performance.

B64-10144  
RING COUNTER MAY BE ADVANCED OR RETARDED BY  
COMMAND SIGNAL  
LIBBY, J. N. MOORE, H. D. JUL. 1964  
GSFC-101

A power logic circuit, with bidirectional capability, is used to drive small loads in planned sequence. This is designed in the form of a shift register, with a reversible ring counter.

B64-10150  
NOVEL CIRCUIT COMBINES PULSE STRETCHER WITH  
NOR GATE  
CLIFF, R. A. OCT. 1964  
GSFC-187

A pulse-stretching circuit added to a conventional NOR gate circuit detects a preselected state and produces a pulse that the pulse stretcher maintains for a long enough period to reset all counter stages.

B64-10158  
EMISSION TESTER FOR HIGH-POWER VACUUM TUBES  
LUNDY, C. OCT. 1964  
JPL-628

A simple emission-testing circuit for high power vacuum tubes to check their output stability is described. With modification it may be useful in testing mercury-arc rectifiers.

B64-10163  
FIELD EFFECT TRANSISTORS USED AS VOLTAGE-  
CONTROLLED RESISTORS  
INNOVATOR NOT GIVEN NOV. 1964  
M-FS-174

Two new methods of incorporating field effect transistors into circuit designs have resulted in linear response of this type transistor over a wide range of controlled voltage levels. This increases its usefulness as a voltage-controlled resistor.

B64-10171  
SUBMINIATURE BIOTELEMETRY UNIT PERMITS REMOTE  
PHYSIOLOGICAL INVESTIGATIONS  
OCT. 1964  
ARC-39

A subminiature biotelemetry transmitter permits the measurement of biopotential response in humans or animals to controlled environmental stimuli without discomfort while engaged in normal activities.

B64-10173  
HIGH-PASS RF COAXIAL FILTER REJECTS DC AND LOW  
FREQUENCY SIGNALS  
BAILEY, J. W. MC AFEE, D. F. OCT. 1964  
GSFC-73

A low-loss RF filter element for coaxial transmission provides dc isolation and eliminates low frequency signals. The characteristic impedance of the transmission line is not affected, as the design permits direct connection of the filter to the line.

B64-10200  
BINARY SYSTEM GENERATES SIDEREAL RATE FROM  
STANDARD SOLAR RATE  
GRANATA, R. MC CAUL, P. OCT. 1964  
GSFC-190

A sidereal rate output from mean solar rate input is derived from a sidereal generator that uses digital division and multiplication techniques.

B64-10209  
RASTER LINEARITY OF VIDEO CAMERAS CALIBRATED  
WITH PRECISION TESTER  
INNOVATOR NOT GIVEN /RCA/ DEC. 1964  
GSFC-200

The time between transitions in a camera's video output is measured when registered at reticle marks on the vidicon faceplate. This device permits precision calibration of raster linearity of television camera tubes.

B64-10222  
COMPACT CARTRIDGE DRIVES CODED TAPE AT  
CONSTANT READOUT SPEED  
AUSTIN, D. C. OCT. 1964  
JPL-472

To facilitate storage and repetitive reading of short-program coded tape, a cartridge case, containing mechanical drive and readout assemblies, has been fabricated. The drive transports the tape past a conventional pickup device during the reading function.

B64-10226  
TEMPERATURE-COMPENSATION CIRCUIT STABILIZES  
PERFORMANCE OF VIDICONS  
NOV. 1964  
JPL-486

A simple transistor circuit uses a thermistor to change the vidicon target potential in relation to temperature differences.

B64-10237  
APPARATUS MEASURES CONCENTRATION OF SUSPENDED  
DROPLETS IN GAS STREAMS  
BOOTH, F. W. DEC. 1964  
LANGLEY-31

An apparatus, operating on the principle of wet- and dry-bulb thermometry, permits intermittent or continuous measurement of the concentration of droplets dispersed in a gas stream over a wide range of gas pressure.

B64-10255  
ELECTRONIC DEVICE SIMULATES RESPIRATION RATE  
AND DEPTH  
THOMAS, J. A. NOV. 1964  
MSC-89

An oscillator circuit and a thermistor, in close proximity to a light bulb, periodically alter the heat output of the bulb by varying the voltage across its filament. Use of this simulator permits checkout tests on pneumographs.

B64-10258  
DIGITAL CARDIOMETER COMPUTES AND DISPLAYS  
HEARTBEAT RATE

MITCHELL, V. M. NOV. 1964  
MSC-93

To compute the heartbeat rate from the waveform output of an electrocardiogram, a digital cardiometer with solid state circuit elements has been developed. This computes the beat every 15 seconds and visually presents the data on numerical display tubes.

B64-10259  
PNEUMOTACHOMETER COUNTS RESPIRATION RATE OF HUMAN SUBJECT  
GRAHAM, O. NOV. 1964  
MSC-92

To monitor breaths per minute, two rate-to-analog converters are alternately used to read and count the respiratory rate from an impedance pneumograph over fixed intervals. The converter outputs are sequentially displayed numerically on electroluminescent matrices.

B64-10271  
IMPROVED TECHNIQUE FOR LOCALIZING ELECTRO-POLISHING FEATURES NOVEL NOZZLES  
INNOVATOR NOT GIVEN /GEN. DYN./ASTRONAUTICS/ NOV. 1964  
WOO-101

Impingement electropolishing is accomplished by use of an electrolyte film, which is evenly distributed by an insulated nozzle designed to match the contour of the workpiece to be treated. The workpiece is connected to the positive terminal of a generator and the nozzle to the negative terminal.

B64-10280  
SERVO SYSTEM FACILITATES PHOTOELASTIC STRAIN MEASUREMENTS ON RESINS  
OTTS, J. W. NOV. 1964  
JPL-504

To facilitate photoelastic measurements of the strains developed by stresses applied to birefringent resins, a servomechanism is employed.

B64-10281  
PTC THERMISTOR PROTECTS MULTILOADED POWER SUPPLIES  
LEVERONE, H. MANDELL, N. NOV. 1964  
GSFC-236

A PTC /positive-temperature-coefficient/ thermistor placed in series with each branch load of a multiload circuit prevents power loss in parallel branches. This thermistor may be used in any circuit requiring current limiting or intended overload resetting.

B64-10283  
MOUNTING FOR DIODES PROVIDES EFFICIENT HEAT SINK  
INNOVATOR NOT GIVEN /RCA/ NOV. 1964  
M-FS-197

Efficient heat sink is provided by soldering diodes to metal support bars which are brazed to a ceramic base. Electrical connections between diodes on adjacent bars are made flexible by metal strips which aid in heat dissipation.

B64-10299  
RADIATION DETECTOR-OPTICAL HANGING DEVICE IS OF SIMPLIFIED CONSTRUCTION  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ JAN. 1965  
GSFC-251

A simplified radiation detector was designed which employs an activated continuous front surface consisting of either the diffused or barrier type of semiconducting material with a grid structure on the nonactivated side of the detector. Its form may be either a rectangular coordinate or a polar coordinate system.

B64-10305  
TRANSISTORIZED CONVERTER PROVIDES NONDISSIPATIVE REGULATION  
INNOVATOR NOT GIVEN /DUKE U./ DEC. 1964  
GSFC-238

A transistorized regulator converter efficiently converts fluctuating input voltages to a constant output voltage, avoiding the use of saturable

reactors. It is nondissipative in operation and functions in an open loop through variable duty cycles.

B64-10309  
WELDING PROCEDURE IMPROVES QUALITY OF WELDS, OFFERS OTHER ADVANTAGES  
DEC. 1964  
M-FS-32

An improved procedure for arc spot welding uses the SIGMA /submerged inert gas metallic arc/ method. This has resulted in welds of higher quality than are obtainable by conventional means.

B64-10320  
VOLTAGE GENERATOR SWEEPS OSCILLATOR FREQUENCY LINEARLY WITH TIME  
INNOVATOR NOT GIVEN /MELPAR, INC./ JAN. 1965  
M-FS-219

A voltage-tuned oscillator circuit is described which sweeps the output signal frequency linearly exponentially varying with time.

B64-10330  
ECONOMICAL FABRICATION PROCESS PRODUCES HIGH-QUALITY JUNCTION TRANSISTORS  
INNOVATOR NOT GIVEN /IBM/ DEC. 1964  
JPL-SC-065

A convenient, three-step fabrication process, with a p-type layer of gallium arsenide vapor-deposited on a starting wafer of germanium, is used to produce heterojunction-homojunction p-n-p transistors. These are of high quality with good injection efficiency and low capacitance.

B64-10349  
BANDWIDTH SWITCHING IS TRANSIENT-FREE, AVOIDS LOSS OF LOOP LOCK  
INNOVATOR NOT GIVEN /SPACE TECHNOL. LABS./ DEC. 1964  
WOO-054

A circuit, in a wide bandwidth mode, overcomes transient-producing capacitance switching by maintaining an equivalent voltage at all times. Bandwidth switching may be done at any time, and integrity of the loop lock is maintained.

B65-10001  
CIRCUIT CONVERTS AM SIGNALS TO FM FOR MAGNETIC RECORDING  
INNOVATOR NOT GIVEN /RCA/ JAN. 1965  
GSFC-227

Convert AM signals to FM for magnetic recording by relaxation-type voltage-controlled oscillator /VCO/. This circuit may be used in radar, telemetry, and test equipment.

B65-10002  
TUNNEL-DIODE CIRCUIT FEATURES ZERO-LEVEL CLIPPING  
BUSH, E. G. JAN. 1965  
GSFC-241

Tunnel-diode circuit starts clipping action as input voltage crosses zero axis. This clipper circuit is effective as limiter in FM receiver.

B65-10005  
COMPUTER MODIFICATION REDUCES TIME OF PERFORMING ITERATIVE DIVISION  
INNOVATOR NOT GIVEN /IBM/ FEB. 1965  
M-FS-166

Time reduction in performing iterative division results from using a serial-by-parallel divider employing a look-ahead feature that predetermines the sign relationships of several iterations before the computer cycle begins. This method can be employed in any data handling system performing high-speed division.

B65-10006  
MODIFICATION INCREASES LIGHT OUTPUT OF INJECTION-LUMINESCENT DIODES  
INNOVATOR NOT GIVEN /RCA/ JAN. 1965 SEE ALSO  
B64-10283  
M-FS-192

Removing a section of the electrode area from the N-face of injection-luminescent diodes for pumping lasers substantially increases light output. Light is emitted from the N-face as well



as from the four edges of the diode.

**B65-10010**  
INEXPENSIVE, STABLE CIRCUIT MEASURES HEART RATE  
VICK, H. A. JAN. 1965  
MSC-95

Inexpensive transistorized circuit provides reliable analog indications of heart rate in response to preamplified electrocardiograph signal applied to its input.

**B65-10011**  
CIRCUIT IMPROVEMENT PRODUCES MONOSTABLE MULTIVIBRATOR WITH LOAD-CARRYING CAPABILITY  
GOLDMAN, N. E. SCHAFFERT, J. C. JAN. 1965  
GSFC-34A

Improved circuit provides greater reliability and load-carrying capabilities for monostable multivibrator.

**B65-10012**  
HELICAL COAXIAL-RESONATOR MAKES EXCELLENT RF FILTER  
INNOVATOR NOT GIVEN /RCA/ JAN. 1965 1965  
GSFC-243

Isolation of closely spaced transmitting and receiving frequencies of an antenna without insertion loss by filtering the receiver input is accomplished by an inner conductor with two winding helices and an outer conductor of aluminum. A tuning slug is at either end of the inner conductor form.

**B65-10013**  
ZENER DIODE FUNCTION GENERATOR REQUIRES NO EXTERNAL REFERENCE VOLTAGE  
BOLTE, G. BURNS, R. JAN. 1965  
JPL-33

Function generator utilizing parallel impedance networks with zener diodes produces functions which are discontinuous in slope. The function generated appears at the output of the parallel network in the form of a voltage varying in time.

**B65-10018**  
CARBON ARC IGNITION IMPROVED BY SIMPLE AUXILIARY CIRCUIT  
INNOVATOR NOT GIVEN /RCA/ JAN. 1965  
MSC-103

High voltage, low current pulse in series with arc power supply efficiently ignites a carbon arc. The easily and economically produced circuit is useful with arc burners and searchlights and with plasma jets.

**B65-10023**  
MINIATURE STRESS TRANSDUCER HAS DIRECTIONAL CAPABILITY  
SAN MIGUEL, A. SILVER, R. H. JAN. 1965  
JPL-591

Miniature stress transducer uses a semi-conductive piezoresistive element to detect stress only on specific axes. Measurement of internal mass stress is based on the compressive deformation of the transducer. The device is applicable to constant stress monitoring in building and dam structural parts.

**B65-10025**  
LOGIC REDUNDANCY IMPROVES DIGITAL SYSTEM RELIABILITY  
INNOVATOR NOT GIVEN /STANFORD RES. INST./ FEB. 1965  
JPL-SC-069

Redundant-channel system automatically corrects any single error in a set of three binary signal channels. This system is especially applicable to digital computers where data is transmitted in parallel channels.

**B65-10026**  
STEPPING MOTOR DRIVE CIRCUIT DESIGNED FOR LOW POWER DRAIN  
INNOVATOR NOT GIVEN /HARVARD COLL./ FEB. 1965  
GSFC-198

High power drain is eliminated by a circuit consisting of a divide-by-two stage, two identical inputs, a wiggle amplifier, driver, and power

output stages to drive the step motor.

**B65-10028**  
TRANSISTOR VOLTAGE COMPARATOR PERFORMS OWN SENSING  
CLIFF, R. A. FEB. 1965  
GSFC-228

Detection of the highest voltage input among a group of varying voltage inputs is accomplished by a transistorized voltage comparison circuit. The collector circuits of the transistors perform the sensing function. Input voltage levels are governed by the transistors.

**B65-10030**  
LIBRARY OF DOCUMENTS COMPRESSED INTO LAP-HELD DISPLAY KIT  
INNOVATOR NOT GIVEN /NATL. CASH REGISTER CO./ FEB. 1965  
MSC-125

A lightweight Apollo flight kit containing microfilmed data is packaged in a hinged box with a viewing screen cover, and a writing surface. It is secured to the users lap.

**B65-10033**  
PHOTOELECTRIC SEMICONDUCTOR SWITCH OPERATES WITH LOW LEVEL INPUTS  
INNOVATOR NOT GIVEN /IBM/ FEB. 1965  
JPL-SC-068

Photoelectric semiconductor switch with a buried emitter region avoids high-leakage currents across the emitter. It exhibits high emitter-to-collector transport efficiency beta at low signal levels.

**B65-10041**  
PULSE HEIGHT ANALYZER OPERATES AT HIGH REPETITION RATES, LOW POWER  
INNOVATOR NOT GIVEN /SPACE TECHNOL. LABS., INC./ FEB. 1965  
WQO-046

Simple multistage transistor gating circuit provides a pulse height analyzer that operates at high repetition rates and low power. The circuit compares the input pulse heights to discrete reference voltages.

**B65-10045**  
THERMISTOR CONNECTOR ASSEMBLY INCREASES ACCURACY OF MEASUREMENTS  
INNOVATOR NOT GIVEN /ATLANTIC RES. CORP./ FEB. 1965  
LANGLEY-62

Isolation of the thermistor from spurious heat transfer for accurately measuring ambient air temperatures is accomplished by a mounting consisting of a transparent plastic film bonded to a U-shaped phenolic board with depositions of aluminum on each face and upper edge, and a variable capacitor for fine tuning.

**B65-10047**  
CIRCUIT DETECTS ERRORS IN ADDRESS CURRENTS FOR MAGNETIC CORE ARRAYS  
INNOVATOR NOT GIVEN /IBM/ FEB. 1965  
M-FS-234

Address current error detector generates a signal whenever any error producing conditions arise in magnetic core arrays. Can be used with test equipment and memory storage units.

**B65-10048**  
MICROPARTICLE IMPACT SENSOR MEASURES ENERGY DIRECTLY  
ALEXANDER, W. M. BERG, O. E. FEB. 1965  
GSFC-252

Construction of a capacitor sensor consisting of a dielectric layer between two conductive surface layers and connected across a potential source through a sensing resistor permits measurement of energy of impinging particles without degradation of sensitivity. A measurable response is produced without penetration of the dielectric layer.

**B65-10050**  
NULLING PYROMETER USES KERR CELL SHUTTER FOR FAST RESPONSE  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./

FEB. 1965  
NU-0010

Conventional pyrometer, in which Kerr cell replaces mechanical shutter and polarizers are added to filters, yields rapid shutter response.

B65-10051  
METAL SHEATH IMPROVES THERMOCOUPLE USING GRAPHITE IN ONE LEG  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
FEB. 1965  
NU-0011

Thermocouple using graphite in one leg is sealed in a moistureproof metal sheath which permits high EMF output and good mechanical strength.

B65-10052  
ZENER DIODE IS STARTER FOR TRANSISTOR-REGULATED POWER SUPPLY  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
FEB. 1965  
NU-0015

Zener diode in parallel with a silicon transistor supplies the starting current for a transistor-regulated power supply.

B65-10054  
PULSE GENERATOR PERMITS NONDESTRUCTIVE TESTING OF COMPONENT BREAKDOWN VOLTAGE  
INNOVATOR NOT GIVEN /HONEYWELL/ MAR. 1965  
MSC-122

Nondestructive testing of the breakdown voltage of transistors and other electronic components is achieved by a simple relay circuit. The circuit operates by applying low-energy, high-voltage microsecond pulses to the components under test.

B65-10055  
FM OSCILLATOR USES TETRODE TRANSISTOR  
BOENSEL, D. W. MAR. 1965  
JPL-82

Tetrode-driven crystal oscillator achieves large frequency variations for a given input signal. Frequency control is obtained by variation of the second base current of the tetrode.

B65-10056  
VIBRATING-MEMBRANE ELECTROMETER HAS HIGH CONVERSION GAIN  
COON, G. W. DIMEFF, J. APR. 1965  
ARC-38

Vibrating-membrane transducer in a circuit can measure current below 10 to-the-minus 17 ampere. This electrometer has a high conversion gain and a minimum internal power consumption.

B65-10057  
FEED-THROUGH HAS POLYTERMINAL FEATURE  
SANDERS, L. H. MAR. 1965  
M-FS-25

Feed-through connector with individual solder pots in the polyterminal side provides good connections with small amounts of solder and permits visual inspection of bonds. Polyterminal also provides a friction mechanical bond to position conductors prior to soldering.

B65-10059  
METAL DIAPHRAGM USED TO CALIBRATE MINIATURE TRANSDUCERS  
INNOVATOR NOT GIVEN /ASTRO-SPACE LABS./ MAR. 1965  
M-FS-207

Dynamic comparative calibration system measures response of miniature pressure transducers. The system is composed of an electromechanically driven metal diaphragm, a calibrated and an uncalibrated transducer and an oscillator.

B65-10061  
SIMPLE CONTROL DEVICE SENSES SOLAR POSITION  
LONBORG, J. O. RANDALL, J. C. MAR. 1965  
JPL-638

The amount of solar radiation incident on a specially prepared bimetallic strip is simply and reliably controlled by a light valve. This device is valuable for systems requiring temperature regulation.

B65-10062  
PULSED PLASMA ACCELERATOR OPERATES REPETITIVELY WITHOUT COMPLEX CONTROLS  
SABOL, A. P. MAR. 1965  
LANGLEY-48

Self-repeating pulsed plasma accelerator operates with a wide variety of gases over a large range of pressures without complex control equipment. The accelerator combines a circular channel with a tangential channel at the entrance way of a high-velocity gas.

B65-10066  
FUEL CELL SERVES AS OXYGEN LEVEL DETECTOR  
INNOVATOR NOT GIVEN /GE/ MAR. 1965  
JPL-SC-072

Monitoring the oxygen level in the air is accomplished by a fuel cell detector whose voltage output is proportional to the partial pressure of oxygen in the sampled gas. The relationship between output voltage and partial pressure of oxygen can be calibrated.

B65-10067  
SENSITIVE LEVEL SENSOR MADE WITH SPIRIT LEVEL, GIVES ELECTRICAL OUTPUT  
BRYANT, E. L. MAR. 1965  
LANGLEY-49

Sensor incorporating a circular spirit level, electrical lamp and two pairs of photocells, provides an electrical indication of flat surface level deviation.

B65-10068  
AUTOMATIC THERMAL SWITCH ACCELERATES COOLING-DOWN OF CRYOGENIC SYSTEM  
WIEBE, E. R. MAR. 1965  
JPL-655

Automatic switch uses short stainless steel tube with copper heat sinks to accelerate helium gas cooling and provides good thermal conductivity and good thermal insulation.

B65-10069  
FEEDBACK OSCILLATOR FUNCTIONS AS LOW-LEVEL PULSE STRETCHER  
INNOVATOR NOT GIVEN /SPERRY RAND CORP./ MAR. 1965  
GSFC-261

Low trigger pulses of the pulse stretcher circuit are obtained by forward biasing the transistor oscillator. The loop gain is kept below unity and prevents free-running oscillation. Two parallel feedback loops improve the stretching capabilities.

B65-10072  
SYNCHRONIZED PULSE GENERATOR NEEDS NO EXTERNAL POWER  
CANCRO, C. A. JANNICHE, P. J., JR. MAR. 1965  
GSFC-274

Simple circuit with high input and low output impedance generates a fast rise-time pulse synchronized with an input pulse of slower rise and fall times. Circuit requires no external power.

B65-10073  
SYSTEM MEASURES ANGULAR DISPLACEMENT WITHOUT CONTACT  
DAVIS, W. T. MAR. 1965  
LANGLEY-46

Optic system coupled to an electronic detection and measuring system converts angular movement of reflected light to a direct readout, without any direct contact with the object.

B65-10076  
LIGHT-SENSITIVE POTENTIOMETER MEASURES PRODUCT OF TWO VARIABLES  
HAERTSCH, O. C. MAR. 1965  
GSFC-240

The output voltage from a photoconductive potentiometer circuit using a galvanometer mirror reflecting the light beam is directly proportional to the product of the input voltage.

B65-10079  
PHOTOELECTRIC SENSOR OUTPUT CONTROLLED BY EYEBALL MOVEMENTS

INNOVATOR NOT GIVEN /SPACO/ MAR. 1965  
M-FS-274

The difference between the infrared absorption of the iris and infrared reflectivity of the eyeball controls the operation of a device consisting of an infrared source and amplifier, a cadmium selenide infrared sensor, and an infrared filter.

B65-10080  
PHASE DETECTOR CIRCUIT SYNTHESIZES OWN  
REFERENCE SIGNAL  
INNOVATOR NOT GIVEN /FAIRCHILD STRATOS CORP./  
MAR. 1965  
M-FS-247

Circuit with isolation amplifier connected to a frequency multiplier and synchronous phase detector synthesizes the phase reference signal from the phase modulated input signal.

B65-10085  
TRANSDUCER SENSES DISPLACEMENTS OF PANELS  
SUBJECTED TO VIBRATION  
PEA, R. O. MAR. 1965  
ARC-37

Inductive vibration sensor measures the surface displacement of nonferrous metal panels subjected to vibration or flutter. This transducer does not make any physical contact with the test panel when measuring.

B65-10086  
SYSTEM SELECTS FRAMING RATE FOR SPECTROGRAPH  
CAMERA  
INNOVATOR NOT GIVEN /AM. OPT. CO./ MAR. 1965  
LANGLEY-55

Circuit using zero-order light is reflected to a photomultiplier in the spectrograph monitors incoming radiation to provide an error signal which controls the advancing and driving rate of the film through the camera.

B65-10087  
APPARATUS MEASURES SWELLING OF MEMBRANES IN  
ELECTROCHEMICAL CELLS  
HENNIGAN, T. J. APR. 1965  
GSFC-280

Apparatus consisting of a pressure plate unit, four springs of known spring constant and a micrometer measures the swelling and force exerted by the polymer membranes of alkaline electrochemical cells.

B65-10089  
TRANSDUCER MEASURES TEMPERATURE DIFFERENTIALS  
IN PRESENCE OF STRONG ELECTROMAGNETIC FIELDS  
APR. 1965  
ARC-27

Measurement of temperature rise of cooling water under pressure and in strong electromagnetic fields is accomplished by a transducer using a magnetically shielded thermocouple arrangement. The thermocouple junctions are immersed in oil to isolate them from electric currents in the water.

B65-10091  
SIMULATOR PRODUCES PHYSIOLOGICAL WAVEFORMS  
EKEROOT, S. MAR. 1965  
MSC-94

Physiological waveform simulator capable of producing signals to simulate an axillary and a sternal electrocardiogram, blood pressure, respiratory rate and body temperature. This may be used to check out bioinstrumentation.

B65-10093  
COMPUTER PROGRAMS SIMPLIFY OPTICAL SYSTEM  
ANALYSIS  
INNOVATOR NOT GIVEN /HONEYWELL/ APR. 1965  
GSFC-306

The optical ray-trace computer program performs geometrical ray tracing. The energy-trace program calculates the relative monochromatic flux density on a specific target area. This program uses the ray-trace program as a subroutine to generate a representation of the optical system.

B65-10096  
DIGITAL SYSTEM ACCURATELY CONTROLS VELOCITY  
OF ELECTROMECHANICAL DRIVE

NICHOLS, G. B. APR. 1965  
GSFC-287

Digital circuit accurately regulates electromechanical drive mechanism velocity. The gain and phase characteristics of digital circuits are relatively unimportant. Control accuracy depends only on the stability of the input signal frequency.

B65-10097  
VARIABLE VOLTAGE SUPPLY USES ZENER DIODE AS  
REFERENCE  
KLEINBERG, L. L. LAVIGNE, R. C. APR. 1965  
GSFC-262

Using a zener diode as the reference element, a simple transistorized circuit provides a stable variable reference voltage.

B65-10102  
SIMPLE CIRCUIT FUNCTIONS AS FREQUENCY  
DISCRIMINATOR FOR PFM SIGNALS  
BILLINGSLEY, J. APR. 1965  
GSFC-267

Simple circuit monitors the frequency of PFM /pulse frequency modulated/ telemetry signals. This discriminator can be used as a constant current integrator in such circuits as linear sweep and time delay.

B65-10103  
IMPROVED MAGNETOMETER USES TOROIDAL GATING  
COIL  
INNOVATOR NOT GIVEN /CORNELL UNIV./ APR. 1965  
GSFC-249

Improved magnetometer employs a cylindrical, high permeability magnetic core with a toroidal gating coil and a solenoid pickup coil. Flux interaction can be reduced by electrostatically shielding the pickup coil from the gating coil. The magnetometer principle can be applied to navigation devices.

B65-10105  
VARIABLE LOAD AUTOMATICALLY TESTS DC POWER  
SUPPLIES  
BURKE, H. C., JR. SULLIVAN, R. M. APR. 1965  
GSFC-291

Continuously variable load automatically tests dc power supplies over an extended current range. External meters monitor current and voltage, and multipliers at the outputs facilitate plotting the power curve of the unit.

B65-10108  
MAGNETIC FIELD CONTROLS CARBON ARC TAIL FLAME  
INNOVATOR NOT GIVEN /RCA/ APR. 1965  
MSC-139

Polarity of two electromagnets placed near the exhaust flue cancels out a high carbon-arc field. The arc tail flame is correctly drawn to the exhaust flue and contamination is diverted. This device should reduce maintenance cycles on any arc-powered illuminator.

B65-10112  
UNIUNCTION FREQUENCY DIVIDER IS FREE OF  
BACKWARD LOADING  
FAIRBANKS, A. F. APR. 1965  
JPL-WOO-010

Simple frequency divider composed of relaxation oscillators uses unijunction transistors to reduce backward loading to a minimum. This circuit design is applicable in timing devices and sync generators for television systems.

B65-10118  
TRANSISTORIZED CIRCUIT CLAMPS VOLTAGE WITH  
0.1 PERCENT ERROR  
INNOVATOR NOT GIVEN /RCA/ APR. 1965  
GSFC-196

Transistorized clamping circuit clamps either of two voltage levels to input of digital-to-analog resistive matrix with 0.1 percent error. Clamping circuit technique has analog, digital, and hybrid circuit applications.

B65-10119  
VARIABLE FREQUENCY TRANSISTOR INVERTERS USE  
MULTIPLE CORE TRANSFORMERS

INNOVATOR NOT GIVEN /DUKE UNIV./ APR. 1965  
GSFC-183

Magnetic-coupled multivibrators containing two or more square-loop cores with multiple windings in a single transformer package, provide indirect frequency control and improved operational characteristics. This multivibrator can be used for power oscillators, nonlinear magnetic circuitry and telemetry circuits.

B65-10120  
MULTIPLE TEST TUBES STIRRED MECHANICALLY  
LEON, H. J. STRONG, I. J. APR. 1965  
ARC-42

Mechanical device simultaneously stirs multiple test tubes under controlled laboratory conditions. The invention provides a variable stirring rate, minimal amount of contamination of tube contents, unattended and simple operation, and easy maintenance and cleaning.

B65-10123  
EFFICIENT THIN FILM HEATING ELEMENT TAKES MINIMUM SPACE  
BUSCH, A. H. APR. 1965  
GSFC-289

Light, thin-film heating element is formed by vacuum deposition of metal onto a nonconductive surface to be heated. This small-sized heater has a very fast response time.

B65-10124  
VARIABLE FREQUENCY MAGNETIC MULTIVIBRATOR GENERATES STABLE SQUARE-WAVE OUTPUT  
PAULL, S. MAY 1965  
GSFC-AE-21

Variable frequency magnetic multivibrator operates in a full wave fashion to provide a stable square wave output over wide variations in temperature and power supply potential. This invention is applicable in clocks and control devices.

B65-10125  
SIMPLIFIED ELECTROMETER HAS EXCELLENT OPERATING CHARACTERISTICS  
BRANTNER, R. E. MAY 1965  
JPL-413

Simplified and improved electrometer circuit provides high-input impedance, stability of gain and operating point, linear response, and low power requirements.

B65-10127  
TRAVELING-WAVE TUBE CIRCUIT SIMPLIFIES MICROWAVE RELAY  
ALLEN, W. K. IPPOLITO, L. J. NACE, D. A. MAY 1965  
GSFC-299

Circuit with a sawtooth-modulated traveling-wave tube, which acts as a frequency converter and as an amplifier, simplifies microwave transmission. Lower power losses and reduced size and weight are also realized in this circuit.

B65-10128  
PIEZORESISTIVE GAGE TESTS PIN-CONNECTOR SOCKETS  
BOND, W. W. MAY 1965  
JPL-675

Connector pin consisting of a piezoresistive crystal, retainer spring and a bridge circuit with voltmeter is used to test connector sockets and may be adapted for multiple socket testing.

B65-10137  
INSTRUMENT CALIBRATES LOW GAS-RATE FLOWMETERS  
COPELAND, A. C. FULTON, W. C. SMITHER, M. A. MAY 1965  
MSC-134

Electronically measuring the transit time of a soap bubble carried by the gas stream between two fixed points in a burette calibrates flowmeters used for measuring low gas-flow rates.

B65-10138  
HIGH-GAIN AMPLIFIER HAS EXCELLENT STABILITY AND LOW POWER CONSUMPTION  
KLEINBERG, L. L. MAY 1965  
GSFC-272

Transistorized amplifier, in which an external reference voltage controls gain, combines high gain with stability and low power consumption. This circuit is useful in electronic servo and portable audio equipment.

B65-10139  
SPHERICAL ELECTRODE ELIMINATES HIGH-VOLTAGE BREAKDOWN  
FINKE, R. C. VETRONE, R. H. MAY 1965  
LEWIS-155

Spherical electrodes surrounding electrode-dielectric junctions eliminate high-voltage breakdown. The gap between the spherical electrode and the dielectric must be of an optimum size for proper operation. Modified, this electrode should be suitable as a high-voltage feedthrough between various liquid and gaseous media.

B65-10142  
AUXILIARY CIRCUIT ENABLES AUTOMATIC MONITORING OF EKG'S  
INNOVATOR NOT GIVEN /TEX. INST. FOR REHABILITATION AND RES./ MAY 1965 SEE ALSO B65-10143 AND B65-10010  
MSC-106

Auxiliary circuits allow direct, automatic monitoring of electrocardiograms by digital computers. One noiseless square-wave output signal for each trigger pulse from an electrocardiogram preamplifier is produced. The circuit also permits automatic processing of cardiovascular data from analog tapes.

B65-10143  
DIGITAL-OUTPUT CARDIOTACHOMETER MEASURES RAPID CHANGES IN HEARTBEAT RATE  
VICK, H. MAY 1965 SEE ALSO B65-10010 AND B65-10142  
MSC-133

Cardiotachometer circuits produce an output voltage proportional to the heartbeat rate on a beat-by-beat basis. This is less complex and less costly than the digital cardiometers.

B65-10145  
LOGARITHMIC AMPLIFIER USES FIELD EFFECT TRANSISTORS  
STEWART, J. L. MAY 1965  
JPL-509

Solid-state amplifier utilizes field effect transistors and planar junction diodes to provide a logarithmic response to a wide range of input signals.

B65-10146  
FREQUENCY OFFSET IN LINEAR FM/CW TRANSPONDER ELIMINATES CLUTTER  
INNOVATOR NOT GIVEN /MELPAR/ MAY 1965  
M-FS-249

Clutter is eliminated by offsetting the frequency of a transponder signal with respect to an interrogation signal. This improves the tracking of aircraft and spacecraft by FM/CW transponders.

B65-10151  
ROTOR POSITION SENSOR SWITCHES CURRENTS IN BRUSHLESS DC MOTORS  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ MAY 1965  
GSFC-315

Reluctance switch incorporated in an induction motor is used for sensing rotor position and switching armature circuits in a brushless dc motor. This device drives the solar array system of an unmanned space satellite.

B65-10152  
CIRCUIT REDUCES DISTORTION OF FM MODULATOR  
INNOVATOR NOT GIVEN /RCA/ MAY 1965  
GSFC-257

Correction circuit improves the linearity of a voltage-variable capacitor used to modulate a free-running oscillator. This improvement only applies to audio frequency modulation and will not correct for slowly varying dc input in some telemetry systems.

B65-10158

LASER BEAM TRANSMITS ELECTRIC POWER  
INNOVATOR NOT GIVEN /RCA/ JUN. 1965  
GSFC-293

Semiconductor laser beam supplies sustained level of electrical power to remote location not served by conventional conductors. This system would be useful where transmission of energy is critical, such as in nuclear reactors, or other hazardous environments.

B65-10159

SOLID-STATE SWITCHING USED TO SPEED UP  
CAPACITIVE INTEGRATOR  
NEWCOMB, A. L., JR. JUN. 1965  
LANGLEY-104

Capacitive integrator circuit using silicon controlled switches /SCS/ insures output voltage linearly proportional to input pulse width. This circuit provides high input impedance and relatively low output impedance.

B65-10161

INTERFEROMETER COMBINES LASER LIGHT SOURCE  
AND DIGITAL COUNTING SYSTEM  
INNOVATOR NOT GIVEN /MIT/ JUN. 1965  
MSC-151

Measurement of small linear displacements in digital readouts with extreme accuracy and sensitivity is achieved by an interferometer. The instrument combines a digital electro-optical fringe-counting system and a laser light source.

B65-10165

SUPERCONDUCTOR MAGNETS USED FOR STAGGER-TUNING  
TRAVELING-WAVE MASER  
INNOVATOR NOT GIVEN /RCA/ JUN. 1965  
GSFC-292

Superconducting materials reduce size and weight of magnets used for stagger-tuning individual traveling-wave maser crystals. The invention is useful in microwave communication systems requiring a high information rate.

B65-10169

PHASE SHIFT FREQUENCY SYNTHESIZER IS  
EFFICIENT, SMALL IN SIZE  
INNOVATOR NOT GIVEN /SPACE TECHNOL. LABS./ JUN. 1965  
M-FS-250

Phase shift frequency synthesizer produces suppressed-carrier signals at the sum and difference frequencies. All unwanted frequencies are suppressed by this small-sized synthesizer.

B65-10178

DC TO AC CONVERTER OPERATES EFFICIENTLY AT LOW  
INPUT VOLTAGES  
INNOVATOR NOT GIVEN /DUKE UNIV./ JUN. 1965  
GSFC-130

Self-oscillating dc to ac converter with transistor switching to produce a square wave output is used for low and high voltage power sources. The converter has a high efficiency throughout a wide range of loads.

B65-10182

FORCE CONTROLLED SOLENOID DRIVES MICROWELD  
TESTER  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1965  
WOO-125

Solenoid-driven device tests the integrity of a microweld joint between an electronic component lead wire and a wire ribbon by applying tension stress to the joint. Variable measured force is provided when either destructive or nondestructive testing is performed.

B65-10183

MODIFIED INTERELEMENT SPACING IMPROVES YAGI  
ANTENNA ARRAY  
BECK, F. B. JUN. 1965  
LANGLEY-130

Symmetrical antenna array is designed by adjusting the Yagi disk interelement spacing so that the grating lobe of the array factor coincides with the first sidelobe of the element pattern.

B65-10184

PRESSURE SENSOR RESPONDS ONLY TO SHOCK WAVE  
INNOVATOR NOT GIVEN /BOEING CO./ JUN. 1965

M-FS-238

Pressure sensor responds only to high pressure crest of a shock wave, and will not respond to conditions of overpressure. The sensor uses plates of a battery to produce voltage output used to actuate an alarm signal or crew escape system.

B65-10187

CRYSTAL MEASURES-SHORT TERM, LARGE-MAGNITUDE  
FORCES  
PFEIFFER, C. G. JUN. 1965  
JPL-77

By using the magnitude of piezoelectric crystal response to distortion and compression, this device measures transient accelerations and their rate of change. The invention could be used in a servo control system by supplementing the accelerometer and taking over its function when its range was exceeded.

B65-10193

LOGIC CIRCUIT EXHIBITS OPTIMUM PERFORMANCE  
HUSSON, C. JUN. 1965  
LANGLEY-129

Performance of circuits are compared to determine the optimum circuit configuration for implementation into microelectronic functions. Comparison is made in terms of power drain, propagation time, and component variations with temperature and load.

B65-10194

ANALOG-TO-DIGITAL CONVERTER HAS INCREASED  
RELIABILITY AND REDUCED POWER CONSUMPTION  
THORNWALL, J. C. JUN. 1965  
GSFC-246

Eight-bit analog-to-digital converter decreases average power consumption and increases component reliability. The converter uses solid-state components in pulse operation and magnetic core components for minimizing power consumption. The magnetic core components also increase reliability.

B65-10195

DEVICE MEASURES FLUID DRAG ON TEST VEHICLES  
FREEMAN, R. JUDD, J. H. LEISS, A. JUN. 1965  
LANGLEY-34

Electromechanical drag balance device measures the aerodynamic drag force acting on a vehicle as it moves through the atmosphere and telemeters the data to a remote receiving station. This device is also used for testing the hydrodynamic drag characteristics of underwater vehicles.

B65-10196

INEXPENSIVE ELECTRICAL CONNECTOR IS MOISTURE  
AND CORROSIONPROOF  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1965  
MSC-164

Compression-sealed electrical connector made principally of plastic components is used in a corrosive atmosphere. This inexpensive and moistureproof connector can be modified to provide a multiple-pin connector.

B65-10197

IMPROVED SOLDERLESS CONNECTOR IS EASILY  
DISCONNECTED  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ JUN. 1965  
JPL-SC-060

Compression type solderless connector is easily disconnected and reassembled and resists vibration. The connector, which uses a tapered, split sleeve that is tightened by a nut into a mating bug, is used in place of standard solder lugs and to connect unsolderable wire.

B65-10199

MODULAR THERMOELECTRIC CELL IS EASILY PACKAGED  
IN VARIOUS ARRAYS  
EPSTEIN, J. JUN. 1965  
GSFC-339

Modular thermoelectric cells are easily packaged in various arrays to form power supplies have desirable voltage and current output characteristics. The cells employ two pairs of

thermoelectric elements, each pair being connected in parallel between two sets of aluminum plates. They can be used as solar energy conversion devices.

**B65-10200**  
DENSITY TRACE MADE WITH COMPUTER PRINTOUT  
WILSON, M. JUN. 1965  
GSFC-322

Special drum for a computer-controlled printer improves density trace of scientific data. The drum provides uniformly shaped characters and evenly spaced variations of print density that precisely reflect data magnitude. This device plots temperature profiles, geographic contours, pressure gradients, electric potential gradients, and magnetic field configurations.

**B65-10202**  
QUICK-DISCONNECT COUPLING SAFE TRANSFER OF  
HAZARDOUS FLUIDS  
DEWITT, R. L. SCHMIDT, H. W. JUN. 1965  
LEWIS-125

Quick-disconnect coupling is used for uncoupling of plumbing during ground-to-vehicle transfer of cryogenic and hazardous fluids. The coupling allows remote positive control of liquid pressure and flow during the transfer operation, remote connection and separation capabilities, and negligible liquid spillage upon disconnection.

**B65-10203**  
TINY BIOMEDICAL AMPLIFIER COMBINES HIGH  
PERFORMANCE, LOW POWER DRAIN  
DEBOD, G. J. JUL. 1965  
ARC-41

Transistorized, portable, high performance amplifier with low power drain facilitates biomedical studies on mobile subjects. This device, which utilizes a differential input to obtain a common-mode rejection, is used for amplifying electrocardiogram and electromyogram signals.

**B65-10204**  
VOLTAGE VARIABLE OSCILLATOR HAS HIGH PHASE  
STABILITY  
HEARN, C. P. JUL. 1965  
LANGLEY-123

Two or more series RLC circuits are used with a negative feedback amplifier to make a voltage variable oscillator. This combination results in high phase stability and optimum frequency modulation.

**B65-10206**  
SENSITIVE ELECTROMETER FEATURES DIGITAL  
OUTPUT  
DOONG, H. JUL. 1965  
GSFC-288

Four-stage transistorized electrometer eliminates the need for a logarithmic compression network. It measures very low currents and produces a digital output directly indicative of the input current magnitude.

**B65-10208**  
HYBRID COMPUTER TECHNIQUE YIELDS RANDOM  
SIGNAL PROBABILITY DISTRIBUTIONS  
CAMERON, W. D. JUL. 1965  
ARC-34

Hybrid computer determines the probability distributions of instantaneous and peak amplitudes of random signals. This combined digital and analog computer system reduces the errors and delays of manual data analysis.

**B65-10209**  
OSCILLATOR CIRCUIT MEASURES LIQUID LEVEL IN  
TANKS  
INNOVATOR NOT GIVEN /IBM/ JUL. 1965  
M-FS-245

Oscillator circuits automatically measure the liquid level in tanks. The circuit employs a twin transmission line as a liquid level probe.

**B65-10212**  
DETECTOR CIRCUIT COMPENSATES FOR VIDICON BEAM  
CURRENT VARIATIONS

INNOVATOR NOT GIVEN /RCA/ JUL. 1965  
GSFC-310

Signal detector circuit compensates for black level shifts in vidicons by dark current cancellation. It clamps the video signal to the dark current component of the signal. The device also compensates for background noise variation or transducer bias fluctuations in other repetitive pulse systems.

**B65-10213**  
MULTIAXIAL ANALYZER DETECTS LOW-ENERGY  
ELECTRONS  
LIND, D. L. OGILVIE, K. W. WILKERSON, T. D.  
JUL. 1965  
GSFC-329

Three curved plate energy analyzers coupled with three electron multiplier tubes detect and measure low energy electron flux in several directions simultaneously.

**B65-10215**  
ELECTRICAL PROBE ENSURES RELIABLE CONTACT IN  
SOCKET  
INNOVATOR NOT GIVEN /IBM/ JUL. 1965  
M-FS-315

Spring-loaded probe makes a reliable electrical contact by producing a circular wiping motion at the tip when inserted into a mating socket.

**B65-10218**  
GRAPHITE ELEMENT SERVES AS RADIANT HEAT SOURCE  
JUL. 1965  
M-FS-105

Radiators using a graphite heating element as a radiant heat source have high heat flux and long operational lives. They are used to test the thermal resistance of materials.

**B65-10221**  
INSTRUMENT ACCURATELY MEASURES EXTREMELY LOW  
AIR DENSITIES  
INNOVATOR NOT GIVEN /ELECTRO-OPTICAL SYSTEMS/  
AUG. 1965  
M-FS-193

Gauge accurately measures low air densities in high-vacuum systems. It relies on the detection of near-visible light radiated from nitrogen molecules present in the system.

**B65-10223**  
VOLTAGE CONTROLLED OSCILLATOR IS EASILY  
ALIGNED, HAS LOW PHASE NOISE  
SYDNOR, R. L. AUG. 1965  
JPL-510

Voltage controlled oscillator (VCO), represented by an equivalent RF circuit, is easily adjusted for optimum performance by varying the circuit parameter. It contains a crystal drive level which is also easily adjusted to obtain minimum phase noise.

**B65-10225**  
SIMPLE BCD CIRCUIT ACCURATELY COUNTS TO 24  
SPAFFORD, M. L. AUG. 1965  
GSFC-317

Ripple-through counter with divide-by-24 output pulse is used in digital control clocks to register hours and give a daily output signal. It uses commercially available digital modules that incorporate AND/gates with flip-flops.

**B65-10226**  
MAGNETIC-SHIFT-REGISTER CIRCUIT CONTROLS STEP  
MOTOR OPERATIONS  
VEILLETTE, L. J. AUG. 1965  
GSFC-340

Magnetic-shift-register circuit controls bidirectional operations of a phase-pulsed step motor. The circuit draws no power in standby, is nonregenerative, and is insensitive to switching transients.

**B65-10228**  
SIMPLE CIRCUIT PRODUCES HIGH-SPEED, FIXED  
DURATION PULSES  
GARAHAN, M. M. AUG. 1965  
GSFC-285

Circuit generates an output pulse of fixed width

from a variable width input pulse. The circuit consists of a tunnel diode in parallel with an inductance driven by a constant current generator. It is used for pulsed communication equipment design.

**B65-10232**  
FIELD EFFECT TRANSISTOR PRESENTS HIGH INPUT IMPEDANCE IN AC AMPLIFIER  
MARSHALL, J. H. AUG. 1965  
JPL-500

Four-stage transistorized ac amplifier provides high input impedance and operates at low intrinsic noise levels. It is suited to carrier or narrow band sine wave applications.

**B65-10233**  
HIGH-SPEED SQUARE-WAVE CURRENT LIMITER OPERATES EFFICIENTLY  
INNOVATOR NOT GIVEN /LABKO SCI./ AUG. 1965  
JPL-SC-073

Transistorized high speed circuit limits currents from a square-wave ac power supply. The current limiter resets after each half cycle of the square wave and thus minimizes power losses.

**B65-10234**  
SIMPLE CIRCUIT REDUCES TRANSISTOR SWITCHING TIME  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ AUG. 1965  
GSFC-314

Silicon-controlled rectifier /SCR/, gated by a voltage divider, controls the potentiometer in transistorized switching circuits. The SCR acts as a gate to trigger the switching transistor only when the input signal reaches an amplitude that will switch the transistor rapidly.

**B65-10237**  
BRUSHLESS DC MOTOR USES ELECTRON BEAM SWITCHING TUBE AS COMMUTATOR  
STUDER, P. AUG. 1965  
GSFC-345

Electron beam switching tube eliminates physical contact between rotor and stator in brushless dc motor. The tube and associated circuitry control the output of a dc source to sequentially energize the motor stator windings.

**B65-10238**  
SOLID-STATE LASER TRANSMITTER IS AMPLITUDE MODULATED  
BILDERBACK, R. AUG. 1965  
MSC-121

Amplitude modulated laser transmitter affords radio frequencies unlimited bandwidth. The system, which is solid state and compact, uses a gallium arsenide diode that emits in the near infrared.

**B65-10242**  
ELECTROMETER HAS AUTOMATIC ZERO BIAS CONTROL  
INNOVATOR NOT GIVEN /APPLIED PHYSICS CORP./ AUG. 1965  
GSFC-350

Zero biasing circuit in a vibrating reed type electrometer counterbalances residual potential. It charges a capacitor to the residual potential and connects that capacitor in series with the vibrating reed so that the voltages cancel. This enables the electrometer to read zero output potential in the absence of an input current.

**B65-10243**  
NOVEL PROBE SIMPLIFIES ELECTRONIC COMPONENT TESTING  
SYNER, W. F.  
GSFC-342

Test probe, in conjunction with standard equipment, tests axial-lead electronic components in their original packages. The probe can be modified to test any electronic component with automatic or nonautomatic equipment.

**B65-10244**  
LIGHTWEIGHT COAXIAL CABLE CONNECTOR REDUCES SIGNAL LOSS  
BREJCHA, A. G., JR. AUG. 1965

**JPL-720**

Connectors with milled interface surfaces for perfect electrical contact eliminate secondary-emission discharge and low signal loss in RF coaxial cables. The connectors which contain alignment and centering components for proper joint concentricity are used in communications systems designs.

**B65-10247**  
SERVO CALORIMETER MEASURES MATERIAL HEATING RATE  
GILMOUR, G. WILSON, J. H. /WESTINGHOUSE ELEC. CORP./ AUG. 1965  
NU-0024

Servo calorimeter accurately measures the heating rate of a material exposed to nuclear radiation independently of the specific heat thermal conductivity of the material. The electrical power used is a direct measure of the nuclear heating rate.

**B65-10249**  
MANUAL-FEED ADAPTER PERMITS MICROFILMING OF CONTINUOUS OSCILLOGRAPH OUTPUT  
BENNETT, J. /WESTINGHOUSE ELEC. CORP./ AUG. 1965  
NU-0029

A manual-feed adapter used with a microfilm recording unit permits continuous filming and reduces oscillograph output to manageable dimensions.

**B65-10255**  
BORON TRIFLUORIDE NUCLEAR DETECTOR PREAMPLIFIER USES SINGLE-CABLE CONNECTION  
HECKELMAN, J. D. SHUMAKER, R. E. AUG. 1965  
LEWIS-178

Preamplifier for a nuclear particle detector operates with a single interconnecting cable. Isolating and bypass networks permit this single cable operation.

**B65-10257**  
INDUCTOR FLYBACK CHARACTERISTIC GIVES VOLTAGE REGULATOR FAST RESPONSE  
SMITH, G. D. AUG. 1965  
GSFC-361

Voltage regulator alternately connects an inductor in parallel and in series with the input voltage source. This flyback voltage regulator provides a regulated dc voltage to varying loads from a varying dc supply and gives fast response to load and supply changes.

**B65-10258**  
GAPPED TOROID PROVIDES INFINITE RESOLUTION OF DELAY-LINE PICKUP  
ROBINSON, G. B. AUG. 1965  
GSFC-370

Gapped toroid magnetically coupled to a delay line provides continuous adjustment of the time delay line signal retrieval. A rotating screw moves the toroid pickup parallel to the delay line. This device can be used in signal detection devices and instrumentation equipment.

**B65-10259**  
INCREASED JUNCTION LEAD INDUCTANCE BALLASTS HIGH-FREQUENCY TRANSISTORS  
GILBERT, G. J. /RCA/ SEP. 1965  
GSFC-387

Segmentation of transistor bonding stripes and the inherent inductance of individual leads provides ballast for even current distribution across the junction of a high-frequency transistor.

**B65-10260**  
SIMPLE PULSE COUNTING CIRCUIT COMPUTES SUM OF SQUARES  
SCHAEFER, D. H. SEP. 1965  
GSFC-391

Pulse counting circuit with an extra chain of flip-flops, delay lines, and AND/gates computes the sum of the squares of the pulse sequences. A pulse train and the sum of the squares of the pulses are simultaneously completed.

**B65-10263**  
INDEXING DEVICE ENSURES PROPER MATING OF

## ELECTRICAL CONNECTORS

JENKINS, L. M. SIMMONS, W. H.  
SEP. 1965  
MSC-155

Indexing splines with modified standard male and female connectors eliminates the possibility of incorrect mating. Large stock quantities of differently indexed connectors are unnecessary since connectors from a single stock can be indexed as desired at installation time.

B65-10264

PLASTIC BAGS IN EVACUATED CHAMBER MAKE  
LIGHTWEIGHT GAS SAMPLING SYSTEM  
SHAFFERNOCKER, W. M. /GE/ SEP. 1965  
FRC-31

Portable, lightweight system collects the exhaust gas of an aircraft during flight for use in analyzing combustion efficiency. The system uses an evacuated chamber and plastic bags.

B65-10265

WELD LEAKS RAPIDLY AND SAFELY DETECTED  
INNOVATOR NOT GIVEN /BOEING CO./ SEP. 1965  
M-FS-362

Test method detects leaks that occur during hydrostatic pressure testing of welded joints in metal tanks. A strip of aluminum foil and a strip of water-soluble paper are placed over the weld. A voltage applied between the tank wall and the foil strip is monitored to detect a decrease in ohmic resistance caused by water leakage into the paper layer.

B65-10267

ELECTROMETER PREAMPLIFIER HAS DRIFT CORRECTION  
FEEDBACK  
LABARTHE, L. C. /LABKO SCI./ SEP. 1965  
JPL-SC-074

Negative feedback circuit corrects output drift in an electrometer. The negative feedback is used in the no signal state to maintain the output level at zero reference. Drift voltage storage in the signal on state is also used to provide a drift-free readout.

B65-10268

MULTIPLE TEST CHAMBER EXPOSES MATERIALS TO  
VARIOUS ENVIRONMENTS  
JOHNSTON, R. L. SEP. 1965  
MSC-179

Multiple compartment test chamber exposes several material specimens to various environmental conditions for prolonged periods. The specimens are individually mounted in chamber compartments, rotated to various positions, and measured through optical windows to determine progressive changes in the material properties.

B65-10269

SIMPLE DEVICE PRODUCES ACCELEROMETER  
CALIBRATION PULSE  
INNOVATOR NOT GIVEN /LOCKHEED MISSILES AND SPACE  
CO./ SEP. 1965  
M-FS-363

Shock-impulse exciter produces a remote checkout of the amplitude calibration and frequency response of a piezoelectric vibration accelerometer. The exciter employs a bimetal spring to apply a mechanical acceleration pulse of a known amplitude and frequency to the accelerometer.

B65-10271

COMPOSITE SEAL REDUCES ALKALINE BATTERY  
LEAKAGE  
CLATTERBUCK, C. H. PLITT, K. F. SEP. 1965  
GSFC-337

Composite seal consisting of rubber or plastic washers and a metal washer reduces alkaline battery leakage. Adhesive is applied to each washer interface, and the washers are held together mechanically.

B65-10273

ELECTROMECHANICAL FLOWMETER ACCURATELY  
MONITORS FLUID FLOW  
GRANT, D. J. SEP. 1965  
GSFC-357

Electromechanical flowmeter remotely and accurately monitors the flow rate and total volume of a transparent liquid discharged from a dispensing system. A dual dispensing tube system provides a relative reference level which permits compensation for temperature variations.

B65-10274

ELECTRONIC OHMMETER PROVIDES DIRECT DIGITAL  
OUTPUT  
SEMYAN, J. SEP. 1965  
GSFC-363

Self-balancing wheatstone bridge acts as all-electronic digital readout ohmmeter.

B65-10275

IMPROVED CIRCUIT MINIMIZES GENERATION OF  
PSEUDONOISE CHECK BITS  
ANDERSON, T. O. LUSBAUGH, W. A. SEP. 1965  
JPL-698

Computer switching network consists of parallel and series combinations of mod 2 adders using the minimum number of gating levels. This network minimizes the propagation time in which a sequence of pseudonoise check bits are generated.

B65-10276

ADDED DIODES INCREASE OUTPUT OF BALANCED  
MIXER CIRCUIT  
ROBINSON, G. B. SEP. 1965  
GSFC-354

Two diodes added to a conventional balanced mixer circuit increase the output signal level. The resulting half-wave carrier switch balanced modulator is used in radio equipment.

B65-10277

NONLINEAR FEEDBACK REDUCES ANALOG-TO-DIGITAL  
CONVERTER ERROR  
MUNOZ, R. M. SEP. 1965  
ARC-46

Nonlinear analog-to-digital converter measures the analog input level and continuously adjusts the digital readout scale sensitivity to effectively increase the accuracy. It is able to acquire more accurate low-level data.

B65-10278

MODIFIED DEVELOPER INCREASES LINE RESOLUTION  
IN PHOTOSENSITIVE RESIST  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
SEP. 1965  
GSFC-386

Standard developer solution is mixed with dipropyl carbonate. This reduces swelling in the photosensitive resist and permits application of relatively thick films with minimal pinhole formation and increased line resolution.

B65-10279

INFLATABLE BLADDER PROVIDES ACCURATE  
CALIBRATION OF PRESSURE SWITCH  
SMITH, N. J. /BOEING CO./ SEP. 1965  
M-FS-367

Calibration of a pressure switch is accurately checked by a thin-walled circular bladder. It is placed in the pressure switch and applies force to the switch diaphragm when expanded by an external pressure source. The disturbance to the normal operation of the switch is minimal.

B65-10281

CIRCUIT MAINTAINS DIGITAL DECISION THRESHOLD  
AT PRESET LEVEL  
INNOVATOR NOT GIVEN /AVCO CORP./ SEP. 1965  
M-FS-331

Optimum decision-level circuit maintains the decision threshold at any preselected percentage of the input-signal amplitude. Communications equipment involving recognition of transmitted digital information can benefit from this circuit.

B65-10282

CONSTANT-CURRENT REGULATOR IMPROVES TUNNEL  
DIODE THRESHOLD-DETECTOR PERFORMANCE  
CANCRO, C. A. SEP. 1965  
GSFC-239

Grounded-base transistor is placed in a tunnel diode threshold detector circuit, and a bias



voltage is applied to the tunnel diode. This provides the threshold detector with maximum voltage output and overload protection.

**B65-10284**  
FIELD-EFFECT TRANSISTOR REPLACES BULKY TRANSFORMER IN ANALOG-GATE CIRCUIT  
INNOVATOR NOT GIVEN /RADIATION, INC./ SEP. 1965  
GSFC-351

Metal-oxide semiconductor field-effect transistor /MOSFET/ analog-gate circuit adapts well to integrated circuits. It provides better system isolation than a transformer, while size and weight are appreciably reduced.

**B65-10286**  
UPPERCASE AND LOWERCASE COMPUTER PRINTOUT INCREASES READABILITY  
HAND, W. W. /DOC., INC./ JONSBURG, M. B. SEP. 1965  
HQ-12

Print chain of 120 characters facilitates production of computer printout in both uppercase and lowercase characters. Although the output speed is reduced, the use of the print chain increases the computer printout readability.

**B65-10287**  
PHOTORESISTANCE ANALOG MULTIPLIER HAS WIDE RANGE  
HARTENSTEIN, R. G. SEP. 1965  
GSFC-360

Photoactivated bridge facilitates equal performance of analog multipliers over a wide frequency range. The multiplier operates from direct current to an upper frequency limited by either the light source or the closed-loop amplifier.

**B65-10289**  
BORON NITRIDE HOUSING COOLS TRANSISTORS  
INNOVATOR NOT GIVEN /SPACE TECHNOL. LABS./ SEP. 1965 SEE ALSO B63-10033 AND B65-10186  
WOO-079

Boron nitride ceramic heat sink cools transistors in RF transmitter and receiver circuits. Heat dissipated by the transistor is conducted by the boron nitride housing to the metal chassis on which it is mounted.

**B65-10290**  
FM/CW SYSTEM MEASURES AIRCRAFT ATTITUDE  
INNOVATOR NOT GIVEN /MELPAR/ SEP. 1965  
M-FS-276

FM/CW radar system measures attitude of an approaching aircraft relative to a ground station. The FM/CW transmitter on board the aircraft transmits through two antennas to a ground-based receiver.

**B65-10293**  
ELECTROSTATICALLY DRIVEN DYNAMIC CAPACITOR EMPLOYS CAPACITIVE FEEDBACK  
LONBORG, J. O. OCT. 1965  
JPL-771

Three-part signal electrode provides capacitive feedback to an oscillator driven dynamic capacitor in an electrometer circuit.

**B65-10298**  
TITANIUM DIAPHRAGM MAKES EXCELLENT AMPLITRON CATHODE SUPPORT  
TEICH, W. W. /RAYTHEON CO./ OCT. 1965  
GSFC-394

Cathode support structure designed around a titanium diaphragm prevents radial misalignment between the cathode and anode in amplitrans. The titanium exhibits low thermal conductivity, tolerates lateral thermal expansion of the cathode, and is a poor primary and secondary emission medium.

**B65-10299**  
ELECTROPNEUMATIC RHEOSTAT REGULATES HIGH CURRENT  
HAACKER, J. F. JEDLICKA, J. R. WAGONER, C. B. OCT. 1965  
ARC-44

Electropneumatic rheostat maintains a constant

direct current in each of several high-power parallel loads, of variable resistance, across a single source. It provides current regulation at any preset value by dissipating the proper amount of energy thermally, and uses a column of mercury to vary the effective length of a resistance element.

**B65-10300**  
IMPURITY DIFFUSION PROCESS FOR SILICON SEMICONDUCTORS IS FAST AND PRECISE  
MC LOUSKI, R. M. SKOUSA, G. W. /WESTINGHOUSE ELEC. CORP./ OCT. 1965  
GSFC-397

Impurity diffusion process produces precision silicon semiconductor junctions economically and fast. Oxide is deposited on a silicon wafer and a controlled concentration of impurity atoms in gaseous form is simultaneously introduced into the reaction.

**B65-10301**  
REMOTE RAPIDLY VARYING PRESSURES ACCURATELY MEASURED  
INNOVATOR NOT GIVEN /GE/ OCT. 1965  
FRC-28

Transmitting-damping tube with one end closed, the other open to a pressure source, has a pressure sensor connected to a port close to the pressure source. This accurately measures transient or rapidly varying fluid pressures.

**B65-10304**  
IMPROVED STRAIN-WIRE FLOWMETER HAS FAST RESPONSE TIME  
DILLON, R. C. DUNBAR, W. R. OCT. 1965  
LEWIS-241

Strain-sensitive resistance wires in a wheatstone bridge arrangement from the sensing element of a flowmeter. The change in resistance of the wires is measured as a function of stream velocity. Thus the electrical output is a measure of both rapidly varying and steady fluid-flow rates.

**B65-10305**  
THIN-FILM RESISTORS USED IN FUNCTIONAL ELECTRONIC BLOCKS  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ OCT. 1965  
GSFC-380

Vapor-deposited thin-film resistors replace diffused resistors in R-C tank circuits in a solid state electronic block. This allows an optimum parallel capacitance to be obtained for circuit applications requiring a high resistance and a low capacitance.

**B65-10306**  
OPAQUE MICROFICHE MASTHEAD PERMITS EASY READING  
LOWE, E. M. /DOC., INC./ OCT. 1965  
HQ-7

White-pigmented backing applied to the reverse side of microfiche mastheads makes the area opaque and easily readable. This technique is of value for organizations involved in large volume information storage and retrieval.

**B65-10307**  
FREQUENCY CORRECTION DEVICE USES DIGITAL CIRCUITRY  
SCHAEFER, D. OCT. 1965  
GSFC-268

Signal acquisition and tracking system covering a wide range of frequencies uses a digital circuit to sample the frequency of an incoming signal and provide correction pulses to the voltage-controlled oscillator. The circuit can also sense the presence of a signal on any one of the input lines.

**B65-10308**  
ELECTRONIC AMPERE-HOUR INTEGRATOR IS ACCURATE TO ONE PERCENT  
PAULKOVICH, J. OCT. 1965  
GSFC-203

Electronic ampere-hour integrator is based on current-to-frequency conversion. It operates on low power and is accurate to one percent. This

device can measure the ampere-hour capacity of batteries and can be adapted for other functions.

**B65-10309**  
THERMOELECTRIC ELEMENTS DIFFUSION-BONDED TO TUNGSTEN ELECTRODES  
INNOVATOR NOT GIVEN /TYCO LABS./ OCT. 1965 SEE ALSO B65-10220  
GSFC-346

Solid-state diffusion process bonds lead telluride and lead telluride-tin telluride thermoelectric elements to tungsten electrodes. The resulting bond is nonmagnetic and has high strength and low electrical and thermal resistance. This method is also used with tantalum electrodes.

**B65-10310**  
THRESHOLD DETECTOR PRODUCES NARROW PULSES AT HIGH REPETITION RATES  
GARAHAN, N. M. OCT. 1965  
GSFC-383

Solid state device generates fixed width output pulses from variable width input pulses in the nanosecond range. The circuit produces pulse repetition rates in the megacycle range and exhibits low power drain.

**B65-10311**  
PCM MAGNETIC TAPE SYSTEM EFFICIENTLY RECORDS AND REPRODUCES DATA  
COLE, P. T. OCT. 1965  
GSFC-375

Split-phase PCM technique consists of data and clock signal recording and reproduction systems. This PCM magnetic tape system achieves a high packing density on the tape and provides a symmetrical reproduction of the recorded signal.

**B65-10313**  
PLANETARY CAMERA CONTROL IMPROVES MICROFICHE PRODUCTION  
CHESTERTON, W. L. LEWIS, E. B. /DOC., INC./ OCT. 1965  
HQ-1 HQ-5

Microfiche is prepared using an automatic control system for a planetary camera. The system provides blank end-of-row exposures and signals card completion so the legend of the next card may be photographed.

**B65-10314**  
HYBRID CIRCUIT ACHIEVES PULSE REGENERATION WITH LOW POWER DRAIN  
CANCRO, C. A. OCT. 1965  
GSFC-382

Hybrid tunnel diode-transistor circuit provides a solid-state, low power drain pulse regenerator, frequency limiter, or gated oscillator. When the feedback voltage exceeds the input voltage, the circuit functions as a pulse normalizer or a frequency limiter. If the circuit is direct coupled, it functions as a gated oscillator.

**B65-10315**  
MAGNETOMETER MEASURES ORTHOGONAL COMPONENTS OF MAGNETIC FIELDS  
INNOVATOR NOT GIVEN /SPECTRA PHYS./ OCT. 1965  
GSFC-395

Driven magnetometer accurately measures the components of a low strength magnetic field in each of three mutually perpendicular directions. To accomplish this, it employs the principle of magnetic resonance in optically pumped rubidium vapor.

**B65-10317**  
INSTRUMENT PERFORMS NONDESTRUCTIVE CHEMICAL ANALYSIS, DATA CAN BE TELEMETERED  
TURKEVICH, A. /CHICAGO UNIV./ OCT. 1965  
JPL-SC-078

Instrument automatically performs a nondestructive chemical analysis of surfaces and transmits the data in the form of electronic signals. It employs solid-state nuclear particle detectors with a charged nuclear particle source and an electronic pulse-height analyzer.

**B65-10318**  
REMOTE CONTROL ELECTRICAL SWITCHING SYSTEM HAS

1000-OUTPUT CAPABILITY  
INNOVATOR NOT GIVEN /IBM/ OCT. 1965  
M-FS-380

Electromechanical remote control system has a capacity of 1000 individual on-off functions yet uses only seven pairs of telephone-type lines for interconnection. Installation and maintenance costs are decreased by using this system.

**B65-10320**  
RUGGED PRESSED DISK ELECTRODE HAS LOW CONTACT POTENTIAL  
DAY, J. L. MOSIER, B. /INST. OF RES. AND INSTRUMENTATION/ OCT. 1965 SEE ALSO B64-10025  
MSC-158

Pressed-disk electrode with low contact potential monitors physiological processes. It consists of silver and silver chloride combined with bentonitic clay. The clay affords a surface that permits use over extended periods without contact deterioration.

**B65-10322**  
CAM-OPERATED LIMIT SWITCH FEATURES SAFE FUSE REPLACEMENT  
WEBER, G. J. /MCDONNELL AIRCRAFT CORP./ OCT. 1965  
MSC-218

Two hermetically sealed, short travel, limit switches permit fuse replacement without danger of a spark or arcing. The switches are wired in parallel circuits and actuated by manually operated cams containing the circuit fuses.

**B65-10324**  
SELENIUM BOND DECREASES ON RESISTANCE OF LIGHT-ACTIVATED SWITCH  
INNOVATOR NOT GIVEN /IBM/ NOV. 1965  
JPL-SC-101

Vitrified amorphous selenium bond decreases the ON resistance of a gallium arsenide-silicon light-activated, low-level switch. The switch is used under a pulse condition to prolong switch life and minimize errors due to heating, devitrification, and overdrawing.

**B65-10325**  
DIRECT FORCE-MEASURING TRANSDUCER USED IN BLOOD PRESSURE RESEARCH  
EIGE, J. J. /STANFORD RES. INST./ NEWGARD, P. M. PRESSMAN, G. L. NOV. 1965  
ARC-53

Direct force-measuring transducer acts as an arterial tonometer, gives a direct readout to instrumentation, and is unaffected by ambient noise. It uses a semiconductor strain gauge which is deflected by pressure pulses in the artery. The deflection changes the resistance of the gauge and alters the voltage reading on the associated instrumentation.

**B65-10328**  
FEED-THROUGH CONNECTOR WITHSTANDS HIGH TEMPERATURES IN VACUUM ENVIRONMENT  
KREISMAN, W. S. /GEOPHYS. CORP. OF AM./ NOV. 1965  
GSFC-442

Feed-through connector with sealing action augmented by any temperature increase can be used through the wall of a vacuum device. It retains vacuum integrity through successive cycles of high temperature.

**B65-10329**  
BAKING ENABLES MCLEOD GAUGE TO MEASURE IN ULTRAHIGH VACUUM RANGE  
KREISMAN, W. S. /GEOPHYS. CORP. OF AM./ NOV. 1965  
GSFC-440

Accurate measurements in the ultrahigh vacuum range by a conventional McLeod gauge requires degassing of the gauge's glass walls. A closed system, in which mercury is forced into the gauge by gravity alone, and in which the gauge components are baked out for long periods, is used to achieve this degassing.

**B65-10333**  
COMMUNICATION SYSTEM USES MODULATED LASER BEAM

MINOTT, P. O. NOV. 1965  
GSFC-377

Electro-optical system is placed on a satellite to effect communications between two remote stations. The system employs an essentially passive, retrodirective, laser beam modulator-reflector.

B65-10334  
FREQUENCY DIVIDER IS FREE OF SPURIOUS OUTPUTS  
MC DERMOND, D. NOV. 1965  
GSFC-308

Frequency divider provides sixteen output states free of spurious pulses from four input circuits. The input is binary coded, and a change of one in the input only changes the number of output states by one.

B65-10340  
MINIATURE SERVO ACCELEROMETER IS FORCE-BALANCED  
JOHNSTON, A. R. /CALIF. INST. RES. FOUND./ NOV. 1965  
JPL-155

Miniature servo accelerometer measures unusually small forces of torques. The pendulous mass of the accelerometer is suspended by fused quartz torsion fibers in an electromagnetically force-balanced environment. It is used in gravity surveys for exploring mineral deposits.

B65-10343  
DELAYED RIPPLE COUNTER SIMPLIFIES SQUARE-ROOT COMPUTATION  
CLIFF, R. NOV. 1965  
GSFC-398

Ripple subtract technique simplifies the logic circuitry required in a binary computing device to derive the square root of a number. Successively higher numbers are subtracted from a register containing the number out of which the square root is to be extracted. The last number subtracted will be the closest integer to the square root of the number.

B65-10345  
VARIABLE WORD LENGTH ENCODER REDUCES TV BANDWIDTH REQUIREMENTS  
SIVERTSON, W. E., JR. NOV. 1965  
LANGLEY-87

Adaptive variable resolution encoding technique provides an adaptive compression pseudo-random noise signal processor for reducing television bandwidth requirements. Complementary processors are required in both the transmitting and receiving systems. The pretransmission processor is analog-to-digital, while the postreception processor is digital-to-analog.

B65-10347  
COMPACT SCR TRIGGER CIRCUIT FOR IGNITRON SWITCH OPERATES EFFICIENTLY  
FOSTER, L. E. NOV. 1965  
M-FS-371

Trigger circuit with two series-connected SCR triggers an Ignitron switch used to discharge high-energy capacitor banks. It does not require a warmup period and operates at relatively high efficiency.

B65-10349  
FREQUENCY DISCRIMINATOR WITH BINARY OUTPUT ELIMINATES TUNED CIRCUITS  
DE VELDE, E. /IBM/ NOV. 1965  
M-FS-376

Frequency discriminator has a binary output and permits microminiaturized packaging techniques. It uses a bandpass amplifier and standard logic elements that convert two input frequencies into two discrete logic pulses.

B65-10350  
ZENER DIODE CONTROLS SWITCHING OF LARGE DIRECT CURRENTS  
INNOVATOR NOT GIVEN /IBM/ NOV. 1965  
MSC-188

High-current zener diode is connected in series with the positive input terminal of a dc supply to block the flow of direct current until a high-frequency control signal is applied across

the zener diode. This circuit controls the switching of large dc signals.

B65-10352  
VIBRATING DIAPHRAGM MEASURES HIGH ELECTROSTATIC FIELD STRENGTHS  
INNOVATOR NOT GIVEN /ELECTRO-OPTICAL SYSTEMS/ NOV. 1965  
MSC-189

Meter with flexible conductive diaphragm measures electrostatic charge density on a conducting surface in a vacuum. The diaphragm is supported from an insulated conductive support ring rigidly attached to the conductive surface whose electrostatic charge density is to be measured.

B65-10353  
MULTIPHASE CLOCK-PULSE GENERATOR USES SIMPLIFIED CIRCUITRY  
INNOVATOR NOT GIVEN /IBM/ NOV. 1965  
M-FS-297

Multiphase clock-pulse generator converts a simple pulse train into nonoverlapping clock pulses. The generator employs multistable circuits to minimize the number of electronic components.

B65-10355  
SIMPLE CIRCUIT PERFORMS BINARY ADDITION AND SUBTRACTION  
CLIFF, R. A. SCHAEFER, D. H. NOV. 1965  
GSFC-399

Ripple adder reduces the number of logic circuits required to perform binary addition and subtraction. The adder uses dual input and delayed output flip-flops in one register. The contents of this register are summed with those of a standard register through conventional AND/gates.

B65-10359  
IMPROVED WIRE MEMORY MATRIX USES VERY LITTLE POWER  
FEDDE, G. A. /SPERRY RAND CORP./ NOV. 1965  
JPL-SC-167

Thin-film, plated-wire memory matrix for computer applications requires little power yet has higher speed and four times greater storage capacity than ferrite-core memories of the same size.

B65-10361  
HIGH-INTENSITY FLASHING BEACON POWERED BY MERCURY CELLS  
NOV. 1965  
LANGLEY-80

Pair of xenon flashlamps powered by mercury batteries in a transistorized circuit provides a flashing beacon with an effective intensity of a second-magnitude star at a distance of ten statute miles. This beacon is lightweight, long lasting and it withstands shock and vibration.

B65-10362  
TEMPERATURE TRANSDUCER HAS HIGH OUTPUT, IS TIME STABLE  
FOLLETT, W. H. /BALL BROTHERS RES. CORP./ NOV. 1965  
GSFC-446

Compact, lightweight temperature transducer requires no amplification of its output signal and is time stable. It uses the temperature-dependent characteristics of a silicon transistor to provide a zero-to-five-volt signal proportional to temperature.

B65-10363  
REGENERATIVE FUEL CELL COMBINES HIGH EFFICIENCY WITH LOW COST  
DOYLE, H. FRANK, H. STEPHENS, C. W. /ELECTRO-OPT. SYSTEMS/ DEC. 1965  
WOO-090

Hydrogen/oxygen regenerative fuel cell stores electrical energy efficiently and inexpensively. The fuel cell has a high energy-to-weight ratio, and is adapted for a large number of cycles with deep discharge.

B65-10369  
RESPIRATORY TRANSFER VALUE HAS FAIL-SAFE FEATURE

PUCCINELLI, A. A. SMITH, J. R., JR. DEC. 1965  
ARC-1

Quick-acting, remote controlled valve connects either one of two oxygen or air supplies to a breathing tube. The valve, which is fail-safe, incorporates a cammed piston arrangement that is driven by a remote controlled reversible rotary solenoid or reversible electric motor.

B65-10376  
THREE-POSITION ROCKER SWITCH ACTUATOR HAS POSITIVE CENTERING

BOGLEY, R. L. /N. AM. AVIATION/ DEC. 1965  
MSC-261

Three-position rocker switch actuator provides positive center positioning to inhibit possible override. Switch position is visually identified by rocker position, and functions can be shown on tabs and bars.

B65-10377  
BINARY COUNTER USES FLUID LOGIC ELEMENTS  
INNOVATOR NOT GIVEN /RAND CORP./ DEC. 1965  
M-FS-323

Binary counter with two fluid flip-flops in each stage has an output taken from the output of the second flip-flop. The flip-flops each contain three fluid logic elements.

B65-10379  
THREE-DIMENSIONAL WIRE-MESH CAPACITOR SYSTEM MEASURES FLUID DENSITY  
INNOVATOR NOT GIVEN /GARRETT CORP./ DEC. 1965  
W00-194

Gaging system automatically measures the bulk density of a stored, electrically nonconductive fluid containing varying portions of liquid and vapor. The system employs a three-dimensional wire-mesh capacitor whose capacitance varies with the bulk density of the fluid dielectric medium between the capacitor plates.

B65-10380  
DEVICE DETECTS UNBONDED AREAS IN PLASTIC LAMINATES  
INNOVATOR NOT GIVEN /DOUGLAS AIRCRAFT CO./ DEC. 1965  
W00-206

Device generates an acoustic signal whose frequency changes disclose the presence of delaminated or unbonded areas in plastic laminates. A microphone makes the frequency change audible.

B65-10381  
KEYED PLUGS AND SOCKETS PREVENT IMPROPER CONNECTIONS  
BUCKEY, D. L. LANKFORD, H. /MCDONNELL AIRCRAFT CORP./ DEC. 1965  
MSC-231

Plugs and sockets individually keyed so that no plug can be mated with other than its proper socket facilitates multiple connection in electrical systems.

B65-10382  
PHOTOELECTRIC SYSTEM CONTINUOUSLY MONITORS LIQUID LEVEL  
INNOVATOR NOT GIVEN /BOEING CO./ DEC. 1965  
M-FS-417

Immersion probe presents a depth-sensitive optical transmission path between a light source and a photoelectric cell to continuously monitor the level of a transparent liquid in a tank. This system operates automatically, without moving parts, and provides output signals to a remote recorder.

B65-10387  
SHRINKABLE SLEEVE ELIMINATES SHIELDING GAP IN RF CABLE  
INNOVATOR NOT GIVEN /GEN. DYN./CONVAIR/ DEC. 1965  
W00-207

RF shielding gap between an RF cable and a multipin connector is eliminated by a sleeve assembly installed between the connector and the terminated portion of the shielding. The assembly is enclosed in a heat-shrinkable plastic sleeve which completes the continuous RF shield.

B65-10389  
INSULATOR-HOLDER PROTECTS TRANSISTORS IN DENSE ELECTRONIC ASSEMBLIES  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ DEC. 1965  
MSC-214

Molded insulating spacer with one or more cavities is used as an insulated holder for mounting metal-case transistors in a chassis containing densely packed electronic components. The transistors are mechanically supported on their bases and electrically isolated from each other by the holder.

B65-10392  
NONCONTACTING VIBRATION TRANSDUCER HAS CONSTANT SENSITIVITY  
FLAGGE, B. DEC. 1965  
LANGLEY-99

Noncontacting transducer with constant sensitivity automatically measures the vibration amplitudes along the span of a vibrating structure of irregular contour. A system employing a feedback control positions the transducer at a constant height above the test surfaces. A differential transformer facilitates calibration and extends the amplitude range of the system.

B65-10396  
ADHESIVE-BACKED TERMINAL BOARD ELIMINATES MOUNTING SCREWS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ DEC. 1965  
MSC-173

Low-profile terminal board is used in dense electronic circuits where mounting and working space is limited. The board has a thin layer of pressure-sensitive adhesive backing which eliminates the need for mounting screws.

B65-10399  
BINARY COUNTER ACCUMULATES TIME BY COMPLEMENTARY PRESET  
MARRINER, G. E. /N. AM. AVIATION/ DEC. 1965  
MSC-242

Binary counter reduces the number of logic elements required to furnish electrical control functions. The counter is automatically preset to the complement of the desired time increments in milliseconds. An output pulse is produced each time it reaches its capacity.

B65-10400  
ELECTRICALLY HEATED DIAPHRAGM ELIMINATES USE OF PYROTECHNICS  
MATHEWSON, R. C. /N. AM. AVIATION/ DEC. 1965  
MSC-241

Membrane-type diaphragm is used in systems where fluids are contained under pressure until a certain pressure threshold or point of time has been reached when the fluids are automatically released. The diaphragm is resistance heated until its strength is degraded to the point of rupture, thus releasing the contained fluids.

B66-10002  
DUAL-VOLTAGE POWER SUPPLY HAS INCREASED EFFICIENCY  
STURMAN, J. C. JAN. 1966  
LEWIS-107A

Simple circuit provides two different dc output voltages from an ac source. It employs a full-wave rectifier connected to two passive branches from which the separate dc voltages are taken. The outputs have low ripple and good voltage regulation.

B66-10006  
COMPUTER CIRCUIT CALCULATES CARDIAC OUTPUT  
MC CULLOUGH, C. E. /KAMAN AIRCRAFT CORP./ JAN. 1966  
MSC-274

Electronic circuitry automatically calculates cardiac output. This computer is used for basic research in physiology and as a diagnostic instrument by doctors.

B66-10012  
THIN-FILM SEMICONDUCTOR RECTIFIER HAS IMPROVED PROPERTIES

INNOVATOR NOT GIVEN /MELPAR/ JAN. 1966  
MSC-207

Cadmium selenide-zinc selenide film is used as a thin film semiconductor rectifier. The film is vapor-deposited in a controlled concentration gradient into a glass substrate to form the required junctions between vapor-deposited gold electrodes.

B66-10013  
REACTION HEAT USED IN STATIC WATER REMOVAL FROM FUEL CELLS

PLATNER, J. L. /ALLIS-CHALMERS MFG. CO./ JAN. 1966

M-FS-532

Reaction heat is used for removal of water formed at the hydrogen fuel electrode in a hydrogen-oxygen fuel cell. A portion of the heat inherent in the fuel cell current generation reaction is used to transfer excess water into water vapor and cause it to be exhausted from the cell by a porous vapor transport membrane adjoining a vapor cavity.

B66-10015  
ELECTRODELESS DISCHARGE LAMP IS EASILY STARTED, HAS HIGH STABILITY

BELL, W. E. BLOOM, A. L. /VARIAN ASSOCIATES/ JAN. 1966

WOO-030

Electrodeless discharge borosilicate glass lamp is used in various high-resolution optical systems. It is partially charged with krypton, contains small amounts of rubidium, and is enclosed in a hermetically sealed envelope that maintains the lamp at an optimum temperature during discharge. The lamp is quickly started by its excitation coil.

B66-10021  
SPECIAL MOUNT IMPROVES REMOTE TRANSDUCER ACCURACY

LAYTON, J. P. /PRINCETON UNIV./ JAN. 1966

LEWIS-269

Transducer-mounting device allows measurement of transient pressure in a hostile environment. The device provides free passage areas and a controlled environment for the measuring instrument.

B66-10025  
CUPROUS SELENIDE AND SULFIDE FORM IMPROVED PHOTOVOLTAIC BARRIERS

INNOVATOR NOT GIVEN /RCA/ JAN. 1966

WOO-212

Photovoltaic barriers formed by depositing a layer of polycrystalline cuprous sulfide or cuprous selenide on gallium arsenide are chemically and electrically stable. The stability of these barrier materials is significantly greater than that of cuprous iodide.

B66-10026  
IMPROVED CARBON ELECTRODE REDUCES ARC SPUTTERING

INNOVATOR NOT GIVEN /UNION CARBIDE CORP./ JAN. 1966

MSC-219

Carbon rod cores with a smaller proportion of rare earth compounds than in standard cores reduce arc sputtering in optical equipment. This core is produced without additional cost or equipment.

B66-10028  
PORTABLE SELF-POWERED DEVICE DETECTS INTERNAL FLAWS IN TUBULAR STRUCTURES

GILMOUR, G. /WESTINGHOUSE ELEC. CORP./ JAN. 1966

NU-0019

Portable probe and eddy-current-sensitive circuitry detects internal flaws or hard spot impurities in an electrically conductive tubular channel by recording the conductivity change at the defect point.

B66-10031  
PRESSURE TRANSDUCERS DYNAMICALLY TESTED WITH SINUSOIDAL PRESSURE GENERATOR

JONES, H. B., JR. /PRINCETON UNIV./ JAN. 1966

LEWIS-268

Sinusoidal pressure generator assembly dynamically

tests and calibrates pressure transducers by using a chamber whose lowest resonant mode is above the audiofrequency range.

B66-10034

CIRCUIT EXHIBITS POWER EFFICIENCY GREATER THAN 75 PERCENT

MANKOVITZ, R. J. /N. AM. AVIATION/ FEB. 1966

MSC-254

Variable duty cycle pulser increases circuit power efficiency by more than 75 percent when operating solenoid valves. The pulser provides a low-level holding current after a high-level current has actuated the solenoid valves.

B66-10036

FLOWMETER MEASURES LOW GAS-FLOW RATES

WELLS, F. E. FEB. 1966

M-FS-215

Positive-displacement flowmeter measures low gas-flow rates by gauging the time required for a slug of mercury to pass between two reference levels in a tube of known volume.

B66-10038

CIRCUIT OPERATES AS SINE FUNCTION GENERATOR

BOGART, T., JR. /N. AM. AVIATION/ FEB. 1966

MSC-255

Electronic circuit drives sine function generator using square wave and sawtooth sweep generators. The circuit replaces electromechanical driver and increases accuracy.

B66-10039

CONTROL SYSTEM MAINTAINS SELECTED LIQUID LEVEL

BERGESON, R. L. SCHUCK, J. W. /HONEYWELL/ FEB. 1966

M-FS-470

Single-sensor control system maintains liquid hydrogen at a preselected desired level within a tank, regardless of boiloff. It calibrates output in percentage. Thus, when the fuel is at the desired level, the system output will indicate 100 percent regardless of what percent of tank capacity the fuel has reached.

B66-10041

COLD CATHODE IONIZATION GAUGE HAS RIGID METAL HOUSING

HERZOG, R. KREISMAN, W. S. /GEOPHYS. CORP. OF AM./ FEB. 1966

GSFC-445

Cold cathode ionization gauge in a stainless steel housing accurately measures high pressures. The Penning effect is used with a high voltage discharge in the presence of a magnetic field for an ion current proportional to the gas pressure in the gauge.

B66-10042

VIBRATION TESTS ON VIDICONS MADE BY IMPROVED METHOD

INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ FEB. 1966

JPL-SC-115

Sensitive method is used for checking the performance of vidicons in mechanical vibration tests. The image of the desired fine-detail test pattern is stored in the photosensitive surface of the vidicon while the system is free of mechanical vibration. Mechanical excitation is then applied, and its effects observed.

B66-10046

LAMP AUTOMATICALLY SWITCHES TO NEW FILAMENT ON BURNOUT

INGLE, W. B. /N. AM. AVIATION/ FEB. 1966

M-FS-498

Lamp with primary and secondary filaments has a means for automatic switching to the secondary filament at primary filament burnout. Lamp failures and resultant expenses during oscillograph printing are appreciably reduced.

B66-10048

NONCONTACTING TRANSDUCER MEASURES SHAFT TORQUE

INNOVATOR NOT GIVEN /N. AM. AVIATION/ FEB. 1966

M-FS-474

Transducer for measuring the output torque of a

rotating shaft uses a magnetically permeable sleeve fitted over a section of the shaft which deflects axially in direct proportion to the output torque. A corresponding change in reluctance occurs in pickup coils mounted in close proximity to the sleeve. This change is measured by attached conventional circuitry.

**B66-10050**  
SINGLE CONNECTOR PROVIDES SAFETY FUSES FOR MULTIPLE LINES  
WEBER, G. J. /MCDONNELL AIRCRAFT./ FEB. 1966  
MSC-199

Fuse-bearing sleeve which is inserted between the male and female members of a multiple-line connector contains a safety fuse for each pin of the connector assembly. The sleeve is easily and quickly opened for fuse replacement.

**B66-10051**  
FERROELECTRIC BOLOMETER MEASURES RF ABSOLUTE POWER AT SUBMILLIMETER WAVELENGTHS  
COHN, M. RODGERS, J. D. /ADVANCED TECHNOL. CORP./ FEB. 1966  
GSFC-422

Two ferroelectric bolometer sensing elements measure low RF absolute power at millimeter and submillimeter wavelengths. The sensing elements are mounted in sections of waveguide and connected in series in a standard temperature compensating bridge circuit.

**B66-10057**  
MINIATURE BIOELECTRIC DEVICE ACCURATELY MEASURES AND TELEMETERS TEMPERATURE  
FRYER, T. B. FEB. 1966 SEE ALSO B64-10171  
ARC-52

Miniature micropower solid-state circuit measures and telemeters the body temperature of laboratory animals over periods up to two years. The circuit employs a thermistor as a temperature sensing element and an FM transmitter. It is constructed from conventional discrete components or integrated circuits.

**B66-10062**  
FORTRAN PROGRAM FLOWCHART IS AUTOMATICALLY PRODUCED  
CLARK, D. J. WILLIAMS, D. /GE/ FEB. 1966  
M-FS-369

Computer under control of the FLO-TRAN program automatically produces and updates flowcharts of Fortran program source decks fed to it. The flowcharts are produced on either 35mm film or paper.

**B66-10064**  
TRANSMISSION SYSTEM ISOLATES PRESSURE TRANSDUCER FROM SEVERE ENVIRONMENT  
INNOVATOR NOT GIVEN /SPACE-GEN. CORP./ FEB. 1966  
WOO-239

Pressure transmission system measures the pressure of a high temperature, chemically active fluid by isolating the pressure transducer from the process fluid without component disconnections.

**B66-10066**  
ANTENNA CONFIGURATIONS PROVIDE POLARIZATION DIVERSITY  
SCHUMACHER, C. N. /CUTLER HAMMER/ FEB. 1966  
GSFC-74

Compact back-to-back trapezoidal tooth log-periodic /TTLP/ antenna with frequency-independent characteristics is formed by reducing the angle between the two elements of a basic TTLP to zero. The back-to-back antenna, arranged in various configurations, provides monopulse operations in one or two planes and in various polarizations.

**B66-10067**  
AUXILIARY COIL CONTROLS TEMPERATURE OF RF INDUCTION HEATER  
INNOVATOR NOT GIVEN /GEN. DYN./ELECTRON./ FEB. 1966  
GSFC-428

Auxiliary coil controls the temperature of an RF induction furnace that is powered by a relatively unstable RF generator. Manual or servoed

adjustment of the relative position of the auxiliary coil, which is placed in close proximity to the RF coil, changes the looseness of the RF coil and hence the corresponding heating effect of its RF field.

**B66-10068**  
SENSOR DETECTS HYDROCARBON OIL CONTAMINANTS IN FLUID LINES  
ROTH, B. /N. AM. AVIATION/ FEB. 1966 SEE ALSO B63-10311  
M-FS-522

Sensor with ultraviolet light monitors and detects hydrocarbon oil contaminants present in fluid lines. The light causes the oil particles to fluoresce. This light emitted by the oil particle is detected by a photocell which is relatively insensitive to ultraviolet radiation.

**B66-10082**  
ROD AND DISH CATHODE IMPROVES PENNING-TYPE VACUUM GAUGE  
PEPPIN, G. B. /HUGHES AIRCRAFT CO./ MAR. 1966  
GSFC-447

Improved penning-type ionization gauge provides range and sensitivity required to measure gas pressure below .01 torr under high vacuum conditions. The gauge uses a highly conductive cathode composed of two disks of high magnetic permeability separated by a rod of low magnetic permeability.

**B66-10084**  
REFRACTORY COATING PROTECTS INTRICATE GRAPHITE ELEMENTS FROM HIGH-TEMPERATURE HYDROGEN  
FERRIS, J. R. PATTERSON, R. L. STEFFEN, R. J. VOGEL, C. E. /WESTINGHOUSE ASTRONUCL. LAB./ MAR. 1966  
NU-0027

Refractory coating protects graphite heater elements operating at high temperature in a hydrogen atmosphere. The coating is formed by painting the graphite elements with a composition containing powdered tungsten, and heat-treating it.

**B66-10085**  
SEISMOMETER DESIGNED FOR REMOTE OPERATION IN RANDOM ORIENTATION  
LEHNER, F. E. /CALIF. INST. OF TECH./ MAR. 1966  
JPL-320

Portable seismometer mounted in a rugged housing can be placed in inaccessible locations and operate efficiently in other than a vertically upright position. The instrument housing contains an amplifier, transmitter, and antenna to relay measurement data to a receiving station.

**B66-10088**  
GELATIN COATED ELECTRODES ALLOW PROLONGED BIOELECTRONIC MEASUREMENTS  
INNOVATOR NOT GIVEN /INST. OF RES. AND INSTRUMENTATION/ MAR. 1966 SEE ALSO B64-10025, B65-10015, AND B65-10320  
MSC-153

Silver electrodes treated with an anodizing electrolyte containing gelatin are used for long term monitoring of bioelectronic potentials in humans. The electrodes do not interact with perspiration, cause skin irritation, or promote the growth of bacteria.

**B66-10089**  
AUTOMATIC GAIN CONTROL CIRCUIT HANDLES WIDE INPUT RANGE  
BLACK, S. H. /SPERRY GYROSCOPE CO./ MAR. 1966  
MSC-166

Automatic gain control circuit for a radio receiver handles a wide range of input signal levels without overloading the output stage. The transistorized circuit maintains a relatively constant output by varying attenuation of the input signal.

**B66-10091**  
VAPOR GROWN SILICON DIOXIDE IMPROVES TRANSISTOR BASE-COLLECTOR JUNCTIONS  
CARLEY, D. R. /RCA/ DUCLOS, R. A. MAR. 1966  
GSFC-389

Vapor grown silicon dioxide layer protects base-collector junction in silicon planar transistors during the emitter diffusion process. This oxide fills in any imperfections that exist in the thermally grown oxide layer and is of greater thickness than that layer. This process is used to deposit protective silicon dioxide coatings on optical surfaces.

B66-10094

SYSTEM PROPORTIONS FLUID-FLOW IN RESPONSE TO DEMAND SIGNALS  
INNOVATOR NOT GIVEN /CURTISS-WRIGHT CORP./  
GSFC-457

Control system provides proportioned fluid flow rates in response to demand signals. It compares a digital signal, representing a flow demand, with a reference signal to yield a control voltage to one or more solenoid valves connected to orifices of a predetermined size.

B66-10097

COMPUTER PROGRAM SIMPLIFIES SELECTION OF STRUCTURAL STEEL COLUMNS  
VISSING, G. S. MAR. 1966  
NU-0044

Computer program rapidly selects appropriate size steel columns and base plates for construction of multistory structures. The program produces a printed record containing the size of a section required at a particular elevation, the stress produced by the loads, and the allowable stresses for that section.

B66-10099

CAPACITIVE SYSTEM DETECTS AND LOCATES FLUID LEAKS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1966  
M-FS-478

Electronic monitoring system automatically detects and locates minute leaks in seams of large fluid storage tanks and pipelines covered with thermal insulation. The system uses a capacitive tape-sensing element that is adhesively bonded over seams where fluid leaks are likely to occur.

B66-10101

RING COUNTER CIRCUIT SWITCHES MULTIPHASE MOTOR DIRECTION OF ROTATION  
FAIRBANKS, A. F. /SPACE TECH. LABS./ MAR. 1966  
JPL-SC-166

Solid state three-phase counter circuit reverses the direction of rotation of a multiphase motor without changing the phase wiring of the supply current source.

B66-10103

MOUNT MAKES LIQUID NITROGEN-COOLED GAMMA RAY DETECTOR PORTABLE  
FESSLER, T. E. MAR. 1966  
LEWIS-259

Liquid nitrogen-cooled gamma ray detector system is made portable by attaching the detector to a fixture which provides a good thermal conductive path between the detector and the liquid nitrogen in a Dewar flask and a low heat leak path between the detector and the external environment.

B66-10105

ANGULAR ACCELERATION MEASURED BY DEFLECTION IN SENSING RING  
RICHARD, R. R. MAR. 1966  
MSC-250

Small, lightweight angular accelerometer performs reliably when subjected to harsh temperature and vibration environments. The device uses strain gauges to measure the amount of deflection in a metal ring caused by movement of inertial masses mounted through the ring. Range of the instrument is varied by varying the value of inertial masses.

B66-10106

LOW-POWER RING COUNTER DRIVES HIGH-LEVEL LOADS  
INNOVATOR NOT GIVEN /SPERRY RAND/ MAR. 1966  
GSFC-431

Ring counter dissipates very low power in standby conditions, yet drives high-current loads on a low

duty-factor basis. Complementary transistors are used so that in one selected stage both transistors are conducting while the transistors of the other stage are cut off.

B66-10112

NEW TELEVISION CAMERA ELIMINATES VIDICON TUBE  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
MAY 1966  
M-FS-472

Small, lightweight camera systems use solid state imaging devices in the form of phototransistor mosaic sensors instead of vidicon tubes for light sensing and image conversion. The digital logic circuits scan the sensor mosaic at 60 frames per second to produce pictures composed of a series of dots rather than lines.

B66-10113

IMPROVED CHOPPER CIRCUIT USES PARALLEL TRANSISTORS  
INNOVATOR NOT GIVEN /IBM/ MAR. 1966  
M-FS-468

Parallel transistor chopper circuit operates with one transistor in the forward mode and the other in the inverse mode. By using this method, it acts as a single, symmetrical, bidirectional transistor, and reduces and stabilizes the offset voltage.

B66-10126

VARIABLE-CAPACITANCE TACHOMETER ELIMINATES TROUBLESOME MAGNETIC FIELDS  
INNOVATOR NOT GIVEN /BENDIX CORP./ MAR. 1966  
GSFC-435

Dual variable-capacitance tachometer measures angular speed and sense of rotation without magnetic components. Thus it eliminates magnetic flux interference with associated instrumentation in an electromechanical system.

B66-10127

APPARATUS MEASURES THERMAL CONDUCTIVITY OF HONEYCOMB-CORE PANELS  
MAR. 1966  
LANGLEY-202

Overall thermal conductivity of honeycomb-core panels at elevated temperatures is measured by an apparatus with a heater assembly and a calibrated heat-rate transducer. The apparatus has space between the heater and transducer for insertion of a test panel and insulation.

B66-10128

OPTICAL GYRO PICKOFF OPERATES AT CRYOGENIC TEMPERATURES  
INNOVATOR NOT GIVEN /GE/ MAR. 1966  
M-FS-407

Two-axis pickoff for cryogenic gyros uses solid-state light sources and sensors. This compact system operates efficiently at cryogenic temperatures.

B66-10129

DIGITALLY CONTROLLED PULSE-LEVEL DISCRIMINATOR OPERATES OVER WIDE VOLTAGE RANGE  
CANCRO, C. A. MAR. 1966  
GSFC-324

Low power drain discriminator circuit generates an output pulse when an input pulse exceeds a discrete digitally controlled threshold voltage. The discriminator operates over a wide linear or nonlinear range of threshold levels. It uses several amplifier stages ahead of a fixed-reference threshold detector.

B66-10130

MATERIALS PHYSICALLY TESTED IN VARIABLE-ENVIRONMENT CHAMBER  
KNOELL, A. C. MAR. 1966  
JPL-789

Controlled environment chamber for physical tests of crushable materials encloses both the test specimen and the devices for performing the tests. The chamber may be stepped through a range of changing environment.

B66-10133

OMNIDIRECTIONAL ANTENNAS TRANSMIT AND

RECEIVE OVER LARGE BANDWIDTH  
WOODWARD, O. M., JR. /RCA/ MAR. 1966  
GSFC-436

For exchanging wideband signals between two distant ground stations, low-gain antennas with wide angular coverage and circular polarization are mounted on a single mast extending from a satellite. The transmitting antenna has two decoupled ports or inputs for eliminating switching problems when using two transmitters on different frequencies.

B66-10134  
HIGH TEMPERATURE THERMOCOUPLE OPERATES  
IN REDUCTION ATMOSPHERE  
HOFF, R. G. /AERJET-GEN. CORP./ MAR. 1966  
NU-0046

Thermocouple continuously measures a flowing gas up to 4500 degrees F in a hazardous environment. The thermocouple combines rhodium and tungsten in the probe, housing, and swaged extension lead. The wires extend continuously from the cold junction to the probe tip to eliminate errors from secondary thermocouple effects.

B66-10141  
OPTICALLY DRIVEN SWITCH TURN-OFF TIME REDUCED  
BY OPAQUE COATINGS  
INNOVATOR NOT GIVEN /IBM/ APR. 1966  
JPL-SC-107

Turn-off response time of an optically driven switch is reduced by placing an opaque covering over the passivating silicon dioxide members. The coating prevents photon absorption so that carriers are not trapped or stored on the base region, thus shortening turn-off time.

B66-10142  
DIFFUSION TECHNIQUE STABILIZES RESISTOR  
VALUES  
GALLAGHER, R. C. GIULIANO, M. N. /WESTINGHOUSE  
ELEC. CORP./ APR. 1966  
MSC-205

Reduction of the contact resistance stabilizes the values, over a broad temperature range, of resistors used in linear integrated circuits. This reduction is accomplished by P-plus diffusion under the alloyed aluminum contacts.

B66-10144  
MOUNTING IMPROVES HEAT-SINK CONTACT WITH  
BERYLLIA WASHER  
INNOVATOR NOT GIVEN /COLLINS RADIO CO./ APR.  
1966 SEE ALSO B63-10033  
MSC-194

To conduct heat away from electrical components that must be electrically insulated from a metal heat sink, a metal washer and a coil spring are placed between one end of the electrical component and the beryllia washer mounted on the heat sink. The thermal paths are formed by the component lead and base, the metal and beryllia washers, and the compressed spring.

B66-10147  
POLYMER DEFORMATION GAUGE MEASURES THICKNESS  
CHANGE IN TENSILE TESTS  
BROYLES, H. F. BROYLES, H. H. APR. 1966  
JPL-745

Lightweight deformation gauge attached to a polymer specimen determines the thickness changes undergone by the specimen during the testing of its tensile and elongation properties. Mechanical noise from outside sources is dampened when the assembly is hung on a light rubber band.

B66-10148  
TESTER PERIODICALLY REGISTERS DC AMPLIFIER  
CHARACTERISTICS  
CREE, D. WENZEL, G. E. APR. 1966  
MSC-190

Motor-driven switcher-recorder periodically registers the zero drift and gain drift signals of a dc amplifier subjected to changes in environment. A time coding method is used since several measurements are shared on a single recorder trace.

B66-10158  
SWITCHING MECHANISM SENSES ANGULAR  
ACCELERATION  
INNOVATOR NOT GIVEN /BALL BROS. RES. CORP./  
APR. 1966  
GSFC-462

Switching mechanism actuates an electrical circuit when a predetermined angular acceleration and displacement are reached. A rotor in the mechanism overcomes the restraint of a magnetic detent when the case in which the detent is mounted reaches the predetermined angular acceleration.

B66-10159  
IMPROVED SYSTEM MEASURES OUTPUT ENERGY OF  
PYROTECHNIC DEVICES  
SHORTLY, E. M. /N. AM. AVIATION/ APR. 1966  
WOO-256

System for measuring the output energy of pyrotechnic devices discharges the reaction products into a test chamber. It measures the radiant heat output from a pinhole aperture as well as internal pressure changes on a common time base.

B66-10160  
ELECTROPNEUMATIC TRANSDUCER AUTOMATICALLY  
LIMITS MOTOR CURRENT  
LOVITT, T. F. APR. 1966  
LEWIS-253

Pneumatic controller regulates the load on a centrifugal freon compressor in a water cooling system, thus limiting the current input to an electric motor driving it. An electromechanical transducer monitoring the motor input current sends out air signals which indicate changes in the current to the pneumatic controller.

B66-10161  
TRANSDUCER MEASURES FORCE IN VACUUM  
ENVIRONMENT  
GLENN, D. C. APR. 1966  
LEWIS-218

Transducer assembly measures force in a vacuum environment. The assembly consists of a standard capacitance probe and a torque beam. This transducer can be used in high-pressure as well as in low-pressure environments for static and dynamic force measurements.

B66-10162  
FIXTURE AIDS SOLDERING OF ELECTRONIC  
COMPONENTS ON CIRCUIT BOARD  
ROSS, M. H. APR. 1966  
ARC-56

Spring clamp fixture holds small electronic components in a desired position while they are being soldered on a circuit board. The spring clamp is clipped on the edge of the circuit board and an adjustable spring-steel boom holds components against the board. The felt pad at the end of the boom is replaced with different attachments for other holding tasks.

B66-10163  
TWO-LIGHT CIRCUIT CONTINUOUSLY MONITORS AC  
GROUND, PHASE, AND NEUTRAL WIRES  
MEE, R. W. /N. AM. AVIATION/ APR. 1966  
MSC-356

Two-transformer, two-lamp circuit monitors the continuity of ac ground, neutral, and phase wires. The circuit gives different visual indications if any one of the three lines should become open circuited.

B66-10164  
FATIGUE TESTER ACHIEVES TRUE AXIAL MOTION  
THROUGH FLEX PLATES AND BARS  
HENGSTENBERG, T. F. /WESTINGHOUSE ASTRONUCLEAR  
LAB./ KURINKO, C. D. APR. 1966  
NU-0021

Lever load-amplifying fatigue testing machine with a load cycle frequency of 100 to 900 cycles per minute applies the load through true axial motion. Pivot friction and bearing wear are eliminated by replacing these parts with flex plates and bars.



B66-10170  
SCANNING PHOTOMETER SYSTEM AUTOMATICALLY  
DETERMINES ATMOSPHERIC LAYER HEIGHT  
WOLFF, M. /MIT/ APR. 1966  
MSC-245

Two photometers, placed a given distance apart, determine the height of nonuniform luminous layers in a synchronous manner. Photometer outputs are correlated by a simple analog correlation computer to automatically give the luminous layer height. This system is used to determine visibility ceilings at airports.

B66-10177  
BINARY FLUID AMPLIFIER SOLVES STABILITY AND  
LOAD PROBLEMS  
LARKIN, B. D. READER, T. D. /GIANNINI CONTROLS  
CORP./ MAY 1966  
ERC-15

Digital fluid amplifier has load intensity, high stability, and operates at low Reynolds numbers. It contains specially designed nozzles to provide uniform exit-velocity profiles and to ensure jets of low turbulence.

B66-10179  
COMPLEMENTARY MONOSTABLE CIRCUITS ACHIEVE LOW  
POWER DRAIN AND HIGH RELIABILITY  
KLEINBERG, L. L. LAVIGNE, R. C. MAY 1966  
GSFC-433

Two-transistor multivibrator has minimum power dissipation and maximum reliability. It minimizes the use of components that are subject to environmental changes or other unpredictable behavior.

B66-10180  
THIN-FILM GAGE MEASURES LOW HEAT-TRANSFER  
RATES  
SPITZER, C. R. MAY 1966  
LANGLEY 205

Low heat-transfer gauge facilitates determination of the transition between laminar and turbulent conditions, in the boundary layer surrounding slender and moderately slender cones under test in a hypersonic blowdown helium tunnel. The gauge consists of a thin layer of vacuum-evaporated platinum on a heat resistant glass substrate contoured to fit model surfaces.

B66-10182  
SUBMINIATURIZED GAS CHROMATOGRAPH GIVES FAST,  
EFFICIENT ANALYSIS  
WILHITE, W. F. MAY 1966  
JPL-735 JPL-736 JPL-737 JPL-740

Space oriented, lightweight, subminiaturized gas chromatograph analyzes gas samples in a few seconds with a carrier gas flow of one milliliter per second. In extraterrestrial exploration, the system could be used with a mass spectrometer for detection of life-supporting compounds.

B66-10192  
COATING PERMITS USE OF STRAIN GAGE IN WATER  
AND LIQUID HYDROGEN  
BERVEN, B. B. /N. AM. AVIATION/ MAY 1966  
M-FS-594

Strain gauge installation covered with a three-layer coating of commercial materials makes measurements in water and liquid hydrogen. It consists of a selected foil strain gauge bonded with a modified commercial heat-curing epoxy cement. The outer protective layer of the gauge installation may develop cracks when immersed in liquid hydrogen.

B66-10193  
SOLID STATE THERMOSTAT HAS INTEGRAL PROBE AND  
CIRCUITRY  
INNOVATOR NOT GIVEN /METRO PHYS., INC./ MAY 1966  
M-FS-434

Compact, reliable thermostat provides a temperature readout signal and a continuous temperature-control output for temperature monitoring by automatic checkout equipment or telemetry systems. It employs a solid state circuit in a housing rigidly attached to a thermistor probe.

B66-10198  
DEVICE WITHOUT ELECTRICAL CONNECTIONS IN  
TANK MEASURES LIQUID LEVEL  
SHENKMAN, J. S. /V. K. C. AEROJET-GEN. CORP./  
MAY 1966  
WOO-235

Vertical static float in a tank measures the liquid level without the use of electrical connections in the tank. The float transmits the buoyant force of the liquid to an external force transducer. It is insensitive to tank pressure and temperature changes.

B66-10200  
APPARATUS PRESENTS VISUAL DISPLAY OF  
SEMICONDUCTOR SURFACE CHARACTERISTICS  
SUMMERS, R. A. MAY 1966  
JPL-665

Apparatus provides a representation of the physicochemical condition of the surface layers of a semiconductor. It is based on the principle that the surface layers of a semiconductor will conduct an electric current when exposed to a beam of light.

B66-10203  
SOLDERING IRON TEMPERATURE IS AUTOMATICALLY  
REDUCED  
LUM, J. Y. MAY 1966  
ARC-57

Hinged cradle-microswitch arrangement maintains a soldering iron at less than peak temperature when not in use. The microswitch introduces a voltage reducing element into the soldering iron power circuit when the iron is placed on the cradle. The iron, when removed from the cradle, returns to operating temperature in 15 to 30 seconds.

B66-10205  
WIDE-RANGE INSTRUMENT MONITORS FLOW RATES  
OF CHEMICALLY ACTIVE FLUIDS  
INNOVATOR NOT GIVEN /SPACELABS/ MAY 1966  
MSC-186

In-line transducers system measures flow rate of chemically active propellant fluids. The system uses one low-flow transducer and one high-flow transducer. Each consists of separate heater and temperature-sensing elements.

B66-10220  
ULTRASONIC RECORDING SCANNER USED FOR  
NONDESTRUCTIVE WELD INSPECTION  
INNOVATOR NOT GIVEN /BOEING CO./ MAY 1966 SEE  
ALSO B66-10178  
M-FS-284

Portable ultrasonic recording scanner is used for nondestructive inspection of welds. It is adaptable to continuous operation in one direction while maintaining oscillatory motion at a right angle to this direction. The scanning speed and oscillation frequency are independently adjustable.

B66-10223  
MULTICOLOR STROBOSCOPE PINPOINTS RESONANCES IN  
VIBRATING COMPONENTS  
INNOVATOR NOT GIVEN /CALIF. INST. RES. FOUND./  
MAY 1966  
JPL-0033

Stroboscopic system, which uses three different colored lights, rapidly scans a multicomponent assembly and provides a visual indication of resonant components. The lights are pulsed at the same flash frequency but at different phases.

B66-10224  
FET COMPARATOR DETECTS ANALOG SIGNAL LEVELS  
WITHOUT LOADING ANALOG DEVICE  
WALLACE, H. L. /GE/ MAY 1966  
M-FS-503

FET comparator circuit detects discrete analog computer output levels without excessively loading the output amplifier of the computer. An FET common source amplifier is coupled by a differential amplifier to a bistable transistor flip-flop. This circuit provides a digital output for analog voltages above or below a predetermined level.

**B66-10225**  
SINGLE-CRYSTAL SEMICONDUCTOR FILMS GROWN ON  
FOREIGN SUBSTRATES  
VOHL, P. /RCA/ MAY 1966  
WOO-076

Intermediate alloy formed between foreign substrates and semiconductor material enable the growth of single crystal semiconductor films on the alloy layer. The melted film must not ball up on the surface of the substrate and neither chemically react nor alloy with the intermediate alloy formed on the substrate.

**B66-10232**  
ELECTRONIC PHASE-LOCKED-LOOP SPEED CONTROL  
SYSTEM IS STABLE  
STONE, F. A. /RAYMOND ENG. LAB./ JUN. 1966  
JPL-SC-084

Phase locked-loop circuit is used for playback motors in digital tape recorders where the reproducer output remains in exact synchronism with an external reference clock over extended periods. It removes the motor dynamics from the control loop so that the loop is stable without damping.

**B66-10245**  
RUGGED MICROELECTRONIC MODULE PACKAGE SUPPORTS  
CIRCUITRY ON HEAT SINK  
JOHNSON, A. L. /MINNEAPOLIS-HONEYWELL REGULATOR  
CO./ JUN. 1966  
MSC-81A

Rugged module package for thin film hybrid microcircuits incorporated a rigid, thermally conductive support structure, which serves as a heat sink, and a lead wire block in which T-shaped electrical connectors are potted. It protects the circuitry from shock and vibration loads, dissipates internal heat, and simplifies electrical connections between adjacent modules.

**B66-10251**  
POLARIZING KEYS PREVENT MISMATCH OF CONNECTOR  
PLUGS AND RECEPTACLES  
CHIAPUZZO, A. /N. AM. AVIATION/ JUN. 1966  
MSC-443

Keying prevents mismatching of plugs and receptacles in connector patching of instrumentation involving several thousand leads. Each receptacle and plug contains three polarizing keys that must mate in a complementary mode before the connector pins and sockets will engage.

**B66-10260**  
MULTIPLE TEMPERATURES SAMPLED USING ONLY ONE  
REFERENCE JUNCTION  
COPE, G. W. JUN. 1966  
GSFC-485

In a multitemperature sampling system where the reference thermocouples are a distance from the test thermocouples, an intermediate thermal junction block is placed between the sets of thermocouples permitting switching between a single reference and the test thermocouples. This reduces the amount of cabling, reference thermocouples, and cost of the sampling system.

**B66-10261**  
SIMPLIFIED CIRCUIT CORRECTS FAULTS IN PARALLEL  
BINARY INFORMATION CHANNELS  
GOLDBERG, J. /STANFORD RES. INST./ JUN. 1966  
SEE ALSO B65-10025

Corrective circuit prevents the appearance of erroneous output signals from the possible failure of any single-channel element interconnected in parallel binary information channels. The circuit is simplified and economical because it does not use redundant channels.

**B66-10264**  
BINARY SEQUENCE DETECTOR USES MINIMUM NUMBER  
OF DECISION ELEMENTS  
PERLMAN, M. JUN. 1966  
JPL-673

Detector of an n bit binary sequence code within a

serial binary data system assigns states to memory elements of a code sequence detector by employing the same order of states for the sequence detector as that of the sequence generator when the linear recursion relationship employed by the sequence generator is given.

**B66-10270**  
MAGNETICALLY OPERATED LIMIT SWITCH HAS  
IMPROVED RELIABILITY, MINIMIZES ARCING  
STEINER, R. /N. AM. AVIATION/ JUN. 1966  
MSC-422

Limit switch for reliable, low-travel, snap action with negligible arcing uses an electrically nonconductive permanent magnet consisting of a ferrimagnetic ceramic and ferromagnetic pole shoes which form a magnetic and electrically conductive circuit with a ferrous-metal armature.

**B66-10271**  
PN ACQUISITION DEMODULATOR ACHIEVES AUTOMATIC  
SYNCHRONIZATION OF A TELEMETRY CHANNEL  
COUVILLON, L. JUN. 1966  
JPL-612

Data demodulator for automatic sync acquisition provides an automatic means for obtaining initial word and bit synchronization in a pulse-code-modulated/phase-shift-keyed digital communications system.

**B66-10272**  
EXCLUSIVE-OR LOGIC CIRCUIT HAS USEFUL  
PROPERTIES  
BATTE, W. G. JUN. 1966  
LANGLEY-214

Single, simple exclusive-or logic connective eliminates excessive hardware and the number of interconnections between logic modules. This circuit performs the necessary switching for the exclusive-or operation and amplifies, restores, and inverts the signal.

**B66-10274**  
BRAZE ALLOYS USED AS TEMPERATURE INDICATORS  
RICE, R. E. /AEROJET-GEN. CORP./ SHURLEY, L. A.  
JUN. 1966  
NU-0063

Patches of braze alloys having known fusion are applied to portions of a metal surface where temperature indicators are required. This method is used to measure temperatures over the range of 175 degrees to 2100 degrees fahrenheit where it is not feasible to employ conventional temperature detectors.

**B66-10280**  
STRAIN GAUGE NETWORK DISTINGUISHES BETWEEN  
THERMAL AND MECHANICAL DEFORMATIONS  
CEPOLLINA, F. J. JUN. 1966  
GSFC-478

Strain gauge network measures the thermal coefficient of linear expansion of composite metal structures. The network consists of a test gauge and two dummy gauges arranged to distinguish thermally induced deformation from mechanical strain.

**B66-10282**  
SIMPLE CIRCUIT PROVIDES RELIABLE MULTIPLE  
SIGNAL AVERAGE AND REJECT CAPABILITY  
OPENSHAW, R. L. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0069

Summation average and reject circuit based on diode clamping allows detection of individual functional deviations in a multiple signal system without shutting down the entire system.

**B66-10286**  
VACUUM TEST FIXTURE IMPROVES LEAKAGE RATES  
MEASUREMENTS  
MAIER, H. MARX, H. /GRUMMAN AIRCRAFT CORP./  
JUN. 1966  
MSC-271

Cylindrical chamber, consisting of two matching halves, forms a vacuum test fixture for measuring leakage rates of individual connections, brazed joints, and entrance ports used in closed fluid flow line systems. Once the chamber has been sufficiently evacuated, atmospheric pressure holds

the two halves together.

B66-10287

DETECTION SYSTEM ENSURES POSITIVE ALARM  
ACTIVATION IN DIGITAL MESSAGE LOSS

BOKROS, P. BURSTEIN, A. HEWITT, E. D. /RCA/  
JUN. 1966  
W00-208

Lost Word Detection System /LOWDS/ provides special identification for each error detection message transmitted from receiver to transmitter. The message is identified as an original message or an n-times retransmitted message so the receiver can detect where a retransmission request was not fulfilled and activate an alarm.

B66-10291

LARGE CAPACITOR PERFORMS AS A DISTRIBUTED  
PARAMETER PULSE LINE

GOODING, T. J. /GEN. DYN./ASTRONAUTICS/ JUL.  
1966  
LEWIS-176

Capacitor of extended foil construction performs as a distributed parameter pulse line in which current, amplitude, and period are readily controlled. The capacitor is used as the energy storage element in a pulsed plasma accelerator.

B66-10292

CIRCUIT PROTECTS REGULATED POWER SUPPLY  
AGAINST OVERLOAD CURRENT

AIRTH, H. B. /WESTINGHOUSE ELEC. CORP./ JUL.  
1966  
GSFC-453

Sensing circuit in which a tunnel diode controls a series regulator transistor protects a low voltage transistorized dc regulator from damage by excessive load currents. When a fault occurs, the faulty circuit is limited to a preset percentage of the current when limiting first occurs.

B66-10293

DAMPING TECHNIQUE GIVES ACCELEROMETER FLAT  
FREQUENCY RESPONSE

WING, T. /GULTON IND./ JUL. 1966  
M-FS-471

Piezoelectric accelerometer uses a viscous damping technique to achieve a flat frequency response over a wide frequency range in high acoustic environments. This eliminates the electrical overload on associated electronics and loss of useful data caused by oscillations of the accelerometer.

B66-10295

SUBSTITUTING TRANSISTOR FOR DIODE IMPROVES  
RECTIFYING MEANS

MULLER, R. M. JUL. 1966  
GSFC-474

Unusual transistor connection that substitutes for a silicon diode and allows significantly higher repetition rates without increasing power loss rectifies an alternating current. Operation speed is improved by a factor of 10 or more when a given diode is replaced by this transistor circuit.

B66-10300

COMPUTER PROGRAM DETERMINES GAS FLOW RATES IN  
PIPING SYSTEMS

FRANKE, R. /BOEING CO./ JUL. 1966  
M-FS-443

Computer program calculates the steady state flow characteristics of an ideal compressible gas in a complex piping system. The program calculates the stagnation and total temperature, static and total pressure, loss factor, and forces on each element in the piping system.

B66-10306

INSTRUMENT CALCULATES MOMENTS OF INERTIA OF  
COMPLEX PLANE FIGURES

MYERS, W. J. /N. AM. AVIATION/ JUL. 1966  
MSC-628

Instrument consisting of a narrow field scanner coupled with a simple preprogrammed computer calculates distributive-area properties of complex or irregular plane figures representing cross

sections of structural members. The calculator obtains the properties quickly and with a high degree of accuracy.

B66-10308

MICROPHONE MULTIPLEX SYSTEM PROVIDES MULTIPLE  
OUTLETS FROM SINGLE SOURCE

LAUVER, R. E. AUG. 1966  
GSFC-426

Microphone multiplex system accepts an audio signal from a single source and provides any number of low impedance outputs at microphone level with complete isolation between output channels. Any input or output may be converted to high impedance by eliminating the associated transformer.

B66-10309

HIGH-PERFORMANCE RC BANDPASS FILTER IS  
ADAPTED TO MINIATURIZED CONSTRUCTION  
JUL. 1966  
ARC-60

Miniaturized bandpass filter with RC networks is suitable for use in integrated circuits. The circuit consists of three stages of amplification with additional resistive and capacitive components to obtain the desired characteristics. The advantages of the active RC filter network are the reduction in size and weight and elimination of magnetic materials.

B66-10315

SYSTEM LOCATES RANDOMLY PLACED REMOTE OBJECTS  
LOVELADY, R. W. MC FALL, J. C., JR. JUL. 1966  
LANGLEY-209

System to locate objects submerged underwater uses active/passive sonar techniques in which a transmitter is attached to the object to be recovered and a receiver is used for search. The system is rugged, has a long term operating life, and furnishes a precise bearing on the object.

B66-10320

SOLVENT RESIDUE CONTENT MEASURED BY LIGHT  
SCATTERING TECHNIQUE

SALKOWSKI, M. J. WERLE, D. K. /IIT RES. INST./  
JUL. 1966  
M-FS-850

Photometric analyzer measures NVR /nonvolatile residue/ in trichloroethylene and other organic solvents. The analyzer converts the liquid solvent to aerosol and passes it between an optically focused light beam and a photodetector that is connected to standard amplifying and readout equipment.

B66-10324

INSTRUMENT TRANSMITS VANISHING POINT TO  
ILLUSTRATION POINT

ALVAREZ, M. M. /N. AM. AVIATION/ JUL. 1966  
MSC-267A

Instrument transmits the vanishing point of an illustration to a point on the illustration on a diminishing scale that also serves as a straightedge.

B66-10331

CIRCUIT PROVIDES ACCURATE FOUR-QUADRANT  
MULTIPLICATION

MC GOWAN, G. F. /MARTIN-MARIETTA CORP./ JUL.  
1966  
W00-272

Solid state circuit provides four-quadrant multiplication at frequencies ranging from dc to 100 cps using pulse-width and -height multiplication techniques. The circuit consumes little power and has an accuracy of approximately one percent.

B66-10341

ULTRASONIC EMISSION METHOD ENABLES TESTING OF  
ADHESIVE BONDS

FRANK, L. SCHMITZ, G. /GEN. AM. TRANSPORTATION  
CORP./ AUG. 1966  
M-FS-799

Detection of acoustic energy emitted by adhesive bonds subjected to tensile stresses at frequencies above sixteen kilocycles per second is used as a method for determining bond strength. This

method is used in measuring adhesive bond strengths on metal honeycomb core panels.

B66-10344  
PHASE INVERTER PROVIDES VARIABLE REFERENCE  
PUSH-PULL OUTPUT  
INNOVATOR NOT GIVEN /RCA/ AUG. 1966  
HQ-23

Dual-transistor difference amplifier provides a push-pull output referenced to a dc potential which can be varied without affecting the signal levels. The amplifier is coupled with a feedback circuit which can vary the operating points of the transistors by equal amounts to provide the variable reference potentials.

B66-10347  
DUST PARTICLE INJECTOR FOR HYPERVELOCITY  
ACCELERATORS PROVIDES HIGH CHARGE-TO-MASS  
RATIO  
BERG, O. E. AUG. 1966  
GSFC-509

Injector imparts a high charge-to-mass ratio to microparticles and injects them into an electrostatic accelerator so that the particles are accelerated to meteoric speeds. It employs relatively large masses in the anode and cathode structures with a relatively wide separation, thus permitting a large increase in the allowable injection voltages.

B66-10349  
ELECTRICALLY CONDUCTIVE FIBERS THERMALLY  
ISOLATE TEMPERATURE SENSOR  
DE WAARD, R. NORTON, B. /BARNES ENG. CO./ AUG.  
1966  
GSFC-456

Mounting assembly provides thermal isolation and an electrical path for an unbaked thermal sensor. The sensor is suspended in the center of a plastic mounting ring from four plastic fibers, two of which are coated with an electrically conductive material and connected to electrically conductive coatings on the ring.

B66-10350  
TRANSISTOR CIRCUIT INCREASES RANGE OF  
LOGARITHMIC CURRENT AMPLIFIER  
GILMOUR, G. /WESTINGHOUSE ASTRONUCL. LAB./ AUG.  
1966  
NU-0018

Circuit increases the range of a logarithmic current amplifier by combining a commercially available amplifier with a silicon epitaxial transistor. A temperature compensating network is provided for the transistor.

B66-10351  
FUNCTION GENERATOR ELIMINATES NECESSITY  
OF SERIES SUMMATION  
CALLAN, J. D. MC CALL, A. J. MEAD, D. /HUGHES  
AIRCRAFT CO./ AUG. 1966  
GSFC-214

Diode generator using four building-block circuits produces complex waveforms without the necessity of series summation. This highly specialized method of producing complex waveforms requires less power than present methods and uses simpler circuitry.

B66-10353  
ACCELERATION-COMPENSATED PRESSURE TRANSDUCER  
HAS FAST RESPONSE  
INNOVATOR NOT GIVEN /CORNELL AERON. LAB./ AUG.  
1966  
LANGLEY-113

Flush-diaphragm transducer accurately measures small dynamic pressures when it is subjected to high accelerations and severe temperature environments. The transducer uses piezoelectric crystals for measuring the pressure and balancing out acceleration forces.

B66-10355  
BRUSHLESS DC MOTOR HAS HIGH EFFICIENCY, LONG  
LIFE  
STUDER, P. A. AUG. 1966  
GSFC-181

Brushless dc motor operates as a commutator in a

vacuum environment with high efficiency and long life. Because of its excellent response time, it can be used in the servomechanism field.

B66-10356  
\*\*SNIFFER\*\* USED AS PORTABLE HYDROGEN LEAK  
DETECTOR  
DAYAN, V. H. ROMMEL, M. A. /N. AM. AVIATION/  
AUG. 1966  
M-FS-846 M-FS-806

Sniffer type portable monitor detects hydrogen in air, oxygen, nitrogen, or helium. It indicates the presence of hydrogen in contact with activated palladium black by a change in color of a thermochromic paint, and indicates the quantity of hydrogen by a sensor probe and continuous readout.

B66-10359  
DEVICE SERVES AS HINGE AND ELECTRICAL  
CONNECTOR FOR CIRCUIT BOARDS  
BETHEL, P. G. HARRIS, G. G. /CHRYSLER CORP./  
AUG. 1966  
M-FS-743

Hinge makes both sides of electrical circuit boards readily accessible for component checkout and servicing. The hinge permits mounting of two circuit boards and incorporates connectors to maintain continuous electrical contact between the components on both boards.

B66-10361  
NEW COMPUTER SYSTEM SIMPLIFIES PROGRAMMING OF  
MATHEMATICAL EQUATIONS  
REINFELDS, J. SEITZ, R. N. WOOD, L. H. AUG.  
1966  
M-FS-441

Automatic Mathematical Translator /AMSTRAN/ permits scientists or engineers to enter mathematical equations in their natural mathematical format and to obtain an immediate graphical display of the solution. This automatic-programming, on-line, multiterminal computer system allows experienced programmers to solve nonroutine problems.

B66-10362  
AUTOMATED DRAFTING SYSTEM USES COMPUTER  
TECHNIQUES  
MILLENSON, D. H. /N. AM. AVIATION/ AUG. 1966  
M-FS-788

Automated drafting system produces schematic and block diagrams from the design engineers freehand sketches. This system codes conventional drafting symbols and their coordinate locations on standard size drawings for entry on tapes that are used to drive a high speed photocomposition machine.

B66-10363  
INFRARED TELEVISION USED TO DETECT HYDROGEN  
FIRES  
PROFFITT, R. T. /N. AM. AVIATION/ AUG. 1966  
M-FS-654

Standard, commercially available closed circuit television system detects hydrogen fires in test facilities. It sees in the infrared and displays on a standard cathode ray monitor screen.

B66-10368  
HYDROGEN FIRE DETECTION SYSTEM FEATURES SHARP  
DISCRIMINATION  
BRIGHT, C. S. /N. AM. AVIATION/ AUG. 1966  
M-FS-643

Hydrogen fire detection system discovers fires by detecting the flickering ultraviolet radiation emitted by the OH molecule, a short-lived intermediate combustion product found in hydrogen-air flames. In a space application, the system discriminates against false signals from sunlight and rocket engine exhaust plume radiation.

B66-10374  
PNEUMATIC BINARY ENCODER REPLACES MULTIPLE  
SOLENOID SYSTEM  
INNOVATOR NOT GIVEN /WESTON HYDRAULICS/ AUG. 1966  
M-FS-665

Pneumatic binary encoder replaces solenoid system in the pilot stage of a digital actuator. The

encoder operates in flip-flop manner to valve gas at either high or low pressures. By rotating the disk in a pinion-to-encoding gear ratio, six to eight adder circuits may be operated from single encoder.

B66-10376  
EFFICIENT DC TO DC CONVERTER ELIMINATES  
LARGE STRAY MAGNETIC FIELDS  
TUMS, E. O. /CHICAGO UNIV./ AUG. 1966  
GSFC-463

Two-core nonsaturating dc to dc converter provides high switching efficiency without producing large stray magnetic fields. It uses one core to provide positive feedback and the combination of the two cores for the transformer.

B66-10377  
SINGLE CHANNEL PULSE-HEIGHT ANALYZER OPERATES  
IN SUBNANOSECOND RANGE  
AUG. 1966 SEE ALSO NASA-TN-D-2673  
LEWIS-267

Single-channel pulse-height analyzer measures nuclear state lifetimes shorter than one nanosecond. The customary logic arrangement is reversed to reduce timing errors.

B66-10379  
HUMAN TRANSFER FUNCTIONS USED TO PREDICT  
SYSTEM PERFORMANCE PARAMETERS  
AUG. 1966 SEE ALSO NASA-TN-D-1952, NASA-TN-D-2177, NASA-TN-D-2394, AND NASA-TN-D-2569  
LANGLEY-203

Automatic, parameter-tracking, model-matching technique compares the responses of a human operator with those of an analog computer model of a human operator to predict and analyze the performance of mechanical or electromechanical systems prior to construction. Transfer functions represent the input-output relation of an operator controlling a closed-loop system.

B66-10382  
FEEDBACK LOOP COMPENSATES FOR RECTIFIER  
NONLINEARITY  
INNOVATOR NOT GIVEN /SPERRY GYROSCOPE CO./ AUG. 1966  
M-FS-384

Signal processing circuit with two negative feedback loops rectifies two sinusoidal signals which are 180 degrees out of phase and produces a single full-wave rectified output signal. Each feedback loop incorporates a feedback rectifier to compensate for the nonlinearity of the circuit.

B66-10386  
PARALLEL LINE RASTER ELIMINATES AMBIGUITIES IN  
READING TIMING OF PULSES LESS THAN 500  
MICROSECONDS APART  
HORNE, A. P. SEP. 1966  
JPL-805

Parallel horizontal line raster is used for precision timing of events occurring less than 500 microseconds apart for observation of hypervelocity phenomena. The raster uses a staircase vertical deflection and eliminates ambiguities in reading timing of pulses close to the end of each line.

B66-10389  
SYSTEM MONITORS DISCRETE COMPUTER INPUTS  
BURNS, J. J. /RCA/ AUG. 1966  
M-FS-1021

Computer system monitors inputs from checkout devices. The comparing, addressing, and controlling functions are performed in the I/O unit. This leaves the computer main frame free to handle memory, access priority, and interrupt instructions.

B66-10391  
JUNCTION CONNECTORS PERMIT STRATEGIC  
PLACEMENT OF TELEVISION CAMERAS  
KEMPSON, A., JR. SEP. 1966  
KSC-66-22

Cable run circuit with switching junction connectors at strategic locations enables television cameras to be plugged in with minimum effort wherever needed. Crimp-type contacts for

mating connections reduce installation time and require a lesser level of technician skill than do soldered and potted connections.

B66-10392  
INDUCTIVE SYSTEM DETECTS LEVEL OF CONDUCTING  
FLUIDS  
ROESKE, P. W. AUG. 1966  
LEWIS-322

Inductive system monitors the liquid level of a conductive fluid that is at a high temperature in a fully closed opaque container. The system is useful in any high temperature liquid-metal system. It shows fast response and is relatively insensitive to temperature fluctuations.

B66-10393  
COMPOSITE FILTER STEEPENS REJECTION SLOPES IN  
MICROWAVE APPLICATION  
INNOVATOR NOT GIVEN /DORNE AND MARGOLIN/ AUG. 1966  
GSFC-480

Composite filter is used to obtain sharp rejection slopes in microwave transmission by filtering techniques. It consists of a bandpass filter to shape the passband and a bandreject filter on each edge of the bandpass filter to steepen the rejection slopes.

B66-10394  
HIGH PRESSURE CRYOGENIC LIQUID FLOW SIGHT  
ASSEMBLY PROVIDES STREAMLINED FLOW FOR EASY  
OBSERVATION  
HOBART, H. E. MINKIN, H. L. AUG. 1966  
LEWIS-310

Window assembly facilitates observation of cryogenic liquids flowing through a smooth pipe at pressures up to several hundred pounds per square inch. This high-pressure cryogenic observation assembly which houses a thin wall glass pipe held within a steel retainer can accommodate fluids under a wide range of pressures and temperatures.

B66-10396  
SOLID STATE DETECTORS MONITOR RELAY CONTACTS  
QUINN, J. D. SEPT. 1966  
JPL-785

Hand carried, solid state, 18-channel detector system constantly monitors contact conditions in relays. The system is relatively insensitive to external noise and is powered by standard 110 volt ac.

B66-10397  
MINIMUM PERMISSIBLE LEAKAGE RESISTANCE  
ESTABLISHED FOR INSTRUMENTATION SYSTEMS  
PERRIN, J. L. /N. AM. AVIATION/ SEP. 1966  
M-FS-848

Mathematical formulas are used to determine if, and to what extent, an instrumentation system that has been exposed to the elements should be dried out to restore minimum permissible leakage resistance to ground. Formulas are also derived and used for an intermediate number of systems that are exposed to moisture penetration.

B66-10401  
DIELECTROMETER DESIGN PERMITS MEASUREMENT IN  
VACUUM UNDER IRRADIATION  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ SEP. 1966  
M-FS-359

Dielectrometer permits measurement of dielectric constant and dielectric losses in a vacuum environment exposed to radiation. It is not necessary to remove the sample from the chamber during testing.

B66-10404  
NEW COMPUTER PROGRAM SOLVES WIDE VARIETY OF  
HEAT FLOW PROBLEMS  
ALMOND, J. C. /BOEING CO./ SEP. 1966  
M-FS-421

Boeing Engineering Thermal Analyzer /BETA/ computer program uses numerical methods to provide accurate heat transfer solutions to a wide variety of heat flow problems. The program solves steady-state and transient problems in almost any situation that can be represented by a

resistance-capacitance network.

**B66-10407**  
DIRECTION INDICATOR SYSTEM DOES NOT REQUIRE  
COMPLICATED OPTICS  
MILDICE, J. W. /GEN. DYN./CONVAIR/ SEP. 1966  
WOO-305

Direction indicator which aligns a system relative to a light source uses two photocells as light sensors to form a set. Each set indicates one direction. This indicator has no moving parts and provides very fine vernier acquisition.

**B66-10409**  
MODULAR POROUS PLATE SUBLIMATOR /MPPS/  
REQUIRES ONLY WATER SUPPLY FOR COOLANT  
RATHBUN, R. J. /IBM/ SEP. 1966  
M-FS-1374

Modular porous plate sublimators, provided for each location where heat must be dissipated, conserve the battery power of a space vehicle by eliminating the coolant pump. The sublimator requires only a water supply for coolant.

**B66-10412**  
LEAK LOCATOR FOR VACUUM JACKETED PIPELINES  
ELIMINATES NEED FOR REMOVAL OF OUTER JACKET  
WELLS, G. H. /N. AM. AVIATION/ SEP. 1966  
M-FS-888

Device for locating leaks in a vacuum-jacketed liquid-hydrogen transfer line consists of two Mylar discs, a source of nitrogen and helium gas, and a mass spectrometer. The outer jacket of the pipeline does not need to be removed for the locator to be used.

**B66-10413**  
ANALOG SOLAR SYSTEM MODEL RELATES CELESTIAL  
BODIES SPATIALLY  
BAERG, H. R. SEP. 1966  
JPL-195

Portable analog planetarium indicates the relative time and space angular locations of the Sun and planets. Distance measuring scales, angular direction indicators, and typical probe trajectories are included.

**B66-10414**  
ELECTRICALLY CONTROLLED OPTICAL LATCH AND  
SWITCH REQUIRES LESS CURRENT  
PIECZONKA, W. A. ROY, M. M. YEH, T. H. /IBM/  
SEP. 1966  
JPL-SC-111 JPL-SC-112

Electrically controlled optical latch consists of a sensitive phototransistor and a solid-state light source. This design requires less current to activate an optically activated switch than in prior art.

**B66-10419**  
METAL OXIDE SILICON /MOS/ TRANSISTORS  
PROTECTED FROM DESTRUCTIVE DAMAGE BY WIRE  
DEVICE  
DEBOO, G. J. DEVINE, E. J. SEP. 1966  
ARC-65

Loop of flexible, small diameter, nickel wire protects metal oxide silicon /MOS/ transistors from a damaging electrostatic potential. The wire is attached to a music-wire spring, slipped over the MOS transistor case, and released so the spring tensions the wire loop around all the transistor leads, shorting them together. This allows handling without danger of damage.

**B66-10420**  
ELECTRONIC BIDIRECTIONAL VALVE CIRCUIT  
PREVENTS CROSSOVER DISTORTION AND THRESHOLD  
EFFECT  
KERNICK, A. /WESTINGHOUSE ELEC. CORP./ SEP. 1966  
MSC-193

Four-terminal network forms a bidirectional valve which will switch or alternate an ac signal without crossover distortion or threshold effect. In this network, an isolated control signal is sufficient for circuit turn-on.

**B66-10423**  
AN INVESTIGATION OF PHASE-LOCK LOOP SWEEP-  
FREQUENCY SYNCHRONIZATION

DYE, R. A. /LOCKHEED MISSILES AND SPACE CO./  
SEP. 1966  
M-FS-656

Rapid synchronization of phase-locked oscillators is best achieved by the swept-frequency acquisition technique, wherein the Voltage-Controlled Oscillator /VCO/ is linearly swept through the uncertainty band. The theoretically predicted sweep rates of this technique and the observed experimental results differ by less than seven percent.

**B66-10426**  
COMPUTER SIMULATION PROGRAM IS ADAPTABLE TO  
INDUSTRIAL PROCESSES  
SCHULTZ, F. E. /GE/ OCT. 1966  
LEWIS-240

The Reaction Kinetics Ablation Program /REKAP/, developed to simulate ablation of various materials, provides mathematical formulations for computer programs which can simulate certain industrial processes. The programs are based on the use of nonsymmetrical difference equations that are employed to solve complex partial differential equation systems.

**B66-10427**  
ELECTRICAL CABLING WITHSTANDS SEVERE  
ENVIRONMENTAL CONDITIONS  
HATHAWAY, J. D. /N. AM. AVIATION/ SEP. 1966  
M-FS-1585

Multiconductor electrical cables retain their circuit integrity and remain flexible and abrasion resistant in severe environmental conditions of heat, vibration, and water.

**B66-10429**  
VIDEO SIGNAL PROCESSING SYSTEM USES GATED  
CURRENT MODE SWITCHES TO PERFORM HIGH SPEED  
MULTIPLICATION AND DIGITAL-TO-ANALOG  
CONVERSION  
GILLILAND, M. G. ROUGELOT, R. S. SCHUMAKER, R.  
A. /GE/ OCT. 1966  
MSC-781

Video signal processor uses special-purpose integrated circuits with nonsaturating current mode switching to accept texture and color information from a digital computer in a visual spaceflight simulator and to combine these, for display on color CRT with analog information concerning fading.

**B66-10430**  
SOLID-STATE SWITCH INCREASES SWITCHING SPEED  
MC GOWAN, G. F. /MARTIN CO./ OCT. 1966  
WOO-298

Solid state switch for commutating capacitors in an RC commutated network increases switching speed and extends the filtering or commutating frequency spectrum well into the kilocycle region. The switch is equivalent to the standard Double-Pole Double-Throw /DPDT/ relay and is driven from digital micrologic circuits.

**B66-10431**  
CONTROL CIRCUIT MAINTAINS UNITY POWER FACTOR  
OF REACTIVE LOAD  
KRAMER, M. MARTINAGE, L. H. /IBM/ OCT. 1966  
MSC-192

Circuit including feedback control elements automatically corrects the power factor of a reactive load. It maintains power supply efficiency where negative load reactance changes and varies by providing corrective error signals to the control windings of a power supply transformer.

**B66-10432**  
REMOTE PREAMPLIFIER CIRCUIT MAINTAINS STABILITY  
OVER WIDE TEMPERATURE RANGE  
MAC NAUGHTON, R. G. /VARIAN ASSOCIATES/ OCT.  
1966  
WOO-278

Circuit remains stable over a wide temperature range while preamplifying light signals falling on a photocell and transmitting them through a transmission line to a remote amplifier. The circuits preamplifier consists of a grounded emitter npn stage followed by a pnp emitter.

**B66-10433**  
**LINEAR SIGNAL NOISE SUMMER ACCURATELY**  
**DETERMINES AND CONTROLS S/N RATIO**  
 SUNDRY, J. L. /WESTINGHOUSE ELEC. CORP./ OCT. 1966  
**JPL-SC-152**

Linear signal noise summer precisely controls the relative power levels of signal and noise, and mixes them linearly in accurately known ratios. The S/N ratio accuracy and stability are greatly improved by this technique and are attained simultaneously.

**B66-10436**  
**SHAFT ENCODER PRESENTS DIGITAL OUTPUT**  
 HILLIS, D. A. /HUGHES AIRCRAFT CO./ OCT. 1966  
**JPL-SC-191**

Circuits that include compensation circuitry time a capacitance relative to a reference voltage so that a digital presentation occurs that is representative of the positional condition of the mechanical shaft being monitored. This circuitry may be employed in multiples to furnish binary encoding of a number of rotating devices simultaneously.

**B66-10437**  
**SINGLE-SIDEBAND MODULATOR ACCURATELY**  
**REPRODUCES PHASE INFORMATION IN 2-MC SIGNALS**  
 STRENGLEIN, H. F. /SPERRY MICROWAVE ELECTRON. CO./ OCT. 1966  
**M-FS-664**

Phase-locked oscillator system employing solid state components acts as a single-sideband modulator to accurately reproduce phase information in 2-mc signals. This system is useful in telemetry, aircraft communications and position-finding stations, and VHF test circuitry.

**B66-10438**  
**DENSITOMETER SYSTEM FOR LIQUID HYDROGEN HAS**  
**HIGH ACCURACY, FAST RESPONSE**  
 INNOVATOR NOT GIVEN /FRANKLIN GND CORP./ OCT. 1966  
**M-FS-909**

Developmental densitometer system for cryogenic liquids uses two balanced ionization chambers containing xenon gas, with X-rays as the radiation source. The X-rays are heavily filtered with a lead shield to make the energy spectrum much less dependent on the voltage applied to the X-ray tube.

**B66-10439**  
**ION CHAMBERS SIMPLIFY ABSOLUTE INTENSITY**  
**MEASUREMENTS IN THE VACUUM ULTRAVIOLET**  
 SAMPSON, J. A. R. /GEOPHYS. CORP. OF AM./ OCT. 1966  
**ERC-10**

Single or double ion chamber technique measures absolute radiation intensities in the extreme vacuum ultraviolet region of the spectrum. The ion chambers use rare gases as the ion carrier. Photon absorbed by the gas creates one ion pair so a measure of these is a measure of the number of incident photons.

**B66-10440**  
**PHOTOELECTRIC SCANNER MAKES DETAILED WORK**  
**FUNCTION MAPS OF METAL SURFACE**  
 RASOR, N. S. /THERMO ELECTRON ENG. CORP./ OCT. 1966  
**JPL-SC-176**

Photoelectric scanning device maps the work function of a metal surface by scanning it with a light spot and measuring the resulting photocurrent. The device is capable of use over a range of surface temperatures.

**B66-10441**  
**STANDARD ARC WELDERS PROVIDE HIGH AMPERAGE**  
**DIRECT CURRENT SOURCE**  
 BEASLEY, W. D. BROOKS, J. D. OCT. 1966  
**LANGLEY-267 LANGLEY-268**

Standard arc welders or power supplies are hooked up in parallel or series connections to obtain an adequate supply of current or voltage for various purposes. This method provides maximum

flexibility in a wide range of voltages and currents.

**B66-10442**  
**AN IMPROVED METHOD FOR TESTING PERFORMANCE OF**  
**VIDICONS DURING VIBRATION**  
 CORSON, B. R. /HUGHES AIRCRAFT CO./ OCT. 1966  
**JPL-SC-113**

Vidicon electron beam modulation is used for checking the performance of vidicons in mechanical vibration tests. The vidicon electron beam is modulated with an external signal during the \*\*write\*\* period thereby storing the image on the vidicon face.

**B66-10444**  
**THERMIONIC SCANNER PINPOINTS WORK FUNCTION**  
**OF EMITTER SURFACES**  
 RASOR, N. S. /THERMO ELECTRON ENG. CORP./ OCT. 1966  
**JPL-SC-177**

In the electron tube testing, a thermionic scanner makes accurate spatial resolution measurements of the metallic surface work functions of emitters. The scanner determines the emitter function and its local departures from the mean value on a point-by-point basis for display on an oscilloscope.

**B66-10447**  
**SEMICONDUCTORS CAN BE TESTED WITHOUT**  
**REMOVING THEM FROM CIRCUITRY**  
 ALLEN, B. C. /N. AM. AVIATION/ NOV. 1966  
**M-FS-1163**

Oscilloscope, with specially developed test circuitry, quickly checks semiconductors without removing them from the circuitry. For transistors, approximate gain and linearity, as well as pnp or npn determinations are made. When testing diodes, open or short circuits, and reverse polarity show up plainly.

**B66-10449**  
**BASIC SUPPRESSION TECHNIQUES ARE EVALUATED**  
 DAWIRS, H. N. /RECON, INC./ OCT. 1966  
**M-FS-867**

Investigation of standard suppression methods facilitates switching of inductively loaded circuits which causes interference in adjacent electronic equipment. The data are reduced to tabular form and rapid selection of components by the designer can be made without lengthy calculations or trial and error manipulations.

**B66-10452**  
**RECTILINEAR ACCELEROMETER POSSESSES SELF-**  
**CALIBRATION FEATURE**  
 HENDERSON, R. B. /SAUNDERS ASSOC., INC./ OCT. 1966  
**M-FS-1480**

Rectilinear accelerometer operates from an ac source with a phase-sensitive ac voltage output proportional to the applied accelerations. The unit includes an independent circuit for self-test which provides a sensor output simulating an acceleration applied to the sensitive axis of the accelerometer.

**B66-10456**  
**PULSE GENERATOR USING TRANSISTORS AND SILICON**  
**CONTROLLED RECTIFIERS PRODUCES HIGH CURRENT**  
**PULSES WITH FAST RISE AND FALL TIMES**  
 WOLFSOM, M. G. /WESTINGHOUSE ELEC. CORP./ OCT. 1966  
**MSC-405**

Electrical pulse generator uses power transistors and silicon controlled rectifiers for producing a high current pulse having fast rise and fall times. At quiescent conditions, the standby power consumption of the circuit is equal to zero.

**B66-10461**  
**MODIFIED THERMOCOUPLE IS EFFECTIVE FROM**  
**MINUS 250 DEG TO 5000 DEG F**  
 MOEN, W. K. /N. AM. AVIATION/ NOV. 1966  
**MSC-420**

Modified, commercially available thermocouple which measures the temperature of a spacecraft heat shield, is capable of continuous measurement

in the range of minus 250 deg to 5000 deg F. The modified thermocouples may be used inside metal treating furnaces in high temperature technology, and in certain corrosive environments.

**B66-10462**  
INSTRUMENT AUTOMATICALLY SELECTS PEAK  
ACCELERATION SIGNAL FROM SEVERAL  
ACCELEROMETERS  
CHAPMAN, C. P. OCT. 1966  
JPL-816

Solid state circuit selects the highest of several ac accelerometer signals and gates this signal to an output amplifier, preserving all the frequency information in the peak signal. If the amplitudes of the accelerometer signals change with time, the circuit will continually switch to the highest signal, rejecting the smaller signals.

**B66-10465**  
SOLID STATE CIRCUIT SWITCHES AC LOAD  
CHAPMAN, C. P. RUPNIK, D. R. OCT. 1966  
JPL-798

Differential amplifier circuit switches ac signals with peak amplitudes greater than 5 volts. This solid state circuit biases a switching transistor on and off by a 0.1 to 5.0 dc control voltage.

**B66-10466**  
STUDY COMPARES METHODS FOR THE NUMERICAL  
SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS  
INNOVATOR NOT GIVEN /GEORGIA INST. OF TECHNOL./  
OCT. 1966 SEE ALSO NASA-CR-61060  
M-FS-830

Study compares the use of five different methods for the computer solution of the restricted three-body problem. It describes the implementation of each method on a Burroughs B-5000 computer and in terms of speed and accuracy.

**B66-10469**  
BIPOLAR CURRENT DRIVER FOR MEMORY CIRCUITS  
CHONG, C. F. NELSON, C. A. /SPERRY RAND CORP./  
NOV. 1966  
GSFC-213

Circuit which logically determines the state of a flip-flop and amplifies the current from a clock pulse provides a bipolar driving current to a memory circuit, the polarity of which is determined by the state of a flip-flop. This principle may be applied to various memory driving circuits where power dissipation must be minimized.

**B66-10476**  
DEVICE TO COLOR MODULATE A STATIONARY LIGHT  
BEAM GIVES HIGH INTENSITY  
GANTZ, W. A. /CALIF. UNIV./ DEC. 1966  
HQ-44

Signal controlled system color modulates a beam of light while also providing high intensity and a stationary beam, either collimated or focused. The color modulation acquired by the presented system can be compatible with any color film by employing color filters formed to provide a color wedge having a color distribution compatible with the film's color sensitivity.

**B66-10478**  
PLUG-IN CONNECTOR SOCKET ACCEPTS COAXIAL  
CABLE END  
MITCHELL, D. VAN LOON, J. NOV. 1966  
ARG-9

Connector which includes a spring-loaded contact to receive a protruding center conductor and an internal collet to clamp against a collar attached to a woven outer conductor, is used as a receptacle for the end of a coaxial cable. This plug-in connector socket is used successfully with remote manipulators.

**B66-10480**  
SIMPLE, ONE TRANSISTOR CIRCUIT BOOSTS PULSE  
AMPLITUDE  
KEON, T. MATCHETT, M. W. /CUTLER HAMMER/ OCT.  
1966  
GSFC-501

Simple circuit that uses a single transistor to

accomplish capacitor storage followed by common-base switching supplies a pulse voltage, higher than that normally available from emitter-follower circuits, to drive a 100-watt transmitter.

**B66-10481**  
MODIFIED MCLEOD PRESSURE GAGE ELIMINATES  
MEASUREMENT ERRORS  
KELLS, M. C. NOV. 1966  
ARC-62

Modification of a McLeod gauge eliminates errors in measuring absolute pressure of gases in the vacuum range. A valve which is internal to the gauge and is magnetically actuated is positioned between the mercury reservoir and the sample gas chamber.

**B66-10482**  
AUTOMATIC CRYOGENIC LIQUID LEVEL CONTROLLER  
IS SAFE FOR USE NEAR COMBUSTIBLE SUBSTANCES  
KREJSA, M. OCT. 1966  
LEWIS-195

Automatic mechanical liquid level controller that is independent of any external power sources is used with safety in the presence of combustibles. A gas filled capillary tube which leads from a pressurized chamber, is inserted into the cryogenic liquid reservoir and becomes a liquid level sensing element or probe.

**B66-10486**  
SOLID STATE CIRCUIT CONTROLS DIRECTION, SPEED,  
AND BRAKING OF DC MOTOR  
HANNA, M. F. OCT. 1966  
JPL-757

Full-wave bridge rectifier circuit controls the direction, speed, and braking of a dc motor. Gating in the circuit of Silicon Controlled Rectifiers /SCRs/ controls output polarity and braking is provided by an SCR that is gated to short circuit the reverse voltage generated by reversal of motor rotation.

**B66-10488**  
SPIRAL SPRING/STRAIN GAGE COMBINATION  
ACCURATELY MEASURES SHOCK INDUCED DEFLECTION  
BERVEN, B. R. WALKER, R. R. /N. AM. AVIATION/  
OCT. 1966  
MSC-789

Spiral springs equipped with strain gauges which are hard-wired to readout instrumentation, measure deflection between two relatively inaccessible surfaces in a drop test that causes them to close to near flatness. This technique has been successfully used on Apollo drop tests to measure deflection between aft bulkhead and heatshield.

**B66-10490**  
SOLENOID MAGNETIC FIELDS CALCULATED FROM  
SUPERPOSED SEMI-INFINITE SOLENOIDS  
BROWN, G. V. FLAX, L. NOV. 1966 SEE ALSO  
NASA-TN-D-2494  
LEWIS-184

Calculation of a thick solenoid coil's magnetic field components is made by a superposition of the fields produced by four solenoids of infinite length and zero inner radius. The field produced by this semi-infinite solenoid is dependent on only two variables, the radial and axial field point coordinates.

**B66-10491**  
MINIATURE CAPACITIVE ACCELEROMETER IS  
ESPECIALLY APPLICABLE TO TELEMETRY  
COON, G. W. HARRISON, D. R. NOV. 1966 SEE ALSO  
B63-10429  
ARC-72

Capacitive accelerometer design enables the construction of highly miniaturized instruments having full-scale ranges from 1 g to several hundred g. This accelerometer is applicable to telemetry and can be tailored to cover any of a large number of acceleration ranges and frequency responses.

**B66-10492**  
CIRCUIT PREVENTS OVERCHARGING OF SECONDARY  
CELL BATTERIES



HENNIGAN, T. J. POTTER, N. H. SIZEORE, K. O.  
NOV. 1966  
GSFC-454

Circuit prevents battery cell overcharging by detecting and reducing the charging voltage to the open-circuit voltage of the battery when this current falls to a predetermined value. The voltage control depends on the fact that the charging current falls significantly when the battery nears its fully charged state.

B66-10493  
STUDY SHOWS EFFECT OF SURFACE PREPARATIONS  
ON IMPROVING THERMIONIC EMISSION  
VAN SOMEREN, L. /THERMO ELECTRON ENG. CORP./  
NOV. 1966  
JPL-SC-140

Specimen thermionic emitters were electropolished and electroetched to study the effect of surface preparations on improving thermionic emission. The best technique found was to electropolish the annealed rhenium surface and then electroetch it. The effect of electroetching was to remove other crystal planes faster than basal planes.

B66-10494  
OPTICAL MONITOR PANEL PROVIDES FLEXIBLE TEST  
PANEL CONFIGURATIONS  
GRIFFIN, F. D. NOV. 1966  
KSC-66-18

Optical monitor panel projects a chosen panel configuration upon a translucent screen by using a master projector and appropriate slide to project panel board nomenclature and a series of smaller individual projectors to superimpose monitor indicators upon the projected panel board.

B66-10496  
COMPUTER PROGRAM PERFORMS FLOW ANALYSIS  
THROUGH TURBINES  
KATSANIS, T. NOV. 1966 SEE ALSO NASA-TN-D-2546  
AND NASA-TN-D-2809  
LEWIS-236

Computer program based on an equation for the velocity gradient along an arbitrary quasi-orthogonal analyzes flow through a turbomachine. The program obtains meridional solutions for a hub-to-shroud analysis and blade-to-blade analysis at the hub, mean, and shroud surfaces in a single computer run.

B66-10497  
HIGH VOLTAGE POTENTIAL DIVIDER CALIBRATED BY  
SIMPLE DEVICE  
LEWIS, R. N. NOV. 1966  
ARG-83

Resistance bridge device incorporates a potentiometer, switches, and a null detector to calibrate high potential dividers under high voltage operation conditions. Calibration can be performed with this device in less than 1 minute at an accuracy of 0.001 percent.

B66-10500  
DIGITAL SYSTEM PROVIDES SUPERREGULATION OF  
NANOSECOND AMPLIFIER-DISCRIMINATOR CIRCUIT  
FORGES, K. G. NOV. 1966  
ARG-61

Feedback system employing a digital logic comparator to detect and correct amplifier drift provides stable gain characteristics for nanosecond amplifiers used in counting applications. Additional anticoincidence logic enables application of the regulation circuit to the amplifier and discriminator while they are mounted in an operable circuit.

B66-10501  
ELECTRONIC CIRCUIT DELIVERS PULSE OF HIGH  
INTERVAL STABILITY  
FISHER, B. /N. AM. AVIATION/ NOV. 1966  
MSC-673

Circuit generates a pulse of high interval stability with a complexity level considerably below systems of comparable stability. This circuit is being used as a linear frequency discriminator in the signal conditioner of the Apollo command module.

B66-10502  
POINT-SOURCE LIGHT SENSOR CIRCUIT IS  
INSENSITIVE TO BACKGROUND LIGHT  
DAVIS, E. S. NOV. 1966  
JPL-778

Circuit incorporating a bisynchronous demodulator for an electro-optical star-tracking sensor provides a signal proportional to star intensity without interference from background light in the field of view. The system works best on a sharply focused star image and requires a 50 percent duty cycle.

B66-10503  
COMPUTER PROGRAM DETERMINES PERFORMANCE  
EFFICIENCY OF REMOTE MEASURING SYSTEMS  
MEREWETHER, E. K. /N. AM. AVIATION/ NOV. 1966  
M-FS-1137

Computer programs control and evaluate instrumentation system performance for numerous rocket engine test facilities and prescribe calibration and maintenance techniques to maintain the systems within process specifications. Similar programs can be written for other test equipment in an industry such as the petrochemical industry.

B66-10504  
SUBROUTINE ALLOWS EASY COMPUTATION IN  
EXTENDED PRECISION ARITHMETIC  
BERGGREN, R. L. GYSBERS, J. C. /N. AM. AVIATION/  
NOV. 1966  
M-FS-1136

Subroutine called NPREC allows relatively simple computation of very large numbers or very small fractions with extreme accuracy. This subroutine handles numbers that consist of 35 binary bits /1 word/ for the exponent and 70 bits /2 words/ for the fraction.

B66-10505  
SOLID STATE ANNUNCIATOR FACILITATES COMPLEX  
SYSTEM TROUBLESHOOTING  
HOFFER, H. P. /N. AM. AVIATION/ NOV. 1966  
M-FS-1258

Solid state annunciator monitors up to 60 parameters for a dc voltage change from zero to 28 volts in the testing of complex systems. This annunciator is presently being used for testing of the complex J-2 rocket engine.

B66-10506  
COMPUTER PROGRAM DETERMINES INVENTORY SIZE  
KASPAR, H. /N. AM. AVIATION/ NOV. 1966  
M-FS-1135

Fortran IV computer program calculates optimum size of a small inventory of relatively complex or expensive items. This program can be used in situations where the initial cost of purchase is large or when there is a need for a balanced inventory, on a short production run.

B66-10509  
PULSE STRETCHER HAS IMPROVED DYNAMIC RANGE  
AND LINEARITY  
LARSEN, R. N. NOV. 1966  
ARG-82

Current-switching pulse stretcher overcomes the diode nonlinearity and capacitive feedthrough of voltage switching diode-capacitor stretchers and lengthens nanosecond pulses so that their amplitude may be determined and extends the dynamic range of the pulse stretcher. The rise time of the output pulse in response to a step function is approximately 5 nanoseconds.

B66-10510  
LOW LEVEL ACCELEROMETER TEST METHODS ARE  
INVESTIGATED  
NELSON, R. H., JR. PLOURDE, H. S. /DYN. RES.  
CORP./ NOV. 1966  
M-FS-908

Problems associated with testing accelerometers to an accuracy where the standard error is less than .0000001 g are centered around the elimination of uncertainties in the acceleration input to the accelerometer. By placing a test rig in free fall, the uncertainty in the earth's gravity field can be eliminated.

**B66-10511**  
**COMPUTER ROUTINE ADDS PLOTTING CAPABILITIES**  
**TO EXISTING PROGRAMS**  
 HARRIS, J. C. LINNEXIN, J. S. /LITTON IND. /  
 NOV. 1966  
 GSFC-490

PLOTAN, a generalized plot analysis routine written for the IBM 7094 computer minimizes the difficulties in adding plot capabilities to large existing programs. PLOTAN is used in conjunction with a binary tape writing routine and has the ability to plot any variable on the intermediate binary tape as a function of any other.

**B66-10512**  
**NIXIE TUBE DISPLAY UNIT EMPLOYS TIME-SHARED**  
**LOGIC**  
 GRAY, J. NOV. 1966  
 ARG-117

Cathodes of display tubes wired in parallel achieve input switching simplification of a Nixie tube display system. Use of time-shared logic energizes the appropriate anode and inhibits all unnecessary cathodes.

**B66-10516**  
**DIGITAL SYSTEM DETECTS BINARY CODE PATTERNS**  
**CONTAINING ERRORS**  
 MULLER, R. M. THARPE, H. M., JR. NOV. 1966  
 GSFC-541

System of square loop magnetic cores associated with code input registers react to input code patterns by reference to a group of control cores in such a manner that errors are canceled and patterns containing errors are accepted for amplification and processing. This technique improves reception capabilities in PCM telemetry systems.

**B66-10518**  
**ANTENNA SIMULATOR PERMITS PREINSTALLATION**  
**SYSTEM CHECKOUT**  
 ELIA, A. D. SCHMIDT, R. F. NOV. 1966  
 GSFC-522

Antenna simulator provides for evaluation checkout of corporate feeds, monopulse sum-and-difference networks, etc. in a shielded environment prior to system checkout on an antenna pattern range. This technique is useful wherever simulation of monopulse antenna element characteristics is desired for checkout of ancillary equipment in a controlled environment.

**B66-10520**  
**PYROMETRY HANDBOOK DESCRIBES PRACTICAL**  
**ASPECTS OF SURFACE TEMPERATURE MEASUREMENTS**  
**OF OPAQUE MATERIALS**  
 BRANSTETTER, J. R. BUCHELE, D. R. NOV. 1966 SEE  
 ALSO NASA-TN-D-3604  
 LEWIS-349

Handbook contains extensive reference literature and results from pertinent experiments to provide a collection of applied technology and reference sources for engineers and technicians. Fundamental equations of radiation, off-design corrections, characteristics of pyrometers, and calibration apparatus and techniques are discussed.

**B66-10521**  
**FLOWMETER MEASURES FLOW RATES OF HIGH**  
**TEMPERATURE FLUIDS**  
 VARY, A. NOV. 1966  
 LEWIS-328

Flowmeter in which flow rate is determined by measuring the position and thus the displacement of an internal float acted upon by the flowing fluid determines the flow rates of various liquid metals at elevated temperatures. Viscous forces cause the float to move from its mounted position, affording several means for measuring this motion and the flow rate.

**B66-10524**  
**STUDY OF VORTEX VALVE FOR MEDIUM**  
**TEMPERATURE SOLID PROPELLANTS**  
 HOLT, W. D. RIVARD, J. G. /BENDIX CORP. / DEC.  
 1966  
 LANGLEY-204

Fluid state vortex valve secondary injection control system shows considerable promise for future application to solid propellant rocket engine thrust vector control. The single axis injection system tested would be capable of providing secondary injection thrust vector control using 2000 deg F gas.

**B66-10525**  
**COMPUTER PROGRAM PERFORMS STATISTICAL**  
**ANALYSIS FOR RANDOM PROCESSES**  
 NEWBERRY, M. H. NOV. 1966 SEE ALSO  
 NASA-TM-X-53359  
 M-FS-723

Random Vibration Analysis Program /RAVAN/ performs statistical analysis on a number of phenomena associated with flight and captive tests, but can also be used in analyzing data from many other random processes.

**B66-10526**  
**IMPROVED DESIGN PROVIDES FASTER RESPONSE**  
**TIME IN PHOTOMULTIPLIER**  
 INNOVATOR NOT GIVEN /HALLICRAFTERS CO. / NOV. 1966  
 GSFC-451

Dynamic crossed-field electron multiplying /DCFEM/ light demodulator avoids the normal response time limitations inherent in static field devices, by using time varying crossed electric and static magnetic fields to eliminate the transit time spread that affects electrons as they proceed along the secondary emission stages of the tube.

**B66-10529**  
**COMPUTER PROGRAM SEARCHES CHARACTERISTIC**  
**DATA OF DIODES AND TRANSISTORS**  
 INNOVATOR NOT GIVEN /BOOZ-ALLEN APPL. RES. CORP. /  
 NOV. 1966  
 GSFC-493

Semiconductor information storage and retrieval system provides a comprehensive, accurate, and ready reference to characteristic data of diodes and transistors. The system can be used to supply a complete listing of technical component information necessary for circuit designers, reliability engineers, and quality assurance personnel.

**B66-10531**  
**HEAT FLUX SENSOR DESIGN REDUCES EXTRANEIOUS**  
**SOURCE EFFECTS**  
 CROFTS, E. D. ROBINSON, G. P. /MCDONNELL  
 AIRCRAFT CORP. / NOV. 1966  
 MSC-400

Heat flux sensor isolates the sensor and its transmitting thermocouple from undesirable heat sources by incorporating a radiator section that forms a radiation shield between mounting cup and sensor. Bonding of the thermocouple cable to the underside of the radiator provides a conductive path to dissipate extraneous heat that might otherwise reach the sensor.

**B66-10533**  
**METHOD PERMITS MECHANICAL AND ELECTRICAL**  
**CHECKOUT OF PIEZOELECTRIC TRANSDUCERS WHILE**  
**INSTALLED IN A SYSTEM**  
 JENKINS, R. S. ROGALLO, V. L. NOV. 1966 SEE  
 ALSO B66-10534  
 ARC-73

Known dc voltage is applied and then removed suddenly in a method to permit checkout of the mechanical and electrical condition of piezoelectric transducers of the cantilever beam type, while installed in a system.

**B66-10534**  
**MINIATURE PIEZOELECTRIC TRIAXIAL**  
**ACCELEROMETER MEASURES CRANIAL ACCELERATIONS**  
 DE BOO, G. J. ROGALLO, V. L. NOV. 1966 SEE ALSO  
 B64-10004 AND B66-10533  
 ARC-71

Tiny triaxial accelerometer whose sensing elements are piezoelectric ceramic beams measures human cranial accelerations when a subject is exposed to a centrifuge or other simulators of g environments. This device could be considered for application in dental, medical, and automotive

safety research.

B66-10536  
HELMET SYSTEM BROADCASTS  
ELECTROENCEPHALOGRAMS OF WEARER  
WESTBROOK, R. M. ZUCCARO, J. J. NOV. 1966 SEE  
ALSO B65-10203  
ARC-70

EGG monitoring system consisting of nonirritating sponge-type electrodes, amplifiers, and a battery-powered wireless transmitter, all mounted in the subject's helmet obtains electroencephalograms /EEG's/ of pilots and astronauts performing tasks under stress. After a quick initial fitting, the helmet can be removed and replaced without further adjustment.

B66-10539  
COMPUTER PROGRAMS PERFORM SPECTRAL ANALYSES OF UP TO SEVEN TIME SERIES  
BYARS, B. J. DUBMAN, M. R. /N. AM. AVIATION/  
NOV. 1966

M-FS-1133 M-FS-1134  
Computer programs perform statistical spectral analyses of up seven time series. These programs should have applicability to a variety of engineering systems in the fields of geophysics, physiology, acoustics, and structural analysis.

B66-10541  
COMPUTER USED TO PROGRAM NUMERICALLY CONTROLLED MILLING MACHINE  
HARRIS, T. C. /GE/ NOV. 1966  
M-FS-1608

Computer program automatically directs a numerically controlled milling machine through a series of cutting and trimming actions. It accepts engineering data points, passes smooth curve segments through the points, breaks the resulting curves into a series of closely spaced points, and transforms these points into the form required by the mechanism.

B66-10542  
PREREGULATOR FEEDBACK CIRCUIT UTILIZES LIGHT ACTUATED SWITCH  
HAYSER, T. P. /IBM/ NOV. 1966  
M-FS-1180

Preregulator feedback circuit employing a Light Actuated Switch /LAS/ provides a simple and efficient feedback device in a power supply preregulator which maintains dc isolation between input and output grounds. The LAS consists of a diode pn junction infrared source close to, but electrically isolated from, a photodetector.

B66-10543  
HIGH-RELUCTANCE ROTOR RINGS IMPROVE HOMOPOLAR GENERATOR PERFORMANCE  
MUSSET, E. E. NOV. 1966  
ARG-104

Nonmagnetic metal rings imbedded in a homopolar generator rotor normal to its axis keep the induction flux entering the rotor in a radial path. Use of the rings permits optimum rotor design for any given set of operating requirements and simplifies the task of predicting the operation characteristics of the generator.

B66-10544  
ULTRASONIC QUALITY INSPECTION OF BONDED HONEYCOMB ASSEMBLIES IS AUTOMATED  
KAMMERER, C. C. /N. AM. AVIATION/ NOV. 1966  
MSC-859

Inspection system for bonded honeycomb assemblies is accurate, fast, and automated. The ultrasonic system consists of inner and outer transducer positioning assemblies with suitable motor controls, a centerless turntable assembly, water squirter assemblies, and an inspection program completely encoded on tape suitable for use on a high speed computer.

B66-10548  
SECURITY WARNING SYSTEM MONITORS UP TO FIFTEEN REMOTE AREAS SIMULTANEOUSLY  
FUSCO, R. C. /RCA/ NOV. 1966  
KSC-66-39  
Security warning system consisting of 15

television cameras is capable of monitoring several remote or unoccupied areas simultaneously. The system uses a commutator and decommutator, allowing time-multiplexed video transmission. This security system could be used in industrial and retail establishments.

B66-10549  
MINIATURE ELECTROMETER PREAMPLIFIER EFFECTIVELY COMPENSATES FOR INPUT CAPACITANCE  
BURROUS, C. N. DE BOO, G. J. NOV. 1966  
ARC-69

Negative capacitance preamplifier using a dual MOS /Metal Oxide Silicon/ transistor in conjunction with bipolar transistors is used with intracellular microelectrodes in recording bioelectric potentials. Applications would include use as a pickup plate video amplifier in storage tube tests and for pH and ionization chamber measurements.

B66-10552  
NONELECTROLYTIC TANTALUM CAPACITORS DEVELOPED  
INNOVATOR NOT GIVEN /CORNELL-DUBILIER ELEC. CORP./  
NOV. 1966  
M-FS-1546

Large area, nonelectrolytic tantalum foil capacitor has capacitance of approximately 1 microfarad and is capable of operating at 125 deg C at 150 volts with an insulation resistance of at least 1 megohm. In tests at a potential of 100 volts, capacitors remained stable through a temperature range from 25 deg to 125 deg C.

B66-10553  
COMPUTER PROGRAMS CALCULATE POTENTIAL AND CHARGE DISTRIBUTIONS IN A PLASMA  
JEFFERIES, N. P. PRINCE, D. C. /GE/ NOV. 1966  
M-FS-871

Computer program determines the potential and charge distributions between two electrodes in a plasma. Solutions of the Vlasov equations for plane, cylindrical, and spherical geometries is determined and density distributions are found for each of these configurations over a range of conditions.

B66-10555  
A FAST-NEUTRON SPECTROMETER OF ADVANCED DESIGN  
MOLER, R. B. PRESTON, C. C. /IIT RES. INST./  
NOV. 1966  
M-FS-1664

Fast neutron spectrometer combines helium filled proportional counters with solid-state detectors to achieve the properties of high efficiency, good resolution, rapid response, and effective gamma-ray rejection.

B66-10556  
SIMPLIFIED FIXTURE PERMITS PRECISION ALIGNMENT OF AN OPTICAL TARGET  
MAGURA, P. /IBM/ NOV. 1966  
M-FS-1181

Optical target holder is permanently placed for instrument sighting, yet is adjustable and easily aligned.

B66-10557  
TRISPHERE SPARK GAP ACTUATES OVERVOLTAGE RELAY  
CAMACHO, S. L. DEC. 1966  
ARC-68

Trisphere spark gap and high voltage relay provides a positive, fast response, high current capacity device that will sense an overvoltage condition and remove power from the circuit before insulation breakdown. When an overvoltage occurs, the spark gap breaks down and conducts an actuating current to the relay which removes power from the circuit.

B66-10559  
ONE-COUNT MEMORY CIRCUIT PREVENTS MACHINE MODE INTERACTION  
DE FOREST, B. DEC. 1966  
ARC-90  
One-count memory logic circuit used with

electromechanical counter-printer machines operates in either count or print mode. The circuit advances the counter when the machine is in the count mode and provides storage for the count pulse when the machine is in the print mode.

B66-10561  
PULSE TECHNIQUE PROVIDES MORE ACCURATE  
CHECKOUT OF EXPLODING BRIDGE WIRE DEVICE  
PETRICK, J. R. /GE/ DEC. 1966  
HQ-62

Exploding Bridge Wire /EBW/ is treated as a transmission line system and pulse reflection techniques are used for checking the electrical integrity of an EBW cartridge. A step voltage is propagated into the system and the reflected voltage waves are monitored.

B66-10563  
COLLECTOR/COLLECTOR GUARD RING BALANCING  
CIRCUIT ELIMINATES EDGE EFFECTS  
LIEB, D. P. /THERMO ELECTRON ENG. CORP./ DEC. 1966  
JPL-SC-143

Circuit in which an emitter is maintained opposite a concentric collector and guard structure is achieved by matching the temperature and potential of the guard with that of the collector over the operating range. This control system is capable of handling up to 100 amperes in the guard circuit and 200 amperes in the collectors circuit.

B66-10564  
PHOTOCELL SHADOWING TECHNIQUE IMPROVES LIGHT  
SOURCE DETECTOR  
CARPENTER, D. G. HOOPER, G. E. DEC. 1966  
JPL-809

Lightweight, compact modular system that includes an acquisition photodiode is used as a light source tracking detector that exhibits minimum scale factor change with increased light source angle. Photocells of various types, responsive to other portions of the spectrum, could be used to acquire and track infrared, ultraviolet, and other source fluxes.

B66-10566  
COMPUTATIONAL PROCEDURE FOR FINITE DIFFERENCE  
SOLUTION OF ONE-DIMENSIONAL HEAT CONDUCTION  
PROBLEMS REDUCES COMPUTER TIME  
IIDA, H. T. /N. AM. AVIATION/ NOV. 1966  
MSC-1120

Computational procedure reduces the numerical effort whenever the method of finite differences is used to solve ablation problems for which the surface recession is large relative to the initial slab thickness. The number of numerical operations required for a given maximum space mesh size is reduced.

B66-10568  
MONITORING CIRCUIT ACCURATELY MEASURES  
MOVEMENT OF SOLENOID VALVE  
GILLET, J. D. /N. AM. AVIATION/ DEC. 1966  
M-FS-1829

Solenoid operated valve in a control system powered by direct current issued to accurately measure the valve travel. This system is currently in operation with a 28-vdc power system used for control of fluids in liquid rocket motor test facilities.

B66-10569  
DEVICE ACCURATELY MEASURES AND RECORDS LOW  
GAS-FLOW RATES  
BRANUM, L. W. /N. AM. AVIATION/ DEC. 1966  
M-FS-1077

Free-floating piston in a vertical column accurately measures and records low gas-flow rates. The system may be calibrated, using an adjustable flow-rate gas supply, a low pressure gauge, and a sequence recorder. From the calibration rates, a nomograph may be made for easy reduction. Temperature correction may be added for further accuracy.

B66-10574  
NONDESTRUCTIVE TEST METHOD ACCURATELY SORTS  
MIXED BOLTS

DEZEIH, C. J. DEC. 1966  
M-FS-1426

Neutron activation analysis method sorts copper plated steel bolts from nickel plated steel bolts. Copper and nickel plated steel bolt specimens of the same configuration are irradiated with thermal neutrons in a test reactor for a short time. After thermal neutron irradiation, the bolts are analyzed using scintillation energy readout equipment.

B66-10576  
A CONTINUOUSLY OPERATING SOURCE OF VACUUM  
ULTRAVIOLET BELOW 500 ANGSTROM  
INNOVATOR NOT GIVEN /SPACE SCI. INC./ DEC. 1966  
GSFC-545

Duo plasmatron type source of ultraviolet radiation operates in the wavelength region below 500 angstrom. Since the spectra produced are determined almost completely by the gas injected, and because the source operates continuously, this arrangement is beneficial in the development and calibration of filters and detectors within discrete wavelength ranges.

B66-10577  
ULTRASONIC WATER COLUMN PROBE SPEEDS UP  
TESTING OF WELDS  
HOOP, J. M. MC DONALD, J. A. /GE/ DEC. 1966  
HQ-58

Ultrasonic device consisting of a coaxial rod and transducer enclosed in a cylindrical probe which is filled with deionized or distilled water speeds up the testing of welds. Rubber diaphragm is molded to produce the desired test beam angle.

B66-10579  
AN ORTHONORMALIZATION PROCEDURE FOR  
MULTIVARIABLE FUNCTION APPROXIMATION  
INGRAM, H. L. DEC. 1966  
M-FS-1313

Where a function of several variables is given numerically in tabular form, an orthonormalization technique allows an approximation of the numerical data to be determined in a convenient functional form. In this technique, the speed and accuracy of coefficient computation are much improved.

B66-10580  
RESISTOR MONITORS TRANSFER OF LIQUID HELIUM  
HESKETH, W. D. DEC. 1966  
LANGLEY-229

Large resistance change of a carbon resistor at the liquid helium temperature distinguishes between the transfer of liquid helium and gaseous helium into a closed dewar. The resistor should be physically as small as possible to reduce the heat load to the helium.

B66-10581  
DETECTOR MEASURES POWER IN 50 TO 30,000 GHZ  
RADIATION BAND  
ARAMS, F. R. WANG, M. T. /AIRBORNE INSTR. LAB./ DEC. 1966  
ERC-26

Broadband power detector assembly measures electromagnetic radiation in the 50 to 30,000 GHz band. The assembly includes a matched pair of detectors which incorporate thin-film radiation absorbers. The detector is effective with either coherent or incoherent radiation.

B66-10584  
OPTICAL SUPERHETERODYNE RECEIVER USES LASER  
FOR LOCAL OSCILLATOR  
LUCY, R. F. /PENNSYLVANIA ELECTRON. SYSTEMS/ DEC. 1966  
M-FS-1605

Optical superheterodyne receiver uses a laser coupled to a frequency translator to supply both the incident signal and local oscillator signal and thus permit reception of amplitude modulated video bandwidth signals through the atmosphere. This receiver is useful in scientific propagation experiments, tracking experiments, and communication experiments.

B66-10590  
STUDY MADE OF APPLICATION OF STEREOSCOPIC

**DISPLAY SYSTEM TO ANALOG COMPUTER SIMULATION**  
KENNEL, H. F. DEC. 1966 NASA-CR-61116  
M-FS-1263

Stereoscopic visual display system provides both a qualitative and measurable presentation for functions of several variables. A primary application of such a display system is in analog computer simulation of sets of differential equations.

**B66-10591**  
**ELECTRONIC CIRCUIT PROVIDES ACCURATE SENSING AND CONTROL OF DC VOLTAGE**  
LOFTUS, W. D. /WESTINGHOUSE ASTRONUCL. LAB./  
DEC. 1966  
NU-0089

Electronic circuit used relay coil to sense and control dc voltage. The control relay is driven by a switching transistor that is biased to cutoff for all input up to slightly less than the threshold level.

**B66-10592**  
**SENSORS MEASURE SURFACE ABLATION RATE OF REENTRY VEHICLE HEAT SHIELD**  
RUSSEL, J. M., III DEC. 1966 SEE ALSO  
NASA-TN-D-3686  
LANGLEY-287

Sensors measure surface erosion rate of ablating material in reentry vehicle heat shield. Each sensor, which is placed at precise depths in the heat shield is activated when the ablator surface erodes to the location of a sensing point. Sensor depth and activation time determine ablator surface erosion rate.

**B66-10598**  
**DESIGN CONCEPT FOR PRESSURE SWITCH CALIBRATOR**  
SLINGERLAND, M. G. /GE/ DEC. 1966  
HQ-36

Calibrator and switch design enables pressure switches to operate under 150 g shock loads. The design employs a saturated liquid-to-vapor phase transition at constant pressure to produce a known force independent of displacement over a usable range.

**B66-10599**  
**PRESSURE PROBE COMPENSATES FOR DIMENSIONAL TOLERANCE VARIATIONS**  
BIRNER, R. A. /AEROJET-GEN. CORP./ DEC. 1966  
LEWIS-302

Flexible, compressible spring-loaded pressure probe measures the static pressure between the rotor stages on an axial-flow fuel pump. This probe is used in installation where a drilled static pressure tap or a rigid impulse tube cannot be used. Its parameters must be specially determined for each installation.

**B66-10600**  
**HIGH FREQUENCY WIDE-BAND TRANSFORMER USES COAX TO ACHIEVE HIGH TURN RATIO AND FLAT RESPONSE**  
DE PARRY, T. DEC. 1966  
ARG-107

Center-tap push-pull transformer with toroidal core helically wound with a single coaxial cable creates a high frequency wideband transformer. This transformer has a high-turn ratio, a high coupling coefficient, and a flat broadband response.

**B66-10603**  
**MOSFET ANALOG MEMORY CIRCUIT ACHIEVES LONG DURATION SIGNAL STORAGE**  
INNOVATOR NOT GIVEN /IBM/ DEC. 1966  
M-FS-860

Memory circuit maintains the signal voltage at the output of an analog signal amplifier when the input signal is interrupted or removed. The circuit uses MOSFET /Metal Oxide Semiconductor Field Effect Transistor/ devices as voltage-controlled switches, triggered by an external voltage-sensing device.

**B66-10605**  
**ELECTRICAL CONTINUITY SCANNER FACILITATES**

**IDENTIFICATION OF WIRES FOR SOLDERING TO CONNECTORS**  
BOULTON, H. C. DICLEMENTE, R. A. /N. AM. AVIATION/ DEC. 1966  
MSC-626

Electrical continuity scanner automatically scans 50 wires in 2 seconds to correlate all wires in a circuit with their respective known ends. Modifications made to the basic plan provide circuitry for scanning up to 250 wires.

**B66-10606**  
**A RADIOMETER-PYROMETER**  
DEC. 1966 NASA-TN-D-2405  
LEWIS-284

Radiometer-pyrometer measures the spectral absorption, emission, and temperature of gases. The major problems involved in spectroradiometric measurements are nonuniform spectral sensitivity, nonlinearity, poor absolute accuracy, wide range of intensities, and wide range of wavelengths.

**B66-10607**  
**DEVELOPMENTAL INSTRUMENT SUPPLIES ACCURATE ATTITUDE AND ATTITUDE-RATE DATA**  
INNOVATOR NOT GIVEN /BOLT, BERANEK, AND NEWAN, INC./ DEC. 1966  
HQ-57

Three orthogonal-plane projection provides accuracy of readout of both attitude and attitude-rate information in an easily interpreted, uncluttered arrangement where blind navigation of a moving body is involved. The longitudinal length of the projection is constant, and independent of the pitch and roll attitudes of the moving body.

**B66-10612**  
**RESISTANCE THERMOMETER HAS LINEAR RESISTANCE-TEMPERATURE COEFFICIENT AT LOW TEMPERATURES**  
KUZYK, W. /GEN. DYN./ DEC. 1966  
WOO-190

Resistance thermometer incorporating a germanium resistance element with a platinum resistance element in a Wheatstone bridge circuit has a linear temperature-resistance coefficient over a range from approximately minus 140 deg C to approximately minus 253 deg C.

**B66-10614**  
**STUDY OF THEORY AND APPLICATION OF LONG DURATION HEAT FLUX TRANSDUCERS**  
HEAMAN, J. P. ROBERTSON, S. J. /HEAT TECHNOL. LAB./ DEC. 1966  
M-FS-1265

Theory and application of transducers used to measure heat flux in tests of more than one second duration.

**B66-10617**  
**IMPROVED MEMORY WORD LINE CONFIGURATION ALLOWS HIGH STORAGE DENSITY**  
INNOVATOR NOT GIVEN /UNIVAC/ DEC. 1966  
GSFC-559

Plated wire memory word drive line allows high storage density, good plated wire transmission and a simplified memory plane configuration. A half-turn word drive line with a magnetic keeper is used. The ground plane provides the return path for both the word current and the plated wire transmission line.

**B66-10619**  
**COMPUTER PROGRAM SIMPLIFIES TRANSIENT AND STEADY-STATE TEMPERATURE PREDICTION FOR COMPLEX BODY SHAPES**  
GIEBLER, K. N. /N. AM. AVIATION/ DEC. 1966  
MSC-989

Computer program evaluates heat transfer modes and calculates either the transient or steady-state temperature distributions throughout an object of complex shape when heat sources are applied to specified points on the object. It uses an electrothermal model to simulate the conductance, heat capacity, and temperature potential of the object.

B66-10621

CONNECTOR ACTS AS QUICK COUPLING IN COAXIAL  
CABLE APPLICATIONBREJCHA, A. G., JR. DEC. 1966  
JPL-803

Quick-coupling connector whose inner shells are threaded to the cable ends and whose outer shells have tracks that register in channels machined in the inner shells are rotated 45 deg to effect a locking of the coupling. This connector faithfully reproduces excellent electrical characteristics no matter how frequently assembled and disassembled.

B66-10622

POINT-SOURCE DETECTION SYSTEM REJECTS  
SPATIALLY EXTENDED RADIATION SOURCESMAXWELL, R. F., JR. /WESTINGHOUSE ELEC. CORP./  
DEC. 1966  
GSFC-486

System employing digital space correlation to suppress false target signals in a point-target tracking device is a reliable method for discriminating a distant target from false targets in the field of view of an infrared detection system or tracking device.

B66-10623

THERMOCOUPLES ELECTRICALLY CHECKED WHILE  
CONNECTED TO DATA SYSTEMINNOVATOR NOT GIVEN /REP. AVIATION CORP./ DEC.  
1966  
LANGLEY-182

Constant current source is connected across the input of the millivolt measuring system to monitor the electrical continuity and resistance of multiple thermocouple installations without disconnecting them from a data system. This technique monitored gauge thermocouple leads during the assembly and preflight testing of the Project Fire reentry packages.

B66-10624

MINIATURE TELEMETRY SYSTEM ACCURATELY  
MEASURES PRESSUREFRYER, T. B. DEC. 1966 SEE ALSO B64-10171 AND  
B66-10057  
ARC-74

Miniature, low power, telemetry system that can be used with commercially available strain gauge pressure transducers accurately measures pressure with a small implantable pressure cell and transmitter. The system has been used to date only with pressure transducers, but the circuit is equally applicable to any measurement using a strain gauge sensor.

B66-10625

COMPACT MICROWAVE MIXER HAS HIGH CONVERSION  
EFFICIENCYPENQUE, N. J. ROSEN, H. A. /HUGHES AIRCRAFT CO./  
DEC. 1966  
GSFC-197

Compact, lightweight microwave mixer has a relatively high conversion efficiency and power output. The mixer employs a pair of back-to-back voltage-variable capacitors in a stripline network.

B66-10629

PRECISION CW LASER AUTOMATIC TRACKING  
SYSTEM INVESTIGATEDLANG, K. T. LUCY, R. F. MC GANN, E. J. PETERS,  
C. J. /SYLVANIA ELECTRON. SYSTEMS/ DEC. 1966  
M-FS-1606

Precision laser tracker capable of tracking a low acceleration target to an accuracy of about 20 microradians rms is being constructed and tested. This laser tracking has the advantage of discriminating against other optical sources and the capability of simultaneously measuring range.

B66-10632

ACCURATE DEPTH CONTROL PROVIDED FOR  
THERMOCOUPLE JUNCTION LOCATIONSRICHARDSON, N. R. DEC. 1966 SEE ALSO NASA-TN-364  
LANGLEY-289

Flight reentry experiments define the total heating on a large blunt-nosed body by means of

imbedded thermocouples. The thermocouples, installed in a beryllium layered forebody, were designed to provide minimum feasible disturbance of local heat flow with accurate depth control of the thermocouple junction locations.

B66-10636

AUTOMATIC SYSTEM DETERMINES MOMENTS OF  
INERTIA OF ASYMMETRICAL OBJECTSINNOVATOR NOT GIVEN /SPACO, INC./ DEC. 1966  
M-FS-1769

Automatic system rapidly and accurately determines moments and products of inertia of asymmetrical objects. The system combines a torsional pendulum arrangement and a precision rate table with simplified analog computers to determine the desired quantities directly, without the need for additional calculations.

B66-10637

INSTRUMENT ACCURATELY MEASURES SMALL  
TEMPERATURE CHANGES ON TEST SURFACEHARVEY, W. D. MILLER, H. B. DEC. 1966 SEE ALSO  
NASA-TN-D-2846  
LANGLEY-174

Calorimeter apparatus accurately measures very small temperature rises on a test surface subjected to aerodynamic heating. A continuous thin sheet of a sensing material is attached to a base support plate through which a series of holes of known diameter have been drilled for attaching thermocouples to the material.

B66-10640

VOLUME-RATIO CALIBRATION SYSTEM FOR VACUUM  
GAGESDEC. 1966 SEE ALSO NASA-TN-D-3100  
LEWIS-303

Volume-ratio calibration system consists of a gas source, high pressure gauge, small volume tank, large volume chamber, plus appropriate piping, valves, and vacuum source. This system used in conjunction with commercial vacuum gauges evaluates its ability to accurately produce desired pressures in the .000001 to .01 torr range.

B66-10644

THREE-AXIS ATTITUDE AND DIRECTION REFERENCE  
INSTRUMENT HAS ONLY ONE MOVING PARTBOSSLER, F. B. /BELL AEROSPACE CORP./ DEC. 1966  
M-FS-1819

Lunar vehicle instrument combines the functions of attitude reference, direction reference, and display in a unit having only one moving part. The device, using bubble levels and a calibrated dial, is used as a sextant prior to takeoff, and as a backup navigation system during flight.

B66-10645

CONCEPT FOR USING LASER BEAMS TO MEASURE  
ELECTRON DENSITY IN PLASMASLONGO, S. E. /BOEING CO./ DEC. 1966  
M-FS-965

Concept is proposed for using laser beams as a means of measuring electron density at various points in flame or plasma exhausts. Measurement of the electron density is obtained by detecting reflected waves in the plasma that were activated by the laser.

B66-10650

MAGNETORESISTOR MONITORS RELAY PERFORMANCE

KREBS, D. Q. /BOEING CO./ DEC. 1966  
M-FS-1754

Magnetoresistor monitors the action of relays without disturbing circuit parameters or degrading relay performance. The magnetoresistor measures the relay magnetic flux produced under transient conditions to establish the characteristic signature of the relay.

B66-10653

THERMOCOUPLES EASILY INSTALLED IN HARD-TO-  
GET-TO PLACESGUENTHER, F. G. /N. AM. AVIATION/ DEC. 1966  
M-FS-1946

Thermocouple wires attached to charged capacitors are inserted in a drilled hole. An electric

charge fuses the thermocouple wires to the host material. This method has shown excellent results in fusing nichrome, chromel, Inconel, and stainless steel wires to nickel, beryllium, iron, steel, Inconel, and stainless steel.

B66-10658  
DIGITAL FREQUENCY COUNTER PERMITS READOUT  
WITHOUT DISTURBING COUNTING PROCESS  
WINKELSTEIN, R. DEC. 1966  
JPL-906

Digital frequency counter system enables readout accurately at one-second intervals without interrupting or disturbing the counting process. The system incorporates a master counter and a slave counter with novel logic interconnections. The counter can be readily adapted to provide frequency readouts at 0.1 second intervals.

B66-10659  
LOGIC CIRCUITRY USED TO AUTOMATICALLY TEST  
SHIELDED CABLES  
DIBB, G. /GE/ DEC. 1966  
HQ-60

Automatic cable tester checks multiple shielded conductors assembly cable connections. The tester uses logic circuitry to sequentially test all conductors and their shields to reveal any connection error in a GO-NO GO test.

B66-10661  
STUDY OF FAST RESPONSE THERMOCOUPLE  
MEASUREMENT OF TEMPERATURES IN CRYOGENIC  
GASES

BIELAWSKI, T. LOWRIE, A. R. ROBINSON, C. C.  
/BEECH AIRCRAFT CORP./ DEC. 1966  
M-FS-1659

Thermocouples fabricated from uninsulated small diameter wire have fast reproducible response times. The thermocouple is thermally isolated from its supports by making the leads of sufficient length so that the heat conduction down the leads is small and assuming that the leads adjacent to the junction are subjected to the same thermal conditions.

B66-10664  
PACKAGING OF ELECTRONIC MODULES  
KATZIN, L. DEC. 1966  
JPL-801

Study of design approaches that are taken toward optimizing the packaging of electronic modules with respect to size, shape, component orientation, interconnections, and structural support. The study does not present a solution to specific packaging problems, but rather the factors to be considered to achieve optimum packaging designs.

B66-10668  
PHOTOGRAPHIC METHOD MEASURES PARTICLE SIZE  
AND VELOCITY IN FLUID STREAM  
DICKERSON, R. A. /N. AM. AVIATION/ DEC. 1966  
M-FS-1536

Method employing a nonframing motion picture camera, a continuous front light source, and a strobe light determines the size and velocity of small particles in nonturbulent fluid streams. This method is used in the study of the motion of solid and liquid particles in research and industrial fluid flow systems.

B66-10669  
GAS LEAK DETECTOR IS SIMPLE AND  
INEXPENSIVE  
MITCHELL, D. K. /BOEING CO./ DEC. 1966  
M-FS-1206

Pressure sensor monitors small gas leaks in piping and pressure vessels. A combination of a paper ribbon and adhesive plastic tape is used to cover the area to be monitored and the pressure sensor is placed over a hole in the tape and paper.

B66-10670  
COMPUTER PROGRAM DETERMINES CHEMICAL  
COMPOSITION OF PHYSICAL SYSTEM AT  
EQUILIBRIUM  
KWONG, S. S. /N. AM. AVIATION/ DEC. 1966  
MSC-1119

Fortran IV digital computer program calculates equilibrium composition of complex, multiphase chemical systems. This is a free energy minimization method with solution of the problem reduced to mathematical operations, without concern for the chemistry involved. Also certain thermodynamic properties are determined as byproducts of the main calculations.

B66-10671  
COMPUTER PROGRAM DETERMINES CHEMICAL  
EQUILIBRIA IN COMPLEX SYSTEMS  
GORDON, S. ZELENZNIK, F. J. DEC. 1966 SEE ALSO  
NASA-TN-D-1454  
LEWIS-281

Computer program numerically solves nonlinear algebraic equations for chemical equilibrium based on iteration equations independent of choice of components. This program calculates theoretical performance for frozen and equilibrium composition during expansion, Chapman-Jouguet flame properties, studies combustion and designs hardware.

B66-10675  
GAGE ACCURATELY CONTROLS FORCE FOR PLACING  
CHIPS ON SUBSTRATES  
BENZIE, W. P. /IBM/ DEC. 1966  
M-FS-1941

Device is developed to control the force used in manually placing chips on substrates. It controls the compression load between 2 small members at loads as low as 25 grams by means of a force control gauge that is preset by varying the spring deflection.

B66-10679  
BLACKBODY CAVITY RADIOMETER HAS RAPID  
RESPONSE  
HALEY, F. C. DEC. 1966  
JPL-521

Fast response, spectrally linear standard detector in the form of a blackbody cavity radiometer calibrates rapidly responding photodetectors against a calibrated standard detector. A power amplifier with maximum available gain reduces error signal without stability loss. It may be used as a blackbody radiator by manipulation of the bridge variable arm.

B66-10680  
SLIDE RULE-TYPE COLOR CHART PREDICTS  
REPRODUCED PHOTO TONES  
GRIFFIN, J. D. /N. AM. AVIATION/ DEC. 1966  
MSC-1227

Slide rule-type color chart determines the final reproduced gray tones in the production of briefing charts that are photographed in black and white. The chart shows both the color by drafting paint manufacturer's name and mixture number, and the gray tone resulting from black and white photographic reproduction.

B66-10685  
PROCESS REDUCES SECONDARY RESONANT EMISSION  
IN ELECTRONIC COMPONENTS  
ERPENBACH, H. DEC. 1966  
JPL-934

Process reduces secondary electron emission in coaxial connector and in waveguides in the atmosphere. The assembly is placed in a vacuum chamber and is gradually vented to the atmosphere. It is exposed to high voltage, argon gas, and a hydrocarbon gas during the process.

B66-10687  
STUDY OF HOT WIRE TECHNIQUES IN LOW DENSITY  
FLOWS WITH HIGH TURBULENCE LEVELS  
HANSON, A. R. KRAUSE, F. R. LARSON, R. E. DEC. 1966  
M-FS-1269

Prediction of heat, mass, species, and momentum fluxes in a space vehicle and aerodynamic noise production by supersonic jet and rocket exhausts requires a predictability of the associated turbulence fields. The hot wire is a technique that will allow an experimental determination of turbulent properties.

B66-10689  
LOW INPUT VOLTAGE CONVERTER/REGULATOR  
MINIMIZES EXTERNAL DISTURBANCES  
INNOVATOR NOT GIVEN /HONEYWELL/ DEC. 1966  
GSFC-527

Low-input voltage converter/regulator constructed in a coaxial configuration minimizes external magnetic field disturbance, suppresses radio noise interference, and provides excellent heat transfer from power transistors. It converts the output of fuel and solar cells, thermionic diodes, thermoelectric generators, and electrochemical batteries to a 28 vdc output.

B66-10690  
EQUIVALENT CIRCUIT FOR A FIELD EFFECT  
TRANSISTOR ESTABLISHED FOR COMPUTER  
SIMULATION  
MING, L. J. /IBM/ DEC. 1966  
M-FS-1752

Equivalent circuit for the field effect transistor made up of circuit elements can be simulated by existing computer programs.

B66-10691  
SOLID-STATE RECOVERABLE FUSE FUNCTIONS AS  
CIRCUIT BREAKER  
THOMAS, E. F., JR. DEC. 1966  
GSFC-560

Molded, conductive-epoxy recoverable fuse protects electronic circuits during overload conditions, and then permits them to continue to function immediately after the overload condition is removed. It has low resistance at ambient temperature, and high resistance at an elevated temperature.

B66-10692  
HERMETICALLY SEALED CELLS PROTECTED FROM  
INTERNAL GAS PRESSURE  
CARSON, W. N. /GE/ DEC. 1966  
GSFC-555

Manufacturing process prevents damage to hermetically sealed nickel-cadmium secondary cells by buildup of gas pressure during overcharging and reversed charging conditions. The cells are manufactured with less charge capacity in the positive electrode than in the negative electrode, and two additional electrodes are added.

B66-10696  
LOW RATE FLOW SWITCH CAN BE USED FOR GAS OR  
LIQUID  
BATES, E. T., JR. DEC. 1966  
JPL-867

Flow switch operable at low flow rates is used for detecting the flow of a water coolant in a vacuum deposition apparatus. This switch utilizes one or more reed switches which are actuated by a sliding magnet.

B66-10699  
MONITORING SYSTEM DETERMINES AMPLITUDE AND  
TIME OF VIBRATION CHANNEL PEAKS  
ANDERSON, T. O. DEC. 1966  
JPL-879

Adaptive scheme advocated in this innovation will reduce processing time and is applicable to environmental testing and to space- or aircraft-borne vibration monitoring devices requiring a large number of channels.

B66-10706  
LOGARITHMIC CURRENT SIMULATOR GENERATES  
ELECTRICAL CURRENTS ACCURATELY BETWEEN 10 TO  
THE MINUS 11 AMPERE TO 10 TO THE MINUS 3  
AMPERE  
WILSON, J. /WESTINGHOUSE ASTRONUCL. LAB./ DEC.  
1966  
NU-0087

Current generator accurately simulates electric currents in the range of .0000000001 ampere to 0.1 ampere. Compensation networks have been devised to improve the accuracy at the lower current levels.

B66-10709  
THERMOCOUPLE-FLEXIBLE CABLE CONNECTOR  
INSULATOR IS HIGHLY RELIABLE

GRACEY, C. M. /AEROJET-GEN. CORP./ DEC. 1966  
NU-0082

Plastic/polycarbonate/ insulator improves thermocouple reliability in test operations. The insulator is molded in half sections, assembled mechanically and eliminates electrical shorting.

B67-10001  
PROGRAM COMPUTES SINGLE-POINT FAILURES IN  
CRITICAL SYSTEM DESIGNS  
BROWN, W. R. /N. AM. AVIATION/ JAN. 1967  
MSC-603

Computer program analyzes the designs of critical systems that will either prove the design is free of single-point failures or detect each member of the population of single-point failures inherent in a system design. This program should find application in the checkout of redundant circuits and digital systems.

B67-10002  
COMPUTER PROGRAM DETECTS TRANSIENT  
MALFUNCTIONS IN SWITCHING CIRCUITS  
CALVIN, E. L. /N. AM. AVIATION/ JAN. 1967  
MSC-604

A program which accepts a system model in the form of Boolean equations and solves these equations using a ternary algebra will determine the response of large combinational and sequential switching circuits to given input changes, taking into account malfunctions due to races, hazards, and oscillations.

B67-10009  
TESTER FOR STUDY OF ROLLING ELEMENT BEARINGS  
ZARETSKY, E. V. FEB. 1967  
LEWIS-305

Five-ball fatigue tester makes possible the study of rolling element phenomena. The device consists of a driven test ball pyramided upon four lower balls positioned by a separator and free to rotate in an angular contact raceway.

B67-10013  
SELF-STARTING PROCEDURE SIMPLIFIES NUMERICAL  
INTEGRATION  
JAN. 1967 SEE ALSO NASA-TN-D-2936  
ARC-50

A self-starting, multistep procedure for the numerical integration of ordinary differential equations is devised to produce all the required backward differences directly from the initial equations. The self-starting element eliminates nonessential tallying to determine starting values.

B67-10015  
ALUMINIZED THIN-WINDOW PROPORTIONAL-COUNTER  
TUBE IS STRONGER, MORE RESPONSIVE IN LONG  
WAVELENGTH REGION  
SCHNOPPER, H. W. SHIELDS, R. A. /CORNELL UNIV./  
JAN. 1967  
JPL-689

A thin-window proportional counter tube of 0.25-mil Mylar with a thin aluminum coating on one side permits efficient detection of long wavelength X-rays. It is sufficiently rugged for long-term use in space or other demanding environments.

B67-10017  
SHORTENED HORN-REFLECTOR ANTENNA  
LANTZ, P. A. JAN. 1967  
GSFC-502

A shortened horn-reflector antenna overcomes the mechanical disadvantages and complexity of the conventional horn-reflector antenna. The shortened antenna offers broadband performance, economic construction, very low antenna temperature, and excellent pattern performance.

B67-10020  
MINIATURE CAPACITOR FUNCTIONS AS PRESSURE  
SENSOR  
HARRISON, R. G. FEB. 1967  
JPL-903

Miniature capacitor operates as a differential-pressure telemetry sensor during free flight of test model in a hypersonic wind tunnel. The



capacitor incorporates a beryllium copper diaphragm. It is also used as an absolute pressure sensor.

**B67-10022**  
VARIABLE-PULSE SWITCHING CIRCUIT ACCURATELY  
CONTROLS SOLENOID-VALVE ACTUATIONS  
GILLET, J. D. /N. AM. AVIATION/ FEB. 1967  
M-FS-1895

Solid state circuit generating adjustable square wave pulses of sufficient power operates a 28 volt dc solenoid valve at precise time intervals. This circuit is used for precise time control of fluid flow in combustion experiments.

**B67-10025**  
COMPUTER/PERT TECHNIQUE MONITORS ACTUAL  
VERSUS ALLOCATED COSTS  
HOURY, E. WALKER, J. D. FEB. 1967  
LEWIS-260

A computer method measures the user's performance in cost-type contracts utilizing the existing NASA program evaluation review technique without imposing any additional reporting requirements. Progress is measured by comparing actual costs with a value of work performed in a specific period.

**B67-10027**  
FEED-THROUGH CONNECTOR COUPLES RF POWER INTO  
VACUUM CHAMBER  
GRANDY, G. L. /WESTINGHOUSE ASTRONUCL. LAB./  
FEB. 1967  
NU-0096

Feed-through device connects RF power to an RF coil in a vacuum chamber. The coil and leads are water cooled and vacuum tight seals are provided at the junctions. The device incorporates silver soldered copper tubes, polytetrafluoroethylene electrical insulators, and O-ring vacuum seals.

**B67-10028**  
MONITOR ASSURES AVAILABILITY AND QUALITY OF  
COMMUNICATION CHANNELS  
SMITH, G. P. /RCA/ FEB. 1967  
KSC-66-38

System monitors a communication channel for proper circuit parameters and energizes an alarm if these parameters do not fall within allowable limits. It comprises a monitor-signal transmitter at the transmitting end of the channel and a monitor-signal receiver at the receiving end.

**B67-10029**  
INSTRUMENT SEQUENTIALLY SAMPLES AC SIGNALS  
FROM SEVERAL ACCELEROMETERS  
CHAPMAN, C. P. FEB. 1967 SEE ALSO B66-10462  
JPL-884

Scanner circuit sequentially samples the ac signals from accelerometers used in conducting noise vibration tests, and provides a time-averaged output signal. The scanner is used in conjunction with other devices for random noise vibration tests.

**B67-10030**  
LOCAL MEASUREMENTS IN TURBULENT FLOWS  
THROUGH CROSS CORRELATION OF OPTICAL SIGNALS  
FISHER, M. J. FEB. 1967  
M-FS-1268

Crossed beam correlation method measures turbulent fluctuations in transonic and supersonic flows. Two collimated beams of radiation are crossed at the point of interest in the flow, and the power loss of each beam is measured with two independent photodetectors, which yield information about the turbulent properties.

**B67-10031**  
HIGH TRANSIENTS SUPPRESSED IN ELECTROMAGNETIC  
DEVICES  
MARION, C. W. FEB. 1967  
KSC-66-13

A bifilar winding around the magnetic core of electromagnetic devices suppresses high transient voltages. The winding is alternately spaced vertically and radially from the core to achieve a high coefficient of coupling.

**B67-10035**  
THERMOELECTRIC METAL COMPARATOR DETERMINES  
COMPOSITION OF ALLOYS AND METALS  
STONE, C. C. WALKER, D. E. FEB. 1967  
ARG-235

EMF comparing device nondestructively inspects metals and alloys for conformance to a chemical specification. It uses the Seebeck effect to measure the difference in EMF produced by the junction of a hot probe and the junction of a cold contact on the surface of an unknown metal.

**B67-10038**  
RESIDUAL MAGNETISM HOLDS SOLENOID ARMATURE  
IN DESIRED POSITION  
CRAWFORD, R. P. /GEN. DYN./ MAR. 1967  
LEWIS-343

Holding solenoid uses residual magnetism to hold its armature in a desired position after excitation current is removed from the coil. Although no electrical power or mechanical devices are used, the solenoid has a low tolerance to armature displacement from the equilibrium position.

**B67-10040**  
STUDY MADE OF EXPLOSIVE CUTTING IN SIMULATED  
SPACE ENVIRONMENTS  
COLEMAN, E. R. HAMILTON, L. O. /HAYES INTERN.  
CORP./ MAR. 1967 SEE ALSO NASA-TM-X-53440  
M-FS-1597

Study indicates the feasibility of explosive cutting and establishes techniques applicable to in-space cutting operations. Results show no degradation of the explosive and that work hardening of the target material is limited to the cut edge.

**B67-10041**  
ABSOLUTE VISCOSITY MEASURED USING  
INSTRUMENTED PARALLEL PLATE SYSTEM  
BROYLES, H. H. MAR. 1967  
JPL-874

An automatic system measures the true average shear viscosity of liquids and viscoelastic materials, using the parallel plate method and automatically displays the results on a graphic record. This eliminates apparatus setup and extensive calculations.

**B67-10042**  
IMPROVED FLUID CONTROL CIRCUIT OPERATES ON  
LOW POWER INPUT  
GEBBEN, V. MAR. 1967  
LEWIS-325

Standard electromagnetic relay actuates fluid control circuits with low level electrical signals by switching a fluid amplifier that drives a spool valve.

**B67-10046**  
MULTIPURPOSE INSTRUMENTATION CABLE PROVIDES  
INTEGRAL THERMOCOUPLE CIRCUIT  
ZELLNER, G. /WESTINGHOUSE ASTRONUCL. LAB./ MAR.  
1967  
NU-0108

Multipurpose cable with an integral thermocouple circuit measures strain, vibration, pressure, throughout a wide temperature range. This cable reduces bulky and complex circuitry by eliminating separate thermocouples for each transducer.

**B67-10053**  
SOLID-STATE TIME-TO-PULSE-HEIGHT CONVERTER  
DEVELOPED  
LYNCH, R. J. RODDICK, R. G. MAR. 1967  
ARG-170

Solid-state circuit produces an output pulse with an amplitude directly proportional to the time interval between two input pulses. It uses selected circuit options to achieve variable mode operation and a tunnel diode controls the charging time of a capacitor in proportion to the time interval being measured.

**B67-10055**  
CIRCUIT MULTIPLIES PULSE WIDTH MODULATION,  
EXHIBITS LINEAR TRANSFER FUNCTION  
CARLSON, A. W. FURCINITI, A. MAR. 1967

## HQ-56

Modulation multiplier provides a simple means of multiplying the width modulation of a pulse train by a constant factor. It operates directly on a pulse width modulated input signal to generate an output pulse train having a greater degree of width modulation than the input signal.

## B67-10060

ELECTRON MULTIPLIER HAS IMPROVED PERFORMANCE AND STABILITY  
INNOVATOR NOT GIVEN /G.C.A. CORP./ MAR. 1967  
GSFC-546

Electron multiplier contains a series of massive metal dynodes, compactly secured with ceramic rods for operation in a metal housing. The housing is rigidly mounted within a soft steel vacuum enclosure which shields the multiplier from the effects of external electromagnetic fields.

## B67-10061

CONTROL CIRCUIT ENSURES SOLAR CELL OPERATION AT MAXIMUM POWER  
PAULKOVICH, J. MAR. 1967  
GSFC-432

Control circuit enables a solar cell power supply to deliver maximum electrical power to a load. It senses the magnitude of the slope of the voltage-current characteristic curve and compares it to a reference voltage which represents the slope corresponding to the desired operating limits.

## B67-10065

PORTABLE DETECTOR SET DISCLOSES HELIUM LEAK RATES  
ANDERSON, G. E. /N. AM. AVIATION/ APR. 1967  
M-FS-1733

Portable helium detector measuring helium leak rates makes possible the use of the inert gas helium as a tracer. This helps solve safety and contamination problems in detecting leaks in closed fluid systems.

## B67-10074

FLOW-TEST DEVICE FITS INTO RESTRICTED ACCESS PASSAGES  
FITZGERALD, J. J. OBERSCHMIDT, M. ROSENBAUM, B. J. APR. 1967  
MSC-1078

Test device using a mandrel with a collapsible linkage assembly enables a fluid flow sensor to be properly positioned in a restricted passage by external manipulation. This device is applicable to the combustion chamber of a rocket motor.

## B67-10076

CLEANROOM AIR SAMPLER COUNTS, CATEGORIZES, AND RECORDS PARTICLE DATA  
NELSON, M. B. /IIT RES. INST./ JUN. 1967  
M-FS-2221

Light scattering particle counter monitors particles in a clean room. It categorizes and records the particles according to size and functions simultaneously in three separate areas. The counter uses a transducer head to transform light signals into electric signals.

## B67-10077

COMPUTER PROGRAM SIMULATES DESIGN, TEST, AND ANALYSIS PHASES OF SENSITIVITY EXPERIMENTS  
ALEXANDER, M. J. ROTHMAN, D. ZIMMERMAN, J. M. /N. AM. AVIATION/ APR. 1967  
M-FS-1496

Modular program with a small main program and several specialized subroutines provides a general purpose computer program to simulate the design, test and analysis phases of sensitivity experiments. This program allows a wide range of design-response function combinations and the addition, deletion, or modification of subroutines.

## B67-10080

INSTRUMENT CONTINUOUSLY MEASURES DENSITY OF FLOWING FLUIDS  
JACOBS, R. B. MACINKO, J. MILLER, C. E. /NBS/ APR. 1967

## LEWIS-309

Electromechanical densitometer continuously measures the densities of either single- or two-phase flowing cryogenic fluids. Measurement is made on actual flow. The instrument operates on the principle that the mass of any vibrating system is a primary factor in determining the dynamic characteristics of the system.

## B67-10084

CIRCUIT INCREASES CAPABILITY OF HYSTERESIS SYNCHRONOUS MOTOR  
MARKOWITZ, I. W. /RCA/ APR. 1967  
MSC-1080

Frequency and phase detector circuit enables a hysteresis synchronous motor to drive a load of given torque value at a precise speed determined by a stable reference. This technique permits driving larger torque loads with smaller motors and lower power drain.

## B67-10085

TRIPLE MODULAR REDUNDANCY /TMR/ COMPUTER OPERATION IMPROVED  
BALL, M. HARDIE, F. H. /IBM/ APR. 1967  
MSC-831

Switching off a failed element plus one of the good elements in the TMR computer operation keeps the reliability curve from crossing the simplex curve. This method increases reliability and prevents system failure.

## B67-10086

AUTOMATIC CHANNEL SWITCHING DEVICE  
BALL, M. OLNOWICH, H. T. /IBM/ APR. 1967  
MSC-832 MSC-834

Automatic channel switching device operates with all three triple modular redundant channels when there are no errors. When a failure occurs, channel and module switching isolate the failure to a specific channel. Since only one must operate correctly, reliability is increased.

## B67-10087

TRANSLATOR PROGRAM CONVERTS COMPUTER PRINTOUT INTO BRAILLE LANGUAGE  
POWELL, R. A. /BOEING CO./ APR. 1967  
M-FS-2061

Computer program converts print image tape files into six dot Braille cells, enabling a blind computer programmer to monitor and evaluate data generated by his own programs. The Braille output is printed 8 lines per inch.

## B67-10090

SYSTEM AUTOMATICALLY SUPPLIES PRECISE ANALYTICAL SAMPLES OF HIGH-PRESSURE GASES  
LANGDON, W. M. /IIT RES. INST./ APR. 1967  
M-FS-1814

High-pressure-reducing and flow-stabilization system delivers analytical gas samples from a gas supply. The system employs parallel capillary restrictors for pressure reduction and downstream throttling valves for flow control. It is used in conjunction with a sampling valve and minimizes alterations of the sampled gas.

## B67-10091

SYSTEM MAINTAINS CONSTANT PENETRATION DURING FUSION WELDING  
COOK, G. /MERRIK ENG./ MC CAMPBELL, W. M. APR. 1967  
M-FS-937

Servo system senses variations in fusion welding process, and adjusts the control parameters to compensate for them. The system assumes a correlation between uniform weld penetration and temperature gradients near the molten puddle. It senses weld properties and makes adjustments to travel speed and weld current.

## B67-10092

GREMEX-A NEW MANAGEMENT TRAINING CONCEPT  
DENAULT, M. F. VACCARO, M. J. APR. 1967  
GSFC-574

Goddard Research Engineering Management Exercise provides experience in R+D project decision making from a management rather than technological view. The participant directs a

hypothetical project presented in the management simulation technique. He uses old or new methods without concern for rewards or penalties existing in real life.

B67-10093

STRAIN GAGE CIRCUITRY PROVIDES FATIGUE TESTING MACHINE WITH ACCURATE CYCLE COUNT  
PARK, R. /WESTINGHOUSE ASTRONUCL. LAB./ APR. 1967

NU-0114

Fatigue tester determines the number of cycles to fatigue failure of brittle specimens. A strain gage on the loading arm records the loading applied to the component. As the component starts to break, the load is reduced and the strain gage stops the cycle counter.

B67-10097

HEATER CONTROL CIRCUIT PROVIDES BOTH FAST AND PROPORTIONAL CONTROL  
BASLOCK, R. W. /IBM/ APR. 1967

M-FS-906

Proportional control circuit supplies a heater with full current, from a pulsating dc source, to a present temperature and then switches to proportional control for fine temperature regulation. Two resistors and a diode are added to the existing circuit. The circuit can be adapted to control other functions.

B67-10099

SYSTEM ENABLES MORE COMPLETE CALIBRATIONS OF DYNAMIC-PRESSURE TRANSDUCERS  
PERNET, D. F. /IIT RES. INST./ APR. 1967

M-FS-2063

Absolute pressure calibration system using a Michelson interferometer calibrates phase characteristics and pressure sensitivities of the transducers that monitor acoustic or aerodynamic pressure fields. The interferometer uses a helium-neon laser light source and interchangeable acoustic signal generators to produce acoustic waves.

B67-10101

DOUBLE EMITTER SUPPRESSED CARRIER MODULATOR USES COMMERCIALY AVAILABLE COMPONENTS  
HAIST, C. F. /PISCOPO, A. /IBM/ APR. 1967

M-FS-2494

Double emitter suppressed carrier modulator develops a signal-to-carrier minimum output ratio of 40 db and signal input of 2.5 volts. The circuit uses a commercially available double emitter chopper transistor. It eliminates tuning potentiometers and reduces sideband harmonics.

B67-10103

POLYNOMIAL MANIPULATOR AP-168  
TUTT, G. E. /N. AM. AVIATION/ MAY 1967

MSC-1231

Linear Systems Design Evaluation Program, AP-168 combines the many different analysis techniques used to evaluate and manipulate polynomials. The single program is a pseudo instruction abstraction. It allows the user to enter polynomials of the Laplace operators and to manipulate them freely.

B67-10104

PARAMETRIC UP-CONVERTER INCREASES FLEXIBILITY OF MASER  
SUMMY, R. H. APR. 1967

KSC-67-98

Parametric up-converter translates a broad band of signals to the fixed tuned input frequency of a maser. This modified maser can operate in the 1700-2300 Mc range, eliminating the need to duplicate equipment. It may be applied in communications and radio astronomy.

B67-10106

RF INDUCTOR HAS HIGH Q, IS STABLE AT HIGHER TEMPERATURES  
WILER, E. M. MAY 1967

JPL-1019

Encapsulated RF inductor with an insulated coil has a high Q and remains stable for long periods of time at high temperatures. The coil is wound

on a core and both are encapsulated in an epoxy resin. Two terminals are soldered to the coil.

B67-10108

COMPUTER PROGRAM REDUCES CALCULATION TIME OF NORMAL RESPONSE FUNCTIONS  
ALEXANDER, M. J. ROTHMAN, D. ZIMMERMAN, J. M. /N. AM. AVIATION/ MAY 1967

M-FS-1517

Fortran II computer program rapidly calculates parameters of maximum likelihood estimates from sensitivity experiment data populations. The program uses the Newton-Raphson iterative procedure to calculate the mean and standard deviation of portions of the cumulative normal response function.

B67-10111

FIXTURE TESTS BELLOWS RELIABILITY THROUGH REPETITIVE PRESSURE/TEMPERATURE CYCLING  
LEVINSON, C. /SPERRY GYROSCOPE CO./ MAY 1967

MSC-1176

Fixture explores the reliability of bellows used in precision inertial systems. The fixture establishes the ability of the bellows to withstand repetitive over-stress pressure cycling at elevated temperatures. It is applicable in quality control and reliability programs.

B67-10115

LIQUID HYDROGEN DENSITOMETER UTILIZES OPEN-ENDED MICROWAVE CAVITY  
SMETANA, J. WENGER, N. C. APR. 1967 SEE ALSO  
NASA-TN-D-3680

LEWIS-390

Open-ended microwave cavity directly measures the density of flowing liquid, gaseous, or two-phase hydrogen. Its operation is based on derived relations between the cavity resonant frequency and the dielectric constant and density of hydrogen.

B67-10116

DETECTION OF ENTRAPPED MOISTURE IN HONEYCOMB SANDWICH STRUCTURES  
HALLMARK, W. B. /N. AM. AVIATION/ MAY 1967

MSC-1103

Thermal neutron moisture detection system detects entrapped moisture in intercellular areas of bonded honeycomb sandwich structures. A radium/beryllium fast neutron source bombards a specimen. The emitted thermal neutrons from the target nucleus are detected and counted by a boron trifluoride thermal neutron detector.

B67-10118

TV SYNCHRONIZATION SYSTEM FEATURES STABILITY AND NOISE IMMUNITY  
LANDAUER, F. P. MAY 1967

JPL-915

Horizontal jitter in the video presentation in television systems is prevented by using an additional sync level. This circuitry uses simultaneous signals at both sync and porch frequencies, providing a sync identification from which a coincidence circuit can generate pulses having the required stability and noise immunity.

B67-10119

PERSONAL COMMUNICATION SYSTEM COMBINES HIGH PERFORMANCE WITH MINIATURIZATION  
ATLAS, N. D. /N. AM. AVIATION/ MAY 1967

MSC-720 MSC-722

Personal communication system provides miniaturized components that incorporate high level signal characteristics plus noise rejection in both microphone and earphone circuitry. The microphone is designed to overcome such spacecraft flight problems as size, ambient noise level, and RF interference.

B67-10125

EDGE-TYPE CONNECTORS EVALUATED BY ELECTRICAL NOISE MEASUREMENT  
BRUMMETT, S. L. /BOEING CO./ MAY 1967

M-FS-2243

Electrical noise measurement system measures noise generated by edge-type connectors and circuit cards when they are subjected to sinusoidal

vibration. It provides a signal across the contact area and monitors the signal change during vibration. Noise measured can be expressed as a varying change in total contact resistance.

**B67-10127**  
**CALIBRATING ULTRASONIC TEST EQUIPMENT FOR CHECKING THIN METAL STRIP STOCK**  
 PETERSON, R. M. /AEROJET-GEN. CORP./ JUN. 1967  
 NUC-10009

Calibration technique detects minute laminar-type discontinuities in thin metal strip stock. Patterns of plastic tape are preselected to include minutely calculated discontinuities and the tape is applied to the strip stock to intercept the incident sonic beam.

**B67-10130**  
**MODIFIED UNIVIBRATOR COMPENSATES FOR OUTPUT TIMING ERRORS**  
 STRAUSS, M. G. MAY 1967  
 ARG-85

One-stage, delay compensation amplifier, added to conventional univibrator circuitry time-synchronizes the trailing edge of the output pulse with the origin of the input pulse. The trailing edge is independent of the amplitude of the input pulse.

**B67-10135**  
**INTEGRATOR CAN EASILY BE SET AND RESET WITH AN ELECTRONIC SWITCH**  
 DEBOO, G. J. MAY 1967  
 ARC-10002

Electronic switch sets and resets integrator circuit to some initial condition using a grounded capacitor. This circuit also uses four equal resistors and an operational amplifier.

**B67-10136**  
**COMPUTER PROGRAM CALCULATES MONOTONIC MAXIMUM LIKELIHOOD ESTIMATES USING METHOD OF REVERSALS**  
 ALEXANDER, M. J. /N. AM. AVIATION/ MAY 1967  
 M-FS-1516

Fortran II computer program calculates maximum estimates of a monotonic non-decreasing response function. The program uses the method of reversals algorithm which applies to the analysis of univariate or multivariate sensitivity experiments.

**B67-10137**  
**VARIABLE RELUCTANCE SWITCH AVOIDS CONTACT CORROSION AND CONTACT BOUNCE**  
 WATSON, P. C. /MIT/ MAY 1967  
 MSC-1178

Variable reluctance switch avoids contact corrosion and bounce in a hostile environment. It consists of a wire-wound magnetic core and moveable bridge piece that alters the core flux pattern to produce an electrical output useful for switching control media.

**B67-10139**  
**RECORDING AND TIME EXPANSION TECHNIQUE FOR HIGH-SPEED, SINGLE-SHOT TRANSIENT VIDEO SIGNAL**  
 HRUBY, R. J. SANDER, R. C. MAY 1967  
 ARC-10003

High-speed, single shot, transient voltage is recorded on a video tape recorder, which, when played back, converts the single signal to a repetitive signal. This drives a sample data translator which lengthens the original transient production time, suiting it to an x-y plotter or computer tape recorder use.

**B67-10140**  
**CLAMP PROVIDES EFFICIENT CONNECTION FOR HIGH-DENSITY CURRENTS**  
 MC CARTHY, J. R. TREBES, D. M. /N. AM. AVIATION/ MAY 1967  
 M-FS-2417

Electrical connector clamp /bus bar/ gives high contact-surface efficiency for providing a high current to thin wall stainless steel tubing containing hydrogen gas. It uses lead solder film to provide the electrical equivalent of a

fusion bond without degrading the grain structure, permitting disassembly and reuse of the components.

**B67-10142**  
**THIN FILM PROCESS FORMS EFFECTIVE ELECTRICAL CONTACTS ON SEMICONDUCTOR CRYSTALS**  
 FORMIGONI, N. P. ROBERTS, J. S. /WESTINGHOUSE ELEC. CORP./ MAY 1967  
 M-FS-2343

Process makes microscopic, low-resistance electrical contacts on hexagonal n-type silicon carbide crystals used for microelectronic devices. A vacuum deposition of aluminum is etched to expose the bare silicon carbide where the electrical contacts are made. Sputtering alternating layers of tantalum and gold forms the alloy film.

**B67-10143**  
**DESIGN CONCEPTS USING RING LASERS FOR FREQUENCY STABILIZATION**  
 MOCKER, H. /HONEYWELL INC./ MAY 1967  
 M-FS-2448

Laser frequency stabilization methods are based on a frequency discriminant which generates an unambiguous deviation signal used for automatic stabilization. Closed-loop control stabilizes cavity length at a null point. Some systems have a stabilized ring laser using a piezoelectric dither and others use a Doppler gain tube.

**B67-10144**  
**PROCESS FACILITATES PHOTORESIST MASK ALIGNMENT ON SIC CRYSTALS**  
 FORMIGONI, N. P. ROBERTS, J. S. /WESTINGHOUSE ELEC. CORP./ MAY 1967  
 M-FS-2394

Growth of silicon dioxide on a silicon carbide crystal ensures proper orientation of photoresist masks on the crystals used for semiconductor devices. The crystal is heated in a water vapor-saturated gas to delineate p-n junctions that intersect the crystal surface.

**B67-10145**  
**TEST INSTRUMENTATION EVALUATES ELECTROSTATIC HAZARDS IN FLUID SYSTEM**  
 COLLINS, L. H. HENRY, R. KREBS, D. /BOEING CO./ MAY 1967  
 M-FS-2277

RJ-1 fuel surface potential is measured with a probe to determine the degree of hazard originating from static electricity buildup in the hydraulic fluid. The probe is mounted in contact with the fluid surface and connected to an electrostatic voltmeter.

**B67-10146**  
**HYDROGEN MASER AS A HIGHLY STABLE FREQUENCY REFERENCE**  
 VANIER, J. VESSOT, R. /VARIAN ASSOC./ MAY 1967  
 M-FS-2437

Hydrogen maser is stable short- and long-term frequency reference for precision tracking systems. Its resettability is expressed as the rms deviation from the mean.

**B67-10150**  
**MULTIPLEXING CONTROL DEVICE ENABLES HANDLING OF WIDE VARIATIONS IN SAMPLING RATES**  
 INNOVATOR NOT GIVEN. /WESTINGHOUSE ELEC. CORP./ JUN. 1967  
 M-FS-1871

ESS telecommunication system concept provides the ability to change according to needs indicated by the data without any change to the lunar experiment equipment. The system will include a magnetic core memory as the data multiplexing control device.

**B67-10151**  
**ELECTRONIC FREQUENCY DISCRIMINATOR**  
 REID, W. J. /MOTOROLA, INC./ JUN. 1967  
 M-FS-2434

Digital comparator permits discrimination at accuracy of reference frequency. The compare circuit is a shift register element.

B67-10152  
MEANS FOR IMPROVING APPARENT RESOLUTION OF  
TELEVISION  
HILBORN, E. H. MAY 1967  
ERC-65

Technique using short term temporal integration characteristics of the observer's visual system improves the apparent resolution of television video presentations. The raster is displaced slightly on each frame so the eye can integrate the information in each raster grain. This phase shift uses a switching time delay.

B67-10153  
STUDY OF YTTRIUM IRON GARNET RODS REVEALS  
NEW MAGNETOSTATIC ECHO MODE  
KEDZIE, R. W. /SPERRY RAND RES. CENTER/ JUN.  
1967  
ERC-37

Echo mode in YIG rods has different behavior in magnetic fields. This mode, discovered at 8.5 gigahertz, experiences a linear variation. The time delay exhibited is a linear function of the applied magnetic field and the input pulse frequency.

B67-10155  
SUBMINIATURE DEFLECTION CIRCUIT OPERATES  
INTEGRATED SWEEP CIRCUITS IN TV CAMERA  
SCHAFF, F. L. /WESTINGHOUSE ELEC. CORP./ MAY  
1967  
MSC-1263

Small magnetic sweep deflection circuits operate a hand-held lunar television camera. They convert timing signals from the synchronizer into waveforms that provide a raster on the vidicon target. Raster size remains constant and linear during wide voltage and temperature fluctuations.

B67-10156  
VOLTAGE REGULATOR/AMPLIFIER IS SELF-REGULATED  
DAY, W. E. PHILLIPS, D. E. /COLLINS RADIO CO./  
MAY 1967  
MSC-1240

Signal modulated, self-regulating voltage regulator/amplifier controls the output + voltage in modulated regulator systems. It uses self-oscillation with feedback to a control circuit with a discontinuous amplitude action feedback loop.

B67-10157  
DESIGN CONCEPT FOR IMPROVED PHOTO-SCAN TUBE  
MALLING, L. R. JUN. 1967  
JPL-818

Conceptual photo-scan tube avoids complexity of internal beam scanning and beam-current adjustment by optical scan readout. It differs from a conventional image orthicon in its use of an external oscilloscope tube.

B67-10160  
A POWER-SPECTRAL-DENSITY COMPUTER PROGRAM  
CHAPMAN, C. P. JUN. 1967  
NPO-10126

Computer program simplifies and clarifies random-noise vibration test results. It also varies PSD test specifications, sets up automatic equalization equipment, and calculates an exact acceleration level for the random noise prior to the test.

B67-10161  
SENSING DISKS FOR SLUG-TYPE CALORIMETERS  
HAVE HIGHER TEMPERATURE STABILITY  
INNOVATOR NOT GIVEN /SOUTHERN RES. INST./ JUN.  
1967  
M-FS-1867

Graphite sensing disk for slug-type radiation calorimeters exhibits better performance at high temperatures than copper and nickel disks. The graphite is heat-soaked to stabilize its emittance and the thermocouple is protected from the graphite so repeated temperature cycling does not change its sensitivity.

B67-10162  
CLOSED CIRCUIT TV SYSTEM MONITORS WELDING  
OPERATIONS

GILMAN, M. /N. AM. AVIATION/ JUN. 1967  
MSC-11002

TV camera system that has a special vidicon tube with a gradient density filter is used in remote monitoring of TIG welding of stainless steel. The welding operations involve complex assembly welding tools and skates in areas of limited accessibility.

B67-10165  
HYBRID SOLID STATE SWITCH REPLACES MOTOR-  
DRIVEN POWER SWITCH  
BOOTH, R. A. SCHLOSS, A. I. JUN. 1967  
JPL-931

Hybrid solid state switch replaces existing motor-driven power switches used on spacecraft. It uses a transistor circuit to limit the open circuit voltage and allow small relay contacts to handle high transient currents at reasonable cycle life.

B67-10166  
EFFICIENT MILLIMETER WAVE /140 GHZ/ DIODE  
FOR HARMONIC POWER GENERATION  
INNOVATOR NOT GIVEN /ADVAN. TECHNOL. CORP./ JUN.  
1967  
HQ-61

Epitaxial gallium arsenide diode junction formed in a crossed waveguide structure operates as a variable reactance harmonic generator. This varactor diode can generate power efficiently in the low-millimeter wavelength.

B67-10170  
DATA RETRIEVAL SYSTEM PROVIDES UNLIMITED  
HARDWARE DESIGN INFORMATION  
RAWSON, R. D. SWANSON, R. L. /N. AM. AVIATION/  
JUN. 1967  
MSC-1144

Data is input to magnetic tape on a single format card that specifies the system, location, and component, the test point identification number, the operator's initial, the date, a data code, and the data itself. This method is efficient for large volume data storage and retrieval, and permits output variations without continuous program modifications.

B67-10171  
STRUCTURAL ANALYSIS AND MATRIX INTERPRETIVE  
SYSTEM /SAMIS/  
INNOVATOR NOT GIVEN /PHILCO CORP./ JUN. 1967  
NPO-10130

Structural Analysis and Matrix Interpretive System eliminates high-speed digital computer restrictions of lack of generalization and lack of flexibility. Programming concepts of the system are standardization, modularity, and programming for intermediate-size problems.

B67-10175  
NUMERICAL DATA FRAME READOUT SYSTEM USED IN  
TESTING TELEMETRY SYSTEMS  
COTE, C. E. CRESSEY, J. R. JUN. 1967  
GSFC-551

Digital telemetry systems are tested by a display system that offers direct readout as high data rates. The rates appear in numerical format and are adaptable to photographic recording techniques. The system can show bit dropouts at a memory output or locate a malfunction in a system.

B67-10176  
THERMAL AND BIAS CYCLING STABILIZES PLANAR  
SILICON DEVICES  
HARRIS, R. E. MEINHARD, J. E. /N. AM. AVIATION/  
JUN. 1967  
ERC-48

Terminal burn-in or baking step time in the processing of planar silicon devices is extended to reduce their inversion tendencies. The collector-base junction of the device is also cyclically biased during the burn-in.

B67-10179  
A THEORETICAL MODEL FOR DETERMINING TURBINE  
FLOWMETER SENSITIVITY  
SMITH, R. L. /N. AM. AVIATION/ JUN. 1967

M-FS-1172

Analytical model of turbine-type flowmeter guides in the selection of valid extrapolation of available calibration data. An expression for flowmeter performance is developed to include the effects of fluid friction, bearing drag, and magnetic drag upon helical rotor design.

B67-10181

STUDY INDICATES FLUID DIGITAL COMPUTATION SYSTEMS ARE FEASIBLE

INNOVATOR NOT GIVEN /GE/ JUN. 1967

M-FS-520

Digital computation systems using fluid amplifiers are proven practical. The response speed is adequate for space applications and they are reliable in adverse environments. The systems may be feasible for satellite attitude controls and guidance computers for manned orbital stations.

B67-10190

SWITCHING-TYPE REGULATOR CIRCUIT HAS INCREASED EFFICIENCY

CLAPP, W. M. /SANDERS ASSOCIATES, INC./ JUN. 1967

MSC-1063

Switching series regulator circuit uses an inductive network to feed most of the current applied to the control circuit to the load. This circuit eliminates resistive losses and the need for heat sinks.

B67-10192

FAST-ACTING CALORIMETER MEASURES HEAT OUTPUT OF PLASMA GUN ACCELERATOR

DETHLEFSON, R. LARSON, A. V. LIEBING, L. /GEN. DYNAMICS/CONVAIR DIV./ JUN. 1967

LEWIS-388

Calorimeter measures the exhaust energy from a shot of a pulsed plasma gun accelerator. It has a fast response time and requires only one measurement to determine the total energy. It uses a long ribbon of copper foil wound around a glass frame to form a reentrant cavity.

B67-10196

TECHNIQUE FOR STRIP CHART RECORDER TIME NOTATION

INNOVATOR NOT GIVEN /ROBACK CORP./ JUN. 1967

GSFC-473

Single recorder channel helps determine the time an event is recorded on the readout of a strip chart recorder. It presents hours, tens of minutes, and minutes by a unique method of time increment identification. This facilitates recording timing marks.

B67-10199

ELECTROMETER AMPLIFIER OPERATES OVER DYNAMIC RANGE OF FIVE ORDERS OF MAGNITUDE

KATZ, N. /MARSHALL LAB./ JUN. 1967

ARC-75

Special purpose electrometer amplifier is capable of operation over a dynamic range of five orders of magnitude. This is achieved by using a zener controlled attenuator in the feedback path for the amplifier.

B67-10201

ELECTRONIC CIRCUITRY USED TO AUTOMATE PAPER CHROMATOGRAPHY

STEFFENSEN, G. R. JUN. 1967

JPL-840

Electronic circuit is used in a paper chromatograph instrument that has excellent sensitivity and furnishes a printed record of each test. The circuit measures and records changes in conductivity in a strip of chromatographic paper as different solutions are placed on it.

B67-10203

AUTOMATED MICROSYRINGE IS HIGHLY ACCURATE AND RELIABLE

STUART, J. L. JUN. 1967

NPO-10142

Syringe meters small volumes of fluid used in chemical analysis. The standard body and plunger are adapted to fit with a motor driven micrometer,

making a reliable and convenient device.

B67-10204

A CONCEPTUAL, PARALLEL OPERATING DATA

COMPRESSION PROCESSOR

ANDERSON, T. O. JUN. 1967

NPO-10068

Data compressor processor concept envisions a simplified system for telemetry communications. It is simultaneously a zero-order processor and a floating aperture, a variable aperture, and a binary integer aperture with a decoded buffet fullness counter.

B67-10205

QUARTZ CRYSTALS DETECT GAS CONTAMINANTS

DURING VACUUM CHAMBER EVACUATION

STEPHENS, J. B. JUN. 1967

NPO-10144

Piezoelectric quartz crystals detect condensable gas contaminants backstreaming into a vacuum chamber when a pump is evacuating the chamber. One crystal acts as a thermometer, the other detects mass change. They are energized by electronic equipment which records frequency changes.

B67-10206

PLOTTER DESIGN SIMPLIFIES DETERMINATION OF

IMAGE SENSOR TRANSFER CHARACTERISTIC

BAKER, L. R. JUN. 1967

NPO-10164

Transfer characteristic of vidicons and other image sensors are measured by light from a calibrated electroluminescent panel as a function of the current output of the image sensor. The plot of current output versus the calibrated light output is the transfer characteristic.

B67-10213

FM CARRIER DEVIATION MEASURED BY

DIFFERENTIAL PROBABILITY METHOD

DAQUIN, A. F., JR. HADDICAN, J. /BOEING CO./

JUN. 1967

M-FS-2166

Differential probability FM system measures deviation of a carrier modulated by a complex signal. The peak-to-peak amplitude is measured and related to the frequency shift of the carrier signal. The deviation is described in terms of a probability as well as a peak value.

B67-10215

RUN NUMBERING SYSTEM FOR USE WITH DATA

RECORDERS

PEASE, L. L. /BOEING CO./ JUN. 1967

M-FS-2557

Run numbering identification system provides a permanent identification on the recorder traces of data runs. It automatically enters, by pulse coding, the number of the current data run on the recorder trace. The system uses a keyboard, registers, converters, amplifiers, and a pulse generator.

B67-10220

LOW SPEED, LONG TERM TRACKING ELECTRIC

DRIVE SYSTEM HAS ZERO BACKLASH

RICHTER, H. L. STOLLER, F. W. JUL. 1967

NPO-10173

Electric drive system provides low speed, long term tracking of targets that move at a sidereal rate. It utilizes eddy-current energized actuators that are free from radio frequency interference generation and a solid state feedback amplifier with provisions for antibacklash biasing.

B67-10221

AMPLIFIER PROVIDES DUAL OUTPUTS FROM A

SINGLE SOURCE WITH COMPLETE ISOLATION

DIPPLE, C. R. /WESTINGHOUSE ASTRONUCL. LAB./

NEFF, G. A. /NEFF INSTR. CORP./ JUL. 1967

NUC-10056

Amplifier provides two amplified outputs from a single input signal with complete transformer isolation. It uses modulation techniques to obtain the separated output.

B67-10226

LABORATORY PULSE MODULATOR USES MINORITY  
CARRIER STORAGE DIODES  
INNOVATOR NOT GIVEN /SYLVANIA ELECTRON. SYSTEMS/  
JUL. 1967  
M-FS-2442

Pulse modulator is capable of continuously variable pulse width over a 10 to 1 range of 1.0 microsecond to 0.1 microsecond and operates over a wide range of pulse repetition rates. Pulse width diversity is obtained by operating step-recovery diodes in the reverse conduction mode.

B67-10229

GLOW DISCHARGE DENSITY SENSOR PROBE LIFE IS  
EXTENDED  
MAHUGH, R. A. /BOEING CO./ JUL. 1967  
M-FS-1707

Excitation of the glow discharge probes with a high peak-to-peak voltage square wave reduces instability of density sensors. This results in good probe life plus output stability over a wide range.

B67-10230

FUSED DIODE PROVIDES VISUAL INDICATION OF  
FUZE CONDITION  
JENKINS, K. H. JUL. 1967  
KSC-67-16

Fused diode combines a semiconductor diode and a circuit protective fuse within a common transparent cartridge. It provides visual indication of fuse condition which precludes the necessity of making resistance checks with an ohmmeter.

B67-10231

IMPROVED ATMOSPHERIC PARTICLE ANALYZER  
INNOVATOR NOT GIVEN /BLOCK ENG./ JUL. 1967  
ERC-33

Nephelometer measures aerosol particles in wide concentration and size distribution ranges. It measures the light scattered from the aerosol particles at a controlled sampling rate to ensure laminar flow through the sample tube, and thereby eliminate the need for sheath air.

B67-10234

AN IMPROVED NUCLEAR MAGNETIC RESONANCE  
SPECTROMETER  
ELLEMAN, D. D. MANATT, S. L. JUL. 1967  
JPL-762

Cylindrical sample container provides a high degree of nuclear stabilization to a Nuclear Magnetic Resonance /NMR/ spectrometer. It is placed coaxially about the NMR insert and contains reference sample that gives a signal suitable for locking the field and frequency of an NMR spectrometer with a simple audio modulation system.

B67-10239

A PHONOCARDIOGRAM SIMULATOR  
KEEFER, J. M. JUL. 1967  
KSC-67-94

Simulator calibrates and checks out phonocardiograms used in physiological monitoring of astronauts in flight and during flight simulation. It is also used to check out telemetry systems and instrumentation systems for phonocardiogram monitoring in hospitals and medical care centers, and in training personnel to use such systems.

B67-10242

WEB BELT LOAD MEASURING INSTRUMENT HAS  
EXCELLENT STABILITY  
WALKER, R. R. /N. AM. AVIATION/ JUL. 1967  
MSC-921

Web belt system measures belt or strap load. It is partially disassembled and installed on an existing belt without cutting or re-threading the belt. A strain gauge, installed on one of the support beams, eliminates errors due to uneven loading.

B67-10246

IMPROVED TELEVISION SIGNAL PROCESSING SYSTEM  
WONG, R. Y. JUL. 1967 SEE ALSO B67-10005

NPO-10140

Digital system processes spacecraft television pictures by converting images sensed on a photostorage vidicon to pulses which can be transmitted by telemetry. This system can be applied in the processing of medical X-ray photographs and in electron microscopy.

B67-10248

RECTILINEAR DISPLAY GIVES ACCELERATION LOAD  
FACTOR AND VELOCITY INFORMATION  
FRANK, A. J. JOHNSON, B. C. /N. AM. AVIATION/  
JUL. 1967  
MSC-1045

Spacecraft Entry Monitoring System /EMS/ gives a rectilinear display of acceleration load factor and velocity information. This allows an astronaut to respond with manual spacecraft attitude corrective maneuver commands.

B67-10249

COMPUTER PROGRAM SAMPLES DIGITAL DATA FOR  
CRT DISPLAY  
DAY, D. J. WICKES, W. H. /N. AM. AVIATION/ JUL.  
1967  
MSC-999

High volume, multichannel data reduction computer program permits selection of the rates at which digital data is sampled. The program, written in Fortran IV source language, also permits accessibility to the original mass of data.

B67-10250

EXPERIMENTAL COHERENT FRACTIONAL FREQUENCY  
MULTIPLIER AT S-BAND  
MOSTRUM, R. A. /SMITH ELECTRONICS CO./ JUL. 1967  
M-FS-2427

Experimental circuit produces an efficient fractional frequency multiplier that will operate on a 5.6 mw, 2101.8 MHz input signal to achieve an output-to-input frequency ratio of 240/221. Step-recovery diodes used in all frequency-changing stages result in a coherent offset frequency.

B67-10251

AN EFFICIENT, TEMPERATURE-COMPENSATED  
SUBCARRIER OSCILLATOR  
LAWRENCE, E. D. MEAD, D. C. /HUGHES AIRCRAFT  
CO./ AUG. 1967  
JPL-SC-091

Telemetry subcarrier oscillator has temperature stability, consumes a minimum of power, and has a high input impedance. Its output frequency is a linear function of the magnitude of an input signal. A circuit using an input buffer with a field effect transistor serves as the temperature-compensating element.

B67-10253

SOLID STATE PHASE DETECTOR REPLACES BULKY  
TRANSFORMER CIRCUIT  
MOBERLY, C. L. /MOTOROLA/ JUL. 1967  
MSC-11007

Miniature solid state phase detector using MOSFETs is used in a phase lock loop with a sun-bit detector in an integrated data-link circuit. This replaces bulky transformer circuits. It uses an inverter amplifier, a modulator switch, and a buffer amplifier.

B67-10254

A CALIBRATION MEANS FOR SPECTRUM ANALYZERS  
LARSON, M. S. JUL. 1967  
MSC-10987

Spectrum analyzer calibration system is rapid and provides an accurate family of adjustable markers at any point in the spectrum. Pulse width controls determine the number of markers. The unit operates with a repetition rate from 300 cps to 40 kc at a center frequency from 10 kc to 2 Mc.

B67-10255

ABSOLUTE FREQUENCY STABILIZATION OF LASER  
OSCILLATOR AGAINST LASER AMPLIFIER  
SIEGMAN, A. E. /SYLVANIA ELECTRON. SYSTEMS/ JUL.  
1967  
M-FS-2559

Long-term absolute frequency stabilization of a laser oscillator is obtained when the laser's oscillation frequency is referenced to the exact center of an atomic transition. A laser amplifier acts as a discriminant to indicate when the laser frequency deviates from the center of its atomic transition.

B67-10257  
FAST-RESPONSE FREQUENCY-TO-ANALOG CONVERTER  
HAGIHARA, F. S. /N. AM. AVIATION/ JUL. 1967  
M-FS-709

Frequency-to-analog converter has a fast response time and a low ripple. The circuit uses a frequency-to-pulse converter which provides two pulse trains, both at the same frequency as that of the input signal, but with a 10 microsecond difference between the trains.

B67-10258  
MULTICHANNEL PULSE HEIGHT ANALYZER IS  
INEXPENSIVE, FEATURES LOW POWER  
REQUIREMENTS  
EWALD, C. J. SARKADY, A. A. /NEW HAMPSHIRE  
UNIV./ AUG. 1967  
HQN-10020

Consumption multichannel pulse height analyzer performs balloon and rocket investigations of solar neutrons with energies greater than 10 MeV. The lightweight unit can operate in a temperature range of minus 30 degrees to plus 70 degrees C and withstand storage temperatures from minus 50 degrees to plus 90 degrees C.

B67-10259  
A PIEZO-BAR PRESSURE PROBE  
FRIEND, W. H. MURPHY, C. L. SHANFIELD, I. /MC  
GILL UNIV./ JUL. 1967  
LEWIS-393

Piezo-bar pressure type probe measures the impact velocity or pressure of a moving debris cloud. It measures pressures up to 200,000 psi and peak pressures may be recorded with a total pulse duration between 5 and 65 msec.

B67-10260  
TESTER AUTOMATICALLY CHECKS INSULATION OF  
INDIVIDUAL CONDUCTORS IN MULTIPLE-STRAND  
CABLES  
SHAW, J. VUCKOVICH, M. /WESTINGHOUSE ASTRONUCL.  
LAB./ JUL. 1967  
NUC-10068

Insulation tester checks multiple-strand electrical cables in nuclear rocket reactors. It has both manual and automatic capabilities and can check the insulation of a cable with 200 or more conductors in a few minutes.

B67-10262  
SOLID STATE CIRCUIT AVERAGES MULTIPLE SIGNALS  
AND REJECTS THOSE VARYING SIGNIFICANTLY  
FROM THE AVERAGE  
ELMIGER, R. A. /WESTINGHOUSE ASTRONUCL. LAB./  
AUG. 1967  
NUC-10066

Average and reject logic control system provides an average of the output signals of transducers measuring critical parameters. It uses a circuit that compares each signal against an average, rejects any signal that departs significantly from the average, and supplies an average of the acceptable signals.

B67-10263  
AUTOMATED TESTER PERMITS PRECISE CALIBRATION  
OF PRESSURE TRANSDUCERS FROM 0 TO 1050 PSI  
BRINDA, J. KRISTOFF, L. SHAW, J. VUCKOVICH, M.  
/WESTINGHOUSE ASTRONUCL. LAB./ AUG. 1967  
NUC-10067

Automated portable checker allows last-minute calibration of pressure transducers before testing. It uses a pressure console and equipment that can produce test pressures of 0-1050 psi. The console can be connected to other apparatus for measurement and visual display of the electrical output.

B67-10267  
TESTER AUTOMATICALLY CHECKS PAPER TAPE

PUNCH AND READER AFTER MAINTENANCE  
MAZER, L. MC MURCHY, D. D. AUG. 1967  
ARC-66

Device automatically bench tests paper tape punches and readers in a simulated operating environment following routine maintenance. The reader and punch operate back-to-back and the paper tape output feeds the reader. The tape leader is prepunched with an arbitrary pattern that is continuously reproduced during the check.

B67-10268  
SELF-BALANCING LINE-REVERSAL PYROMETER  
AUTOMATICALLY MEASURES GAS TEMPERATURES  
BUCHELE, D. AUG. 1967  
LEWIS-348

Automatic line-reversal pyrometer measures gas temperatures from 2900 degrees to 4500 degrees R. The self-balancing device uses the sodium D-line but replaces the two conventional manual operations of the line-reversal method and can be used by semiskilled personnel.

B67-10269  
OSCILLOSCOPE USED AS X-Y PLOTTER OR  
TWO-DIMENSIONAL ANALYZER  
HANSEN, D. ROY, N. /THOMPSON-RAMO-WOOLDRIDGE/  
AUG. 1967  
LEWIS-311

Oscilloscope used as an X-Y plotter or two-dimensional analyzer tags each point with a yes or no, depending on a third parameter. The usual square-wave pulse is replaced on the scope by a single information-bearing dot which lengthens to a dash in response to a simultaneous event.

B67-10270  
ELECTRONIC SHUTTER GATES IMAGE ORTHICON ON  
AND OFF  
SENSENG, W. A. /RCA/ AUG. 1967  
HQ-96

TV camera system contains an electronic shutter that gates the image orthicon photocathode on during expose time and off at all other times. The system records images of diffuse light-scattering regions in the solar system.

B67-10274  
HIGH IMPACT PRESSURE REGULATOR WITHSTANDS  
IMPACTS OF OVER 15,000 G  
BILES, J. E., JR. FLOYD, E. L. TOPITS, A. N.,  
JR. AUG. 1967  
NPO-10175

High impact pressure regulator used with a high impact gas scannograph withstands impacts of over 15,000 g. By the passage of fluid through the first and second chambers of the regulator, the pressure of the scannograph is regulated from a specific input valve to the desired output pressure valve.

B67-10275  
PRIMARY CELL USES NEITHER LIQUID NOR FUSED  
ELECTROLYTES  
GUTMANN, F. HERMAN, A. M. REMBAUM, A. AUG. 1967  
SEE ALSO B66-10682  
NPO-10001

Dry, solid state primary battery cell establishes an electrode reaction by a charge transfer mechanism without liquid phase ionization of electrolyte compounds. The charge transfer complex is sufficiently conductive to permit the passage of useful current.

B67-10276  
SYSTEM PRECISELY CONTROLS OSCILLATION OF  
VIBRATING MASS  
HANCOCK, D. J. /BUNKER-RAMO CORP./ AUG. 1967  
M-FS-1875

System precisely controls the sinusoidal amplitude of a vibrating mechanical mass. Using two sets of coils, the system regulates the drive signal amplitude at the precise level to maintain the mechanical mass when it reaches the desired vibration amplitude.

B67-10277  
IR VIDICON SCANNER MONITORS MANY TEST POINTS  
FORTIER, R. J. /BOEING CO./ AUG. 1967



M-FS-1937

Infrared /IR/ scanners are used in test systems that involve many signal paths from transducers to a central evaluation point. The scanner, an IR-sensitive vidicon, looks at the indicator panels of each subsystem of the equipment being tested and picks up the level of radiation from each IR source mounted thereon.

B67-10284

VIBRATOR ELAPSED TIME IS AUTOMATICALLY CONTROLLED

BUROWICK, E. A. /N. AM. AVIATION/ AUG. 1967

M-FS-2573

Circuit determines elapsed operating time for vibrators when three vibrators are located in one room and are powered by two amplifiers through either of two control systems. It operates the control system elapsed time clocks only when voltage is applied to the vibrator armatures.

B67-10289

WIDEBAND, HIGH EFFICIENCY OPTICAL MODULATOR REQUIRES LESS THAN 10 WATTS DRIVE POWER

BECKNELL, W. E. RATTMAN, W. J. YAP, B. K. /SYLVANIA ELECTRON. SYSTEMS/ AUG. 1967

M-FS-12733

Wideband optical modulation system operates with less than 10-watts drive power. It consists of an optical modulator and transistorized driver that combines small cross-section potassium dideuterium phosphate crystals with laser beam-condensing optics. Optical modulation systems may serve importantly in future space wideband communication systems.

B67-10294

SENSITIVE BRIDGE CIRCUIT MEASURES CONDUCTANCE OF LOW-CONDUCTIVITY ELECTROLYTE SOLUTIONS

SCHMIDT, K. AUG. 1967

ARG-147

Compact bridge circuit measures sensitive and accurate conductance of low-conductivity electrolyte solutions. The bridge utilizes a phase sensitive detector to obtain a linear deflection of the null indicator relative to the measured conductance.

B67-10298

ELECTRONIC DUMMY FOR ACOUSTICAL TESTING

BAUER, B. B. DI MATTIA, A. L. ROSENHECK, A. J. STERN, M. TORICK, E. L. /CBS LABS./ AUG. 1967

SEE ALSO M66-25565

MSC-206 MSC-1164 MSC-1165 MSC-1166

Electronic Dummy /ED/ used for acoustical testing represents the average male torso from the Xiphoid process upward and includes an acoustic replica of the human head. This head simulates natural flesh, and has an artificial voice and artificial ears that measure sound pressures at the eardrum or the entrance to the ear canal.

B67-10300

CIRCUIT PROVIDES OVERCURRENT PROTECTION TO PUSH-PULL AMPLIFIER

SKORRA, D. J. /HONEYWELL/ AUG. 1967

MSC-12033

Circuit in push-pull amplifier limits the current flowing to a predetermined level and provides that overcurrent in one half of the amplifier turns off the other half.

B67-10303

PROCESS CONTROLS INTRODUCTION OF SELECTED IMPURITIES INTO SEMICONDUCTOR WAFERS

BARTHOLOMAY, W. C. TOPFER, A. R. /RCA/ AUG. 1967

GSFC-523

Modified three-step process controls the concentration of lithium diffused as a dopant into the base region of a diffused n-on-p silicon solar cell wafer. Part of the surface layer of the base region of the p-type silicon containing the diffused dopant is removed, prior to redistributing the remaining portion of the dopant into the bulk of the wafer.

B67-10311

TRANSISTOR BIASED AMPLIFIER MINIMIZES DIODE DISCRIMINATOR THRESHOLD ATTENUATION

LARSEN, R. N. AUG. 1967

ARG-163

Transistor biased amplifier has a biased diode discriminator driven by a high impedance /several megohms/ current source, rather than a voltage source with several hundred ohms output impedance. This high impedance input arrangement makes the incremental impedance of the threshold diode negligible relative to the input impedance.

B67-10313

PRECISION CAPACITOR HAS IMPROVED TEMPERATURE AND OPERATIONAL STABILITY

BROOKSHIER, W. K. LEWIS, R. N. AUG. 1967

ARG-189

Vacuum dielectric capacitor is fabricated from materials with very low temperature coefficients of expansion. This precision capacitor in the 1000-2000 picofarad range has a near-zero temperature coefficient of capacitance, eliminates ion chamber action caused by air ionization in the dielectric, and minimizes undesirable electromagnetic field charging effects

B67-10314

SIC/SI DIODE TRIGGER CIRCUIT PROVIDES AUTOMATIC RANGE SWITCHING FOR LOG AMPLIFIER INNOVATOR NOT GIVEN /TYCO LABS./ AUG. 1967

M-FS-1879

SIC/SI diode pair provides automatic range change to extend the operating range of a logarithmic amplifier-conversion circuit and assures stability at or near the range switch-over point. The diode provides hysteresis for a trigger circuit that actuates a relay at the desired range extension point.

B67-10317

IMPROVED HEAD-CONTROLLED TV SYSTEM PRODUCES HIGH-QUALITY REMOTE IMAGE

GOERTZ, R. LINDBERG, J. MINGESZ, D. POTTS, C. SEP. 1967

ARG-128

Manipulator operator uses an improved resolution TV camera/monitor positioning system to view the remote handling and processing of reactive, flammable, explosive, or contaminated materials. The pan and tilt motions of the camera and monitor are slaved to follow the corresponding motions of the operator's head.

B67-10318

ELECTRONIC TEST INSTRUMENT GENERATES EXTREMELY SMALL CURRENT SIGNALS

BROOKSHIER, W. K. SEP. 1967

ARG-276

Generator produces dynamic test signals in the range from 10 to the minus fourth and 10 to the minus twelfth amperes. It involves an extension of the technique of applying a triangular voltage waveform to a small capacitor to obtain a square-wave output current. The effects of stray capacitance are minimized by appropriate shielding.

B67-10333

BRAZE JOINT QUALITY TESTED ELECTROMAGNETICALLY

GRAVES, D. B. MC KOWN, R. D. /N. AM. AVIATION/ SEP. 1967

M-FS-12795

Nondestructive electromagnetic method detects the extent of gold/nickel braze alloy flow in an engine injector sleeve-to-post joint. Voltage is induced in an inductor coil, along with a magnetically permeable material. The effects of altering the quantity of braze alloy present can then be measured.

B67-10334

FIELD EFFECT TRANSISTORS IMPROVE BUFFER AMPLIFIER

INNOVATOR NOT GIVEN /DYNATRONICS/ OCT. 1967

M-FS-916

Unity gain buffer amplifier with a field effect transistor /FET/ differential input stage

responds much faster than bipolar transistors when operated at low current levels. The circuit uses a dual FET in a unity gain buffer amplifier having extremely high input impedance, low bias current requirements, and wide bandwidth.

B67-10335

# METHOD OF IMPROVING CONTACT BONDS IN SILICON INTEGRATED CIRCUITS

LYTLE, W. J. SCHUSTER, M. A. /WESTINGHOUSE ELEC. CORP./ SEP. 1967

M-FS-1753

Fabrication method produces stable and reliable metallic systems for interconnections, contact pads, and bonded leads in silicon planar integrated circuits. The method is based on substrate isolation of the interconnection metal from the contact pad and bonded wire.

B67-10336

# DEVICE ENABLES CALIBRATION OF MICROPHONES AT HIGH SOUND PRESSURE LEVELS

GILLEN, A. /WESTINGHOUSE ELEC. CORP./ SEP. 1967

M-FS-11980

Coupling device accurately calibrates microphones at high sound pressure intensities. The system which uses a liquid as the coupling medium can operate in an automatic mode by using a standard microphone as a control sensor. Feedback from the standard microphone controls the calibration signal level.

B67-10338

# ACCURACY OF LASER MEASUREMENTS IMPROVED BY PULSE AUTOCORRELATOR ELECTRONIC SYSTEM

CAMPANELLA, S. J. /MELPAR/ SEP. 1967

MSC-10033

Pulse autocorrelator electronic system discriminates between the dispersion effect of a disturbed laser signal and background noise by detecting multipath arrivals of Gaussian-shaped signal pulses. The autocorrelation function is time-dependent and can be determined by integrating the product of a received pulse and its delayed replicas.

B67-10339

# VIBRATION ANALYSIS UTILIZING MOESSBAUER EFFECT

ROUGHTON, N. A. SEP. 1967 SEE ALSO NASA-SP-132

M-FS-11974

Measuring instrument analyzes mechanical vibrations in transducers at amplitudes in the range of a few to 100 angstroms. This instrument utilizes the Mossbauer effect, the phenomenon of the recoil-free emission and resonant absorption of nuclear gamma rays in solids.

B67-10343

# LIMIT CIRCUIT PREVENTS OVERDRIVING OF OPERATIONAL AMPLIFIER

OPENSHAW, F. L. /AEROJET-GEN. CORP./ SEP. 1967

NUC-10082

Cutoff-type high gain amplifier coupled by a diode prevents overdriving of operational amplifier. An amplified feedback signal offsets the excess input signal that tends to cause the amplifier to exceed its preset limit. The output is, therefore, held to the set clamp level.

B67-10347

# CURRENT PULSE AMPLIFIER TRANSMITS DETECTOR SIGNALS WITH MINIMUM DISTORTION AND ATTENUATION

BUSH, N. E. /WESTINGHOUSE ASTRONUCL. LAB./ SEP. 1967

NUC-10055

Amplifier translates the square pulses generated by a boron-trifluoride neutron sensitive detector located adjacent to a nuclear reactor to slower, long exponential decay pulses. These pulses are transmitted over long coaxial cables with minimum distortion and loss of frequency.

B67-10356

# REPARABLE, HIGH-DENSITY MICROELECTRONIC MODULE PROVIDES EFFECTIVE HEAT SINK

CARLSON, K. J. MAYTONE, F. F. /BOEING CO./ OCT. 1967

1967

M-FS-13075

Reparable modular system is used for packaging microelectronic flat packs and miniature discrete components. This three-dimensional compartmented structure incorporates etched phosphor bronze sheets and frames with etched wire conductors. It provides an effective heat sink for electric power dissipation in the absence of convective cooling means.

B67-10357

# DIGITAL-TO-ANALOG CONVERTER OPERATES FROM LOW LEVEL INPUTS

WINKELSTEIN, R. A. OCT. 1967

JPL-907

Circuit controls a voltage controlled oscillator from computer output binary data representing a rate at which the oscillator is to change. It operates with low level output devices such as integrated circuit registers and devices with somewhat variable output levels.

B67-10359

# TEST DEVICE PREVENTS WELD JOINT DAMAGE BY ELIMINATING AXIAL PIN FORCES ON UNPOTTED MODULES

CREE, R. E. /GEN. DYN./CONVAIR/ OCT. 1967

LEWIS-10201

Test device makes electrical connection to pins on unpotted electronic modules without introducing any displacing forces of the pins, thus preventing weld joint damage. The pins are spaced in a potting header, but are free to slide in and out except for restraint from welded wire joints.

B67-10361

# POCKET-SIZE MANUAL TAPE READER DEVICE AIDS COMPUTER TAPE CHECKING

ODLE, F. L. /BOEING CO./ OCT. 1967

KSC-10058

Pocket-size plastic manual tape reader device aids in reading, interpreting, and correcting binary and octal coded punched tapes. The coded information is more easily read if the color of the back plate contrasts sharply with that of the tape.

B67-10362

# MOVABLE RF PROBE ELIMINATES NEED FOR CALIBRATION IN PLASMA ACCELERATORS

MILLER, D. B. /GE/ OCT. 1967

LEWIS-10127

Movable RF antenna probe in plasma accelerators continuously maps the RF field both within and beyond the accelerator. It eliminates the need for installing probes in the accelerator walls. The moving RF probe can be used to map the RF electrical field under various accelerator conditions.

B67-10363

# SYSTEM AUTOMATICALLY PROVIDES DYNAMIC LAUNCH DECISION CRITERIA

DOIG, J. E. /BOEING CO./ OCT. 1967

M-FS-13063

Saturn V Dynamic Launch Decision Criteria Model provides instantaneous criteria, derived from the parametric behavior of a complex system such as a space launch vehicle plus its payload, for the decision making of launch management personnel.

B67-10367

# TRANSDUCER MEASURES EMBEDMENT STRESSES IN ELECTRONIC MODULES

SMITH, M. H. /DOUGLAS AIRCRAFT CO./ OCT. 1967

M-FS-13486

Strain gauge load transducer measures axial embedment stresses in resins used for encapsulation of welded electronic modules. It simulates the geometry of an actual electronic component and can be modified in size, shape, and operating temperature.

B67-10368

# SIGNAL GENERATOR CONVERTS DIRECT CURRENT TO MULTIPHASE SUPPLIES

BAUDE, J. /ALLIS-CHALMERS MFG. CO./ OCT. 1967

MSC-11043

Multiphase wave generator uses multivibrators in a feedback control mode that produces output signal pairs that are impressed on the primary windings of inverter transformers sequentially with a 120 degrees phase shift from each other.

B67-10369

MULTIPLE METER MONITORING CIRCUITS SERVED BY SINGLE ALARM

BANDINI, U. /GRUMMAN AIRCRAFT ENG. CORP./ OCT. 1967

MSC-10984

Circuitry for multiple meter relay circuits provides complete isolation for each circuit served by a single alarm and permits alarm reset after an out-of-tolerance event in one relay circuit so that the remaining relay circuits continue to be alarm protected.

B67-10370

MECHANICAL PROPERTIES OF WIRE INSULATION AUTOMATICALLY DETERMINED

DAWN, F. S. GILL, W. L. OCT. 1967

MSC-10983

Three separate mechanisms test the insulation on electrical wire specimens for mechanical resistance to flexure, abrasion or wear, and vibration. The test mechanisms perform the evaluation tests on insulated wire specimens in a chamber which can be controlled to simulate space or spacecraft cabin environments.

B67-10376

CIRCUIT AUTOMATICALLY CALIBRATES FLOWMETER AGAINST LIQUID-LEVEL GAGE REFERENCE

FIELD, R. J. /N. AM. AVIATION/ OCT. 1967

M-FS-2194

Turbine-type flowmeter uses the flow of liquid from a tank with reed-type liquid-level switches as a calibration reference. A circuit to generate a reliable gate signal consists of an input and switch identification stage, a monostable and bistable multivibrators, and a signal inverter and pulse output stage.

B67-10378

FLOWMETER DETERMINES MIX RATIO FOR VISCOUS ADHESIVES

LEMONS, C. R. /DOUGLAS AIRCRAFT CO./ OCT. 1967

M-FS-2308

Flowmeter determines mix ratio for continuous flow mixing machine used to produce an adhesive from a high viscosity resin and aliphatic amine hardener pumped through separate lines to a rotary blender. The flowmeter uses strain gauges in the two flow paths and monitors their outputs with appropriate instrumentation.

B67-10382

USE OF COLOR-CODED SLEEVE SHUTTERS ACCELERATES OSCILLOGRAPH CHANNEL SELECTION

BOUCHLAS, T. BOWDEN, F. W. /BOEING CO./ OCT. 1967

KSC-10092

Sleeve-type shutters mechanically adjust individual galvanometer light beams onto or away from selected channels on oscillograph paper. In complex test setups, the sleeve-type shutters are color coded to separately identify each oscillograph channel. This technique could be used on any equipment using tubular galvanometer light sources.

B67-10384

CRACK GROWTH MEASURED ON FLAT AND CURVED SURFACES AT CRYOGENIC TEMPERATURES

ORANGE, T. W. SULLIVAN, T. L. OCT. 1967

LEWIS-389

Multiple element continuity gauge measures plane stress crack growth plus surface crack growth under plane strain conditions. The gauge measures flat and curved surfaces and operates at cryogenic temperatures.

B67-10386

CONTINUOUS WAVE DETECTOR HAS WIDE FREQUENCY RANGE

DEUTSCH, W. F. JARMSKI, S. J. WHEATLEY, C. E. /N. AM. AVIATION/ OCT. 1967

M-FS-1849

Portable battery-operated detector indicates the presence of steady state signals exceeding a predetermined value over a wide frequency range, by the closure of output relay contacts. It was designed to monitor electronic equipment used in the Saturn II program.

B67-10387

LAMP ENABLES MEASUREMENT OF OXYGEN

CONCENTRATION IN PRESENCE OF WATER VAPOR

BRISCO, F. J. MOORHEAD, J. E. PAIGE, W. S. /PERKIN-ELMER CORP./ OCT. 1967

MSC-10043

Open-electrode ultraviolet source lamp radiates sufficient energy at 1800 angstroms and 1470 angstroms for use in a double-beam, dual-wavelength oxygen sensor. The lamp is filled with xenon at a pressure of 100 mm of Hg.

B67-10389

RUGGED SWITCH RESPONDS TO MINUTE PRESSURE DIFFERENTIALS

FRIEND, L. C. SHAUB, K. D. /BENDIX CORP./ OCT. 1967

M-FS-12704

Pressure responsive switching device exhibits high sensitivity but is extremely rugged and resistant to large amplitude shock and velocity loading. This snap-action, single pole-double throw switch operates over a wide temperature range.

B67-10390

HIGH POWER DC/DC AND DC/AC ELECTRICAL POWER CONVERSION TECHNIQUES DEVELOPED

BERRYMAN, G. WHITE, W. T. OCT. 1967

M-FS-13227

Small magnetic amplifiers pass square waves through transformers and provide regulation by varying the pulse width on the secondary of the output power transformers. This pulse duration modulation is provided by a control rectifier technique or a phase-shift technique.

B67-10396

MULTIPLEXER USES INSULATED GATE-FIELD EFFECT TRANSISTORS

GUSSOW, S. S. /BOEING CO./ OCT. 1967

M-FS-13096

Small lightweight multiplexer incorporates IG-FET's /insulated gate-field effect transistors/ for all digital logic functions, including the internally generated 3.6-kHz clock. It consists of 30 primary channels, each of which is sampled 120 times per second.

B67-10399

POTASSIUM PLASMA CELL FACILITATES THERMIONIC ENERGY CONVERSION PROCESS

RICHARDS, H. K. OCT. 1967 SEE ALSO ANL-6802

ARG-10010

Thermionic energy converter converts nuclear generated heat directly into high frequency and direct current output. It consists of a potassium plasma cell, a tantalum emitter, and a silver plated copper collector. This conversion process eliminates the steam interface usually required between the atomic heat source and the electrical conversion system.

B67-10402

AUTOMATIC TELEMETRY CHECKOUT SYSTEM

GEORGE, W. V. /BOEING CO./ NOV. 1967

M-FS-12580

Telemetry checkout station designed to automatically perform measurements on the vehicle telemetry links. Its features include real-time digitizing and computer controlled station setup, data processing, and self-check. The station can handle a wide variety of automatic tests by changing its computer programs.

B67-10404

CONTROL APPARATUS FOR SPECTRAL ENERGY SOURCE

GORDON, W. A. NOV. 1967

LEWIS-391

Automatic, light-controlling system for dc arc emission spectrographs controls the vaporization

rate of the sample and stabilizes the dc arc. The output energy is regulated such that advantage can be taken of the highly sensitive dc arc source without sacrificing the desired precision.

**B67-10410**  
CURRENT STEERING COMMUTATOR OFFERS  
VERSATILITY  
ZOTTARELLI, L. J. OCT. 1967  
JPL-812

Novel current steering commutator capable of stepping to all possible locations from any location by appropriate control logic, and easily tailored to specific user requirements.

**B67-10412**  
TORQUE METER AIDS STUDY OF HYSTERESIS  
MOTOR RINGS  
COLE, M. /METALS RES./ NOV. 1967  
M-FS-12219

Torque meter, simulating hysteresis motor operation, allows rotor ring performance characteristics to be analyzed. The meter determines hysteresis motor torque, the actual stresses of the ring due to its mechanical situation and rotation, aids in the study of asymmetries or defects in motor rings, and measures rotational hysteresis.

**B67-10416**  
DIELECTRIC PRISMS WOULD IMPROVE PERFORMANCE  
OF QUASI-OPTICAL MICROWAVE COMPONENTS  
CARSON, J. W. OCT. 1967  
ERC-10011

The properties of the Brewster angle and internal reflection in a dielectric prism are proposed as the basis of a new type of element for use in oversize waveguide in quasi-optical microwave components. Waveguide loss is reduced and precision broadband attenuators, phase shifters, and directional couplers can be constructed on the basis of these properties.

**B67-10422**  
INFRARED RADIOMETER  
BIRD, A. N. /SOUTHERN RES. INST./ NOV. 1967  
M-FS-13373

Radiometer may be used either with an f/16 telescope to measure thermal radiation from the surface of the dark moon or with a short-range optical system to measure thermal radiation from laboratory samples.

**B67-10424**  
TEMPERATURE-SENSED CRYOGENIC BLEED MAINTAINS  
LIQUID STATE IN TRANSFER LINE  
LINDGREN, A. R. /N. AM. AVIATION/ OCT. 1967  
M-FS-12681

Inverted tee, installed at a high point in a cryogenic transfer line, is equipped with an insulated bleed line that passes a fixed amount of cryogenic fluid at atmospheric pressure. A sensing device activates a vent valve in the tee stack whenever gaseous nitrogen is present.

**B67-10425**  
STUDY MADE OF ANODIZED ALUMINUM CIRCUIT  
BOARDS  
JACOBI, C. SEWELL, R. /BOEING CO./ NOV. 1967  
M-FS-13580

Hard coated aluminum circuit boards demonstrate the feasibility of obtaining an electrical power circuit of high packaging density with very high thermal conductivity and mechanical strengths.

**B67-10426**  
ALUMINUM HEAT SINK ENABLES POWER TRANSISTORS  
TO BE MOUNTED INTEGRALLY WITH PRINTED  
CIRCUIT BOARD  
SEAWARD, R. C. /N. AM. AVIATION/ OCT. 1967  
M-FS-13663

Power transistor is provided with an integral flat plate aluminum heat sink which mounts directly on a printed circuit board containing associated circuitry. Standoff spacers are used to attach the heat sink to the printed circuit board containing the remainder of the circuitry.

**B67-10433**  
CONCEPTUAL NONORTHOGONAL GYRO CONFIGURATION  
FOR GUIDANCE AND NAVIGATION  
GILMORE, J. P. /MIT/ NOV. 1967  
MSC-11363

Nonorthogonal sensor configuration using six single-degree-of-freedom inertial reference gyroscopes and a complete data processing and self-contained failure detection-and-isolation mechanism provides redundant capabilities to guidance and navigation systems. This system has been formulated in a strap-down configuration to attain maximum redundancy.

**B67-10434**  
ALGEBRAIC MONTE CARLO PROCEDURE REDUCES  
STATISTICAL ANALYSIS TIME AND COST FACTORS  
AFRICANO, R. C. LOGSDON, T. S. /N. AM. AVIATION/  
NOV. 1967  
M-FS-1887

Algebraic Monte Carlo procedure statistically analyzes performance parameters in large, complex systems. The individual effects of input variables can be isolated and individual input statistics can be changed without having to repeat the entire analysis.

**B67-10435**  
INTERFERENCE EFFECTS ELIMINATED IN RANDOM  
ORIENTED SPACE STATION ANTENNA SYSTEM  
REILLY, R. R. /LOCKHEED-CALIF. CO./ NOV. 1967  
MSC-11004

System eliminates destructive interference effects among multiple omnidirectional or semi-omnidirectional antennas on a large space vehicle that is either spin-stabilized or randomly oriented relative to the ground station with which communication is necessary.

**B67-10438**  
REVIEW OF RESEARCH AND DEVELOPMENT IN FLUID  
LOGIC ELEMENTS  
READER, T. /SPERRY RAND CORP./ NOV. 1967  
M-FS-420

Research and development in multistate fluid logic elements is reviewed in a historical and critical report - The report concludes that in the development of fluid amplifiers, there are elements with very high gain and poor switching speed, and other elements with very high switching speed and poor gain.

**B67-10444**  
ELLIPSOIDAL-MIRROR REFLECTOMETER ACCURATELY  
MEASURES INFRARED REFLECTANCE OF MATERIALS  
DUNN, S. T. RICHMOND, J. C. /NATL. BUR. OF  
STDS./ NOV. 1967  
GSFC-566

Reflectometer accurately measures the reflectance of specimens in the infrared beyond 2.5 microns and under geometric conditions approximating normal irradiation and hemispherical viewing. It includes an ellipsoidal mirror, a specially coated averaging sphere associated with a detector for minimizing spatial and angular sensitivity, and an incident flux chopper.

**B67-10446**  
BATTERY CHARGE REGULATOR IS COULOMETER  
CONTROLLED  
PAULKOVICH, J. NOV. 1967  
GSFC-561

Coulometer controlled battery charge regulator controls nickel/cadmium type primary cells used in space applications. The use of the coulometer as an ampere hour measuring device permits all available current to go to the battery until full charge state is reached, at which time the charge rate is automatically reduced.

**B67-10447**  
OSCILLATOR CIRCUIT OPERATES AS DIGITALLY  
CONTROLLED FREQUENCY SYNTHESIZER  
CLIFF, R. A. NOV. 1967  
GSFC-570

Oscillator circuit converts digital data from the format of binary information at several input terminals to the format of discrete frequencies at the output terminals. Each state of the input

levels corresponds to one frequency at the output. This device provides a large number of accurately controlled frequencies from a single stable oscillator.

**B67-10448**  
FOIL RADIOMETER ACCESSORY IMPROVES MEASUREMENTS  
SCHUMACHER, P. E. /N. AM. AVIATION/ NOV. 1967  
M-FS-12684 M-FS-12717

The responsiveness of a foil radiometer is increased and its time constant is simultaneously decreased by isolating the foil in a controlled environment. Using an optical system, it is coupled to the media to be measured, and the resulting concentration of energy permits the thermocouple junction temperature to respond quickly.

**B67-10449**  
DIGITAL VOLTAGE-CONTROLLED OSCILLATOR  
SALIGA, T. V. SCHAEFER, D. H. STRONG, J. P., III  
NOV. 1967  
GSFC-512

Digital voltage-controlled oscillator generates a variable frequency signal controlled linearly about a center frequency with high stability and is phase controlled by an applied voltage. Integration ahead of the digital circuitry provides linear operation with control voltage having appreciable noise components.

**B67-10458**  
DESIGN FOR HIGH-TEMPERATURE /1800 DEG F/  
LIQUID METAL PRESSURE TRANSDUCER  
ENGDAHL, R. E. /CONSOLIDATED CONTROLS CORP./  
NOV. 1967  
LEWIS-10144

Thermionic diode sensor is used as a pressure transducer in advanced space power systems using liquid metals as working and heat transfer media at temperatures up to 1800 deg F. The sensor converts the motion of a pressure actuated refractory alloy capsule into a suitable electrical output.

**B67-10459**  
STABLE AC PHASE AND AMPLITUDE COMPARATOR  
BRUCE, H. P. /MARTIN CO./ NOV. 1967  
M-FS-13086

Stable ac phase and amplitude comparator detects excessive vehicle maneuvering or vibration. It has phase demodulation, low-pass filter, and multiple threshold-setting capability designed specifically for low drifts over a wide range of temperatures.

**B67-10460**  
RANGE RECORDING TECHNIQUE ENABLES FOUR-WAY POLARIZATION MEASUREMENTS  
SWINDALL, P. M. NOV. 1967  
M-FS-12447

Manually tracked antenna is the most critical part of range recording system which has signal strength recording responses from dc to 20 kHz. The system records all polarizations simultaneously.

**B67-10461**  
PROTECTED, HIGH-TEMPERATURE CONNECTING CABLE  
ENGDAHL, R. E. /CONSOLIDATED CONTROLS CORP./  
NOV. 1967  
LEWIS-10149

Ceramic insulated, swaged stainless steel, sheathed, protective atmosphere cable admits electrical leads into an 1800 deg F air-environment test chamber. The cable has some bending capability and provides for nine niobium alloy conductors. An argon purge during the TIG weld closure protects internal wires from oxidation and embrittlement.

**B67-10467**  
AUTOMATIC TESTING DEVICE FACILITATES NOISE CHECKS AND ELECTRONIC CALIBRATIONS  
HARROLD, J. L. WEGGMANN, C. F. NOV. 1967  
LEWIS-10173

Automatic Digital Noise Checker determines 1/ the noise content of the many analog inputs of a

data acquisition system and 2/ whether the Electronic Calibrations /EC/ on some data channels are operating properly.

**B67-10468**  
SERIES TRANSISTORS ISOLATE AMPLIFIER FROM FLYBACK VOLTAGE  
BANKS, W. /GEN. DYN. CORP./ NOV. 1967  
MSC-11023

Circuit enables high sawtooth currents to be passed through a deflection coil and isolate the coil driving amplifier from the flyback voltage. It incorporates a switch consisting of transistors in series with the driving amplifier and deflection coil. The switch disconnects the deflection coil from the amplifier during the retrace time.

**B67-10469**  
ULTRAMINIATURE TELEVISION CAMERA  
DETERVILLE, R. J. DRAGO, N. /TELEDYNE SYSTEMS CO./ NOV. 1967  
M-FS-11967

Ultraminiature television camera with a total volume of 20.25 cubic inches, requires 28 vdc power, operates on UHF and accommodates standard 8-mm optics. It uses microelectronic assembly packaging techniques and contains a magnetically deflected and electrostatically focused vidicon, automatic gain control circuit, power supply, and transmitter.

**B67-10470**  
TECHNIQUE ELIMINATES HIGH VOLTAGE ARCING AT ELECTRODE-INSULATOR CONTACT AREA  
MEALY, G. NOV. 1967  
LEWIS-10133

Coating the electrode-insulator contact area with silver epoxy conductive paint and forcing the electrode and insulator tightly together into a permanent connection, eliminates electrical arcing in high-voltage electrodes supplying electrical power to vacuum facilities.

**B67-10471**  
TRANSIENT SENSOR DEVELOPMENT  
CASH, J. /FED. ELEC. CORP./ NOV. 1967  
M-FS-13370 M-FS-13371

Pulse width/amplitude- and noise-sensors are updated to integrated circuit design concepts, and rise time/amplitude sensor design is reduced to an operational prototype to make all the sensors compatible for one system operation. Therefore, transients interfering with the design operation of receivers could be individually isolated and identified.

**B67-10475**  
BLOOD PRESSURE REPROGRAMMING ADAPTER  
ASSISTS SIGNAL RECORDING  
VICK, H. A. DEC. 1967  
MSC-265

Blood pressure reprogramming adapter separates the two components of a blood pressure signal, a dc pressure signal and an ac Korotkoff sounds signal, so that the Korotkoff sounds are recorded on one channel as received while the dc pressure signal is converted to FM and recorded on a second channel.

**B67-10481**  
CONVERTER PROVIDES CONSTANT ELECTRICAL POWER AT VARIOUS OUTPUT VOLTAGES  
PAULKOVICH, J. DEC. 1967  
GSFC-519

Power converter, using an inverted flyback technique, transfers electrical energy at a constant rate from a solar cell source to a number of individual batteries, which are to be charged one at a time. The converter inverts the polarity of the solar cell source and provides the correct charging voltage.

**B67-10482**  
SURFACE-CRACK DETECTION BY MICROWAVE METHODS  
FEINSTEIN, L. HRUBY, R. DEC. 1967  
ARC-10009

Microwave surface-crack detection system examines metallic surfaces with a noncontacting probe. The

change in the microwave signal reflected from the surface under investigation is an indication of the existence of surface flaws. This technique can detect flaws and scratches as small as 100 microinches.

**B67-10487**  
LONG TIME CONSTANT TIMER REQUIRES NO RECOVERY TIME  
SOMERLOCK, C. R. DEC. 1967  
GSFC-10091

Timing circuit delivers relatively long pulses yet requires no recovery time after turnoff. It can be retrigged before it has timed out and turned off.

**B67-10496**  
DIGITAL SERVO READOUT SYSTEM INCREASES RECORDING ACCURACY OF SERVO-BALANCE SCALES  
FAUPELL, L. C. /WESTINGHOUSE  
ASTRONUCL. LAB./ DAVIES, J. B. /TRIDYNE CORP./  
DEC. 1967  
NUC-10125

Digital servo readout system increases recording accuracy of servo-balance weighing scales. Reliability is also increased due to the reduction of the number of components.

**B67-10497**  
HIGH TEMPERATURE THERMOCOUPLE DESIGN PROVIDES GAS COOLING WITHOUT INCREASING OVERALL SIZE OF UNIT  
ZELLNER, G. J. /WESTINGHOUSE ASTRONUCL. LAB./  
DEC. 1967  
NUC-10515

High temperature thermocouple uses a thermoelement of noncircular cross section with insulation of circular cross section to provide space for the flow of coolant gas down the probe.

**B67-10499**  
VANADIUM DIAPHRAGM ELECTRODE SERVES AS HYDROGEN DIFFUSER IN LITHIUM HYDRIDE CELL  
CROUTHAMEL, C. E. HEINRICH, R. R. JOHNSON, C. E.  
DEC. 1967 SEE ALSO B67-10189  
ARG-10048

Lithium hydride cell uses vanadium diaphragm electrode as a hydrogen diffuser. Vanadium is high in hydrogen gas solubility and permeability, is least sensitive to adverse surface effects, maintains good mechanical strength in hydrogen atmospheres, and appears to be compatible with all alkali-halide electrolytes and lithium metals.

**B67-10503**  
COMPOSITE SOLAR CELL MATRIX IS RELIABLE, LIGHTWEIGHT AND FLEXIBLE  
YASUI, R. K. DEC. 1967  
NPO-10821

Conducting strips mechanically and electrically connect individual solar cells into a linear array of cells, called a solar submodule, and then connect in series two or more submodules to form a solar cell matrix. Tiny perforations in the strip make it easy to solder them directly to the individual solar cells.

**B67-10505**  
THIN FILM THERMAL DETECTOR  
MASERJIAN, J. DEC. 1967  
JPL-943

Abnormally large variation of capacitance with temperature is obtained in thin film capacitors when a fixed ionic space charge is present in sufficient density in a dielectric film. This effect is the basis for a new kind of thin film thermal detector, whose performance at room temperature equals or exceeds that of comparable devices at much lower temperatures.

**B67-10506**  
PERFORMANCE OF TURBINE-TYPE FLOWMETERS IN LIQUID HYDROGEN  
DEC. 1967 SEE ALSO NASA-TN-D-3770  
LEWIS-10137

Tests using commercially available flowmeters provide information on the constancy in water of the calibration factor /pulses per unit volume/, on the maximum deviation of the factor from its

mean value, and on the probability of predicting the calibration factor of a meter in liquid hydrogen at full scale.

**B67-10507**  
TEST AND INSPECTION FOR PROCESS CONTROL OF MONOLITHIC CIRCUITS  
SPANGENBERG, E. /WESTINGHOUSE ELEC. CORP./ DEC. 1967  
M-FS-13084

Report details the test and inspection procedures for the mass production of high reliability integrated circuits. It covers configuration control, basic fundamentals of quality control, control charts, wafer process evaluation, general process evaluation, evaluation score system, and diffusion evaluation.

**B67-10513**  
IMPROVED CIRCUIT FOR MEASURING CAPACITIVE AND INDUCTIVE REACTANCES  
DALINS, I. MC CARTY, V. /ALA. UNIV. RES. INST./  
DEC. 1967  
M-FS-13083

Amplifier circuit measures very small changes of capacitive or inductive reactance, such as produced by a variable capacitance or a variable inductance displacement transducer. The circuit employs reactance-sensing oscillators in which field effect transistors serve as the active elements.

**B67-10514**  
APPARATUS MAKES KLYSTRON OPERATING FREQUENCY ADJUSTABLE FROM REMOTE POINT  
CLAUSS, R. C. DEC. 1967  
NPO-09831

Apparatus makes possible proper frequency adjustment in a receiver using a pump klystron for a traveling-wave master. It incorporates a tunable overcoupled cavity with irises of appropriate size to accomplish frequency spread over the desired range and to maintain the Q of the klystron circuit at the optimum value.

**B67-10515**  
VIDEO SYNCHRONIZATION PROCESSOR OVERCOMES POOR SIGNAL-TO-NOISE RATIO  
WEBB, D. L. DEC. 1967  
KSC-10002

Video synchronization processor overcomes poor signal-to-noise ratio which occurs during adverse signal conditions caused by flame attenuation, antenna pattern nulls, and near-horizon tracking. The system maintains sync lock far below the point where excessive noise would normally render the video useless.

**B67-10517**  
CONE AND COLUMN SOLAR ENERGY CONCENTRATOR  
MC CUSKER, T. J. /GOODYEAR AEROSPACE CORP./ DEC. 1967 SEE ALSO NASA-CR-52845  
LANGLEY-210

Solar energy concentrator consists of a reflective membrane cone and a stepped parabolic column located along the optical axis of the cone. The membrane cone can be folded for packaging and is supported by an expandable ring at the rim of the cone when erected. The stepped parabolic column can be telescoped for packaging.

**B67-10519**  
CIRCUIT MEASURES HYSTERESIS LOOP AREAS AT 30 HZ  
HOFFMAN, C. SPILO, D. /MIDWEST APPLIED SCI. CORP./ OCT. 1967  
M-FS-13069

Analog circuit measures hysteresis loop areas as a function of time during fatigue testing of specimens subjected to sinusoidal tension-compression stresses at a frequency of 30 Hz. When the sinusoidal stress signal is multiplied by the strain signal, the dc signal component in the product is proportional to the hysteresis loop area.

**B67-10534**  
FLAME SPRAYED DIELECTRIC COATINGS IMPROVE HEAT DISSIPATION IN ELECTRONIC PACKAGING

MACKAY, T. L. MULLER, A. N. VANAMAN, J. B.  
/DOUGLAS AIRCRAFT CO./ DEC. 1967  
M-FS-13569

Heat sinks in electronic packaging can be flame sprayed with dielectric coatings of alumina or beryllia and finished off with an organic sealer to provide high heat and electrical resistivity.

B67-10535  
EUTECTIC FUSE PROVIDES CURRENT AND THERMAL PROTECTION UNDER HIGH VIBRATION  
IEROKOMOS, N. /N. AM. AVIATION/ DEC. 1967  
M-FS-13664

Eutectic fuses provide current and thermal protection to an electronic system and maintain this protection under high vibration environments. The fuses are embedded within heat shrinkable sleeving which provides positive closing action under the conditions of high current or temperature.

B67-10538  
DOUBLE COPPER SHEATH MULTICONDUCTOR INSTRUMENTATION CABLE IS DURABLE AND EASILY INSTALLED IN HIGH THERMAL OR NUCLEAR RADIATION AREA  
MC CRAE, A. W., JR. /AEROJET-GEN. CORP./ DEC. 1967  
NUC-10007

Multiconductor instrumentation cable in which the conducting wires are routed through two concentric copper tube sheaths, employing a compressed insulator between the conductors and between the inner and outer sheaths, is durable and easily installed in high thermal or nuclear radiation area. The double sheath is a barrier against moisture, abrasion, and vibration.

B67-10540  
AUTOMATIC TRANSDUCER SWITCHING PROVIDES ACCURATE WIDE RANGE MEASUREMENT OF PRESSURE DIFFERENTIAL  
YODER, S. K. /AEROJET-GEN. CORP./ DEC. 1967  
NUC-10001

Automatic pressure transducer switching network sequentially selects any one of a number of limited-range transducers as gas pressure rises or falls, extending the range of measurement and lessening the chances of damage due to high pressure.

B67-10544  
ANALOG BUFFER ISOLATES HIGH IMPEDANCE SOURCE FROM LOW IMPEDANCE LOAD  
DENNY, W. A. /DOUGLAS AIRCRAFT CO./ DEC. 1967  
M-FS-13481

Analog buffer amplifier isolates a high impedance source from a low impedance load through an impedance ratio of approximately 200 million to one. Isolation is accomplished with little alteration to temperature stability, linearity, and gain parameters.

B67-10545  
INSTRUMENTATION MONITORS TRANSPORTED MATERIAL THROUGH VARIETY OF PARAMETERS  
HANSON, H. S. /N. AM. AVIATION/ DEC. 1967  
M-FS-12938

Transport instrumentation system used in transporting sensitive or delicate equipment measures the environmental parameters to which the equipment is exposed and records them constantly in time reference. The system provides a complete historical record plus the capability of taking corrective action where indicated by real time readout.

B67-10546  
DEVELOPMENT OF LOW TEMPERATURE BATTERY  
ARMSTRONG, G. M. /LIVINGSTON ELECTRON CORP./ DEC. 1967 SEE ALSO NASA CR-54970, NASA CR-72173  
LEWIS-10326

Self-contained low temperature battery system consisting of a magnesium anode, potassium thiocyanate-ammonia electrolyte and a cathode composed of a mixture of sulfur, carbon, and mercuric sulfate operates for at least seventy-two hours within a discharge temperature range of plus 20 degrees C to minus 90 degrees C.

B67-10548  
GMT/LOCAL-TIME CONVERSION CHART  
CREVELING, C. J. FEB. 1968  
GSFC-10521

GMT/local-time conversion is made by a longitude pocket instrument that automatically indicates the desired information by simply manipulating the moveable portion of the instrument in accordance with a set of simple instructions imprinted on the instrument's reverse side.

B67-10550  
HIGH-TEMPERATURE /1100 DEGREES F/ CAPACITORS OPERATE WITHOUT SUPPLEMENT COOLING  
STAPLETON, R. E. /WESTINGHOUSE ELEC./ DEC. 1967  
LEWIS-10324

Multilayered capacitor with one-mil thick pyrolytic boron nitride and wrap around sputtered electrodes achieves parallel electrical interconnections in a stacked configuration of 3 to 9 wafers. These capacitors are compact, lightweight, and suitable for operation in high temperatures without supplemental cooling.

B67-10552  
LIGHT-CONTROLLED RESISTORS PROVIDE QUADRATURE SIGNAL REJECTION FOR HIGH-GAIN SERVO SYSTEMS  
MC CAULEY, D. D. /PHILCO/ DEC. 1967  
WSO-340

Servo amplifier feedback system, in which the phase sensitive detection, low pass filtering, and multiplication functions required for quadrature rejection, are performed by light-controlled photoresistors, eliminates complex circuitry. This simplified system also increases gain, improves signal-to-noise ratio, and eliminates the necessity for compensation.

B67-10553  
SIMPLE FIRST ORDER DATA COMPRESSION PROCESSOR CONCEPT  
ANDERSON, T. O. DEC. 1967  
NPO-10338

Data-compression processing systems based on an analog-to-digital converter /ADC/, includes a qualitative comparator for comparison of the ADC output with a ramp generator, which is connected as a bidirectional binary counter with selective inputs. A bidirectional ramp counter selects the proper ramp through a ramp generator selection network.

B67-10554  
CALIBRATION TECHNIQUE FOR ELECTROMAGNETIC FLOWMETERS  
SAWOCHKA, S. G. /G E/ DEC. 1967 SEE ALSO  
NASA-CR-851  
LEWIS-10328

Thermal calorimetric method is used to calibrate electromagnetic flowmeters for liquid alkali metals. The electromagnetic flowmeter is placed in the liquid metal flow system in series with a thermal calorimeter. Therefore, the calculated flow rate through the calorimeter can be compared directly with the respective electromagnetic flowmeter reading.

B67-10557  
IMPROVED CAVITY-TYPE ABSOLUTE TOTAL-RADIATION RADIOMETER  
KENDALL, J. M., SR. PLAMONDON, J. A., JR. DEC. 1967  
JPL-807

Conical cavity-type absolute radiometer measures the intensity of radiant energy to an accuracy of one to two percent in a vacuum of ten to the minus fifth torr or lower. There is a uniform response over the ultraviolet, visible, and infrared range, and it requires no calibration or comparison with a radiation standard.

B67-10558  
SOLID STATE SINGLE-ENDED SWITCHING DC-TO-DC CONVERTER  
HONNELL, M. A. /AUBURN UNIV./ DEC. 1967  
M-FS-13598

Solid state, single-ended switching dc-to-dc converter electrically isolated a dc supply from

the prime dc power service.

B67-10559  
SOLID STATE ZERO-BIAS BILATERAL SWITCH  
HUSTED, J. M. /RCA/ DEC. 1967  
GSFC-532

Circuit switches a plus or minus 2.5 volt peak, dc to 300 kHz input to an operational amplifier. Featured is a bilateral transistor which draws a saturation current of equal amplitude and opposite polarity to the saturation current of the bilateral transistor, cancelling the dc bias effect at the output.

B67-10560  
FLAT PACK INTERCONNECTION STRUCTURE  
SIMPLIFIES MODULAR ELECTRONIC ASSEMBLIES  
KATZIN, L. DEC. 1967  
JPL-819

Flat pack interconnection structure composed of stick modules simplifies modular electronic assemblies by allowing a single axis mother board. Two of the wiring planes are located in the stick module, which is the lower level of assembly, with the third wiring plane in the mother board.

B67-10561  
TRANSISTOR \*\*H\*\* PARAMETER CONVERSION SLIDE  
RULE  
BRANTNER, R. E. DEC. 1967  
JPL-649

Slide rule enables the ready conversion of transistor \*\*H\*\* parameters from one form to another and reduces calculation time by a factor of 5 to 10. The scales are selected to cover all ranges of each parameter that will normally exist for any transistor, and answers are given in the correct order of magnitude, making powers-of-ten calculations unnecessary.

B67-10562  
IMPROVED DIGITAL TV ENCODING AND DECODING  
SYSTEM  
DEUTERMANN, A. R. /PHILCO-FORD CORP./ DEC. 1967  
MSC-11147

Analog-to-digital coder and digital-to-analog decoder system handles wideband TV signals. The system incorporates solid state plug-in modular units and is operated in a VSD /Variable Slope Delta Modulation/ mode or in the conventional one-bit DM /Delta Modulation/ mode.

B67-10565  
LOGIC CIRCUIT DETECTS BOTH PRESENT AND  
MISSING NEGATIVE PULSES IN SUPERIMPOSED  
WAVEFORMS  
RICE, R. E. /DOUGLAS AIRCRAFT/ DEC. 1967  
M-FS-12518

Pulse divide and determination network provides a logical determination of pulse presence within a data train. The network uses digital logic circuitry to divide positive and negative pulses to shape the separated pulses, and to determine, by means of coincidence logic, if negative pulses are missing from the pulse train.

B67-10569  
MOSFET IMPROVES PERFORMANCE OF POWER SUPPLY  
REGULATOR  
LOKERSON, D. C. DEC. 1967  
GSFC-10022

Circuit with Metal Oxide Semiconductor Field Effect Transistor /MOSFET/ as the voltage reference, provides a high degree of power supply voltage regulation and temperature compensation.

B67-10571  
ANALOG VOICING DETECTOR RESPONDS TO PITCH  
ABEL, R. S. WATKINS, H. E. /PHILCO-FORD CORP./  
DEC. 1967  
GSFC-10085

Modified electronic voice encoder /Vocoder/ includes an independent analog mode of operation in addition to the conventional digital mode. The Vocoder is a bandwidth compression equipment that permits voice transmission over channels, having only a fraction of the bandwidth required for conventional telephone-quality speech transmission.

B67-10572  
TELEPRINTER USES THERMAL PRINTING TECHNIQUE  
PERKINS, R. E. /NATL. CASH REGISTER CO./ DEC. 1967  
MSC-11327

Alphanumeric/facsimile printer receives serial digital data in the form of a specified number of bits per group and prints it on thermally sensitive paper. A solid state shift-register memorizes the incoming serial digital data.

B67-10574  
NONDESTRUCTIVE TESTING TECHNIQUES USED IN  
ANALYSIS OF HONEYCOMB STRUCTURE BOND  
STRENGTH  
ERDMAN, D. C. MARTIN, G. MOORE, J. F. THOMAS,  
G. VARNEY, H. S. /N. AM. AVIATION/ DEC. 1967  
M-FS-1214 M-FS-1221

DOT /Driver-Displacement Oriented Transducer/, applicable to both lap shear type application and honeycomb sandwich structures, measures the displacement of the honeycomb composite face sheet. It incorporates an electromagnetic driver and a displacement measuring system into a single unit to provide noncontact bond strength measurements.

B67-10575  
IMPROVED FREQUENCY DIVIDER EMPLOYS  
TRANSISTOR AVALANCHE EFFECT  
JOHNS, C. E. DEC. 1967  
NPO-10008

New frequency divider circuit can be synchronized over a wider input control frequency range, has greater phase stability, and is less sensitive to temperature changes than conventional synchronized oscillators. The new circuit uses the avalanche breakdown mode of operation of transistors.

B67-10576  
MULTIPLEX TELEVISION TRANSMISSION SYSTEM  
REED, W. R. DEC. 1967  
MSC-11595

Time-multiplexing system enables several cameras to share a single commercial television transmission channel. This system is useful in industries for visually monitoring several operating areas or instrument panels from a remote location.

B67-10585  
COMPUTER MEMORY ACCESS TECHNIQUE  
ZOTTARELLI, L. J. DEC. 1967  
NPO-10201

Computer memory access commutator and steering gate configuration produces bipolar current pulses while still employing only the diodes and magnetic cores of the classic commutator, thereby appreciably reducing the complexity of the memory assembly.

B67-10587  
LASER COMMUNICATION SYSTEM IS INSENSITIVE  
TO ATMOSPHERICALLY INDUCED NOISE  
PACKARD, J. N. /AIRCRAFT ARMAMENTS/ DEC. 1967  
GSFC-10396

Angle modulated transmitted reference heterodyne laser communication system is insensitive to atmospherically induced amplitude noise fluctuations and phase distortions.

B67-10595  
CONCEPTUAL SERVO TECHNIQUE FOR CONTROLLING  
TAPE DRIVERS  
BENTLEY, R. COUCHMAN, R. /KINELOGIC CORP./ DEC. 1967  
M-FS-12955

Electronic speed control design maintains magnetic tape in close synchronism at the airborne and ground stationed devices. Use of the servo system during the record and reproduce modes results in the minimum amount of frequency distortion and flutter.

B67-10598  
CARDIOTACHOMETER WITH LINEAR BEAT-TO-BEAT  
FREQUENCY RESPONSE  
DEBOO, G. J. POPE, J. M. SMITH, D. B. D. DEC. 1967



ARC-10033

Cardiotachometer detects and displays the human heart rate during physiological studies. It provides linear response to the heart rate, records heart rate during rest and under heavy stress, provides a beat-to-beat indication of changes in heart rate, and is relatively free of interfering signals from activities other than the heart rate.

B67-10603

MULTIPULSE CURRENT SOURCE OFFERS LOW POWER LOSSES AND HIGH RELIABILITY  
INNOVATOR NOT GIVEN /STANFORD RES. INST./ DEC. 1967

LANGLEY-68

Pulse current source uses low loss, high reliability, LC circuits to provide the necessary high impedance for magnetic memory cores, frequently used in digital computational equipment. Square-loop reactors replace the semiconductor switches previously used.

B67-10606

PREDICTION OF RADIATION DAMAGE EFFECTS IN TRANSISTORS  
INNOVATOR NOT GIVEN /RCA/ DEC. 1967

GSFC-10021

Quantitative relationships between radiation dosage to transistors and resultant damage are established. Calculation of these dose levels is based on high energy particle population data and analysis of the shielding effect provided by the enclosures surrounding a given transistor.

B67-10614

STUDY OF THERMAL EFFECTS ON NICKEL-CADMIUM BATTERIES

FOLEY, R. T. WEBSTER, W. H. /AM. UNIV./ DEC. 1967 SEE ALSO B67-10615

GSFC-10003

Isothermal continuous flow calorimeter is designed to test a nickel-cadmium battery under numerous orbital conditions. This sensitive calorimeter collects cell data such as oxygen pressure and rate of heat generation, and calculates changes in enthalpy.

B67-10615

IMPROVED CALORIMETER PROVIDES ACCURATE THERMAL MEASUREMENTS OF SPACE BATTERIES

FOLEY, R. T. WEBSTER, W. H. /AM. UNIV./ DEC. 1967

GSFC-10003A

Isothermal continuous flow calorimeter measures the thermal characteristics of space batteries undergoing typical orbital cycling. This is 28 times as sensitive as calorimeters previously used.

B67-10616

VAPOR DEPOSITION PROCESS PROVIDES NEW METHOD FOR FABRICATING HIGH TEMPERATURE THERMOCOUPLES

REMLEY, G. A. ZELLNER, G. J. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1967

NUC-10152

Fabrication techniques for high temperature thermocouples bind all components so that differential thermal expansion and contraction do not result in mechanical slippage and localized stress concentrations. Installation space is reduced or larger thermoelements and thicker insulation can be used to improve temperature measurement accuracy.

B67-10620

BALLPOINT PROBE GIVES OPTIMUM RESULTS IN ULTRASONIC TESTING

MELTON, R. E. /SPACO/ DEC. 1967

M-FS-13590

Ballpoint-type ultrasonic probe assembly focuses its beam precisely on the bond lines of a composite thin face sheet structure when testing for bond integrity. It can scan in any direction, and eliminate external couplant spray.

B67-10624

TEMPERATURE-STABILIZED, TRIGGERABLE

MICROELECTRONIC ASTABLE MULTIVIBRATOR

STARTS RELIABLY

STEBBINS, W. J. /WESTINGHOUSE ELEC. CORP./ DEC. 1967

MSC-1173

Multiple chip custom block, MIC construction is used to fabricate an ultracompact, low-power astable multivibrator. The design provides a multivibrator that free runs, eliminating \*\*lockup\*\*, is triggerable, pulling into synchronization with an external signal source, and permits design flexibility for controlling the frequency variations with temperature.

B67-10629

ELECTRONIC SKEWING CIRCUIT MONITORS EXACT POSITION OF OBJECT UNDERWATER

ROLLER, R. YAROSHUK, N. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1967

NUC-10146

Linear Variable Differential Transformer /LVDT/ electronic skewing circuit guides a long cylindrical capsule underwater into a larger tube so that it does not contact the tube wall. This device detects movement of the capsule from a reference point and provides a continuous signal that is monitored on an oscilloscope.

B67-10635

CONNECTOR SHORTING CAP PROVIDES PIN ALIGNMENT, INSPECTION, AND STRAY VOLTAGE PROTECTION

PETERS, G. A. WARMING, K. /N. AM. AVIATION/ DEC. 1967

M-FS-13111

Electrical shorting cap provides pin alignment, protection from stray voltages, and inspection capabilities. A teflon straightener insert is built in to overcome any problems with bent or misaligned pins. A clear plastic bottom allows for inspection of the presence and condition of the pins.

B67-10637

HYDRAULIC SERVO SYSTEM INCREASES ACCURACY IN FATIGUE TESTING

DIXON, G. V. KIBLER, K. S. DEC. 1967

LANGLEY-217

Hydraulic servo system increases accuracy in applying fatigue loading to a specimen under test. An error sensing electronic control loop, coupled to the hydraulic proportional closed loop cyclic force generator, provides an accurately controlled peak force to the specimen.

B67-10642

HIGHLY STABLE MICROWAVE DELAY LINE

HIGA, W. H. DEC. 1967

NPO-09828

TWM /traveling wave maser/ comb structure serves as a highly stable microwave delay line for determining the short-term stability of the hydrogen maser frequency standards used in the deep space network. Cryogenic cooling is used to minimize signal attenuation and thermal noise.

B67-10643

CONCEPT FOR AUTOMATIC DOPPLER COMPENSATION IN TWO-WAY COMMUNICATION SYSTEMS

MULLER, R. M. JAN. 1968

GSFC-10213

Automatic Frequency Control system compensates for Doppler shift in two-way communication systems where one or both stations are moving. This automatic correction can be applied to the reply link to eliminate frequency search for the reply or an excessive bandwidth to accommodate the Doppler.

B67-10646

AN IMPROVED MAGNETIC TAPE RECORDER

UBER, P. W. JAN. 1968

GSFC-08259

Magnetic tape recorder employs a single capstan for simultaneously driving the supply and take-up reels in such a manner that the tape passing between the reels is kept under a predetermined constant tension. This recorder operates with 11+11+11+11 power and is sufficiently rugged to

withstand the severe stresses encountered in high-altitude balloon flight tests.

**B67-10649**  
ELECTRON BEAM DEFLECTED TO DETERMINE FOCAL POINT LOCATION  
DOWNING, R. D. /GE/ JAN. 1968 SEE ALSO  
B67-10650  
M-FS-14107

System locates the focal point of an extremely high intensity electron beam. The electron beam is swept and scanned cyclically with deflection coils under a focusing lens, causing the beam focal point to move so the locus of its positions is a spherical surface symmetrical to the beam axis.

**B67-10650**  
ELECTRON BEAM STANDBY ABSORBER SYSTEM  
DOWNING, R. D. /GE/ JAN. 1968 SEE ALSO  
B67-10649  
M-FS-14108

Electron beam energy is absorbed by deflectors which allow beam distribution over an absorber located between the deflectors and workpiece. The undeflected beam passes through a hole in the absorber when the deflection is de-energized, when energized, the beam is kept to a minimum power level by deflection rate change.

**B67-10652**  
DEVELOPMENT OF DETONATION REACTION ENGINE  
LANGE, O. H. STEIN, R. J. TUBBS, H. E. JAN. 1968  
M-FS-14020

Reaction engine operates on the principle of a controlled condensed detonation. In this engine the gas products that are expelled from the engine to produce thrust are generated by the condensed detonation reaction. The engine is constructed of two basic sections consisting of a detonation wave generator section and a condensed detonation reaction section.

**B67-10656**  
LOW COST SCR LAMP DRIVER INDICATES CONTENTS OF DIGITAL COMPUTER REGISTERS  
CLIFF, R. A. DEC. 1967  
GSFC-10221

Silicon controlled rectifier /SCR/ lamp driver is adapted for use in integrated circuit digital computers where it indicates the contents of the various registers. The threshold voltage at which visual indication begins is very sharply defined and can be adjusted to suit particular system requirements.

**B67-10657**  
REFLECTOMETER FOR RECEIVER INPUT SYSTEM  
STELZRIED, C. T. JAN. 1968  
NPO-10843

Reflectometer, built into a microwave input system, measures the match of devices in the waveguide system of tracking receivers. Match measurements can be made on a routine calibration basis. It was installed in the S-band receiving system in the feed cone of the 210-ft antenna.

**B67-10658**  
DAMAGES IN ROLLING ELEMENT BEARINGS MAY BE DETECTED EARLY  
WEICHBRODT, B. /GE/ DEC. 1967  
HQ-10031

Early detection method locates damage or small defects in rolling element bearings of critical machine components. This detection method operates on the principle that an impact is generated each time a defect in an otherwise smooth surface is in intimate moving contact with another smooth surface.

**B67-10661**  
AIR SAMPLER COLLECTS AND PROTECTS MINUTE PARTICLES  
WOOD, R. C. /LITTON SYSTEMS/ DEC. 1967  
HQ-10037

Air ejector impactor sampler collects and protects samples of particles greater than 0.1 micron in diameter. In operation, it causes impaction of

particle-laden air onto several collection surfaces within a collection cylinder. When not operating, the collector cylinder is maintained in a retracted state within a protective envelope.

**B67-10662**  
PHASE PLANE DISPLAYS DETECT INCIPIENT FAILURE IN SERVO SYSTEM TESTING  
AFFENITO, F. J. WOHL, J. G. /DUNLAP AND ASSOCIATES/ DEC. 1967  
HQ-10018

Computer based, data conditioning and display technique detects incipient failure in servo system testing, for use in prelaunch checkout of complex nonlinear servomechanisms. These phase plane displays enables identification of on line, unusual or abnormal servo responses which can be displayed compactly in the time domain on a cathode ray tube.

**B67-10668**  
UNIQUE FREQUENCY-SHIFT-KEYED DEMODULATION SYSTEM  
STALOFF, C. TELTELBAUM, S. /RCA/ JAN. 1968  
GSFC-217

Frequency-shift-keyed /FSK/ demodulator provides a frequency discriminator whose outputs are separate and applied to two identical decoding channels, one decoding binary ones and the other decoding binary zeros. This demodulator rejects data applied to it at any frequency higher than design.

**B67-10669**  
ULTRAMINIATURE MANOMETER-TIPPED CARDIAC CATHETER  
CUON, G. W. DEC. 1967 SEE ALSO NASA-TN-D-3319  
AND B63-10429  
ARC-10054

Miniature diaphragm-type capacitance transducer capable of being mounted on the end of a cardiac catheter has been developed for measurement of intravascular pressures. The transducer can be inserted in small ducts /arteries and veins/ without disturbing the flow characteristics. It is very useful for making measurements in babies.

**B67-10672**  
THERMIONIC DIODE SWITCHING HAS HIGH TEMPERATURE APPLICATION  
LUEBBERS, S. S. SHIMADA, K. JAN. 1968  
NPO-10404

Thermionic converter switch permits chopping in the immediate vicinity of a low-voltage, high-current power source, eliminating line losses due to temperature limitations of semiconductor devices.

**B67-10674**  
AREAS OF IRREGULAR, DISCONTINUOUS PATTERNS RAPIDLY AND ACCURATELY MEASURED  
MUNFORD, J. A. WHITFIELD, C. E. JAN. 1968  
GSFC-10184

Simple, rapid method measures the surface area of a pattern such as comprised by the conductors on a printed circuit board. A negative or positive film of the circuit layout is placed over a uniformly illuminated translucent surface and the proportion of light transmitted to silicon solar cells is determined.

**B67-10675**  
BROADBAND CHOKE SUPPRESSES SPURIOUS CURRENTS IN ANTENNA STRUCTURE  
BISHOP, D. L. BOLT, C. A., JR. /MCDONNELL-DOUGLAS CORP./ JAN. 1968  
MSC-10013

Quarter-wavelength chokes are mounted on the coaxial line of an antenna structure to prevent induced spurious currents from affecting the antenna radiation frequency pattern. The choke-absorbent combination approximately doubled the usable frequency range for the antenna system studied.

**B67-10676**  
SCAN RATE CONVERTER FOR TAPE RECORDING AND PLAYBACK OF TV PICTURES  
HOLT, N. I. JAN. 1968

NPO-10166

Magnetic tape recording and playback equipment converts television pictures, both black and white and color, from one scan rate to another. The equipment indexes color picture frames for retrieval electronically and can be used as a document storage and retrieval medium that is compatible with hard-copy printout machines.

## 02 PHYSICAL SCIENCES (ENERGY SOURCES)

B63-10260

SOLAR-ANGLE SENSOR HAS NO MOVING PARTS

EXNER, D. W., JR. MEISENHOLDER, G. W. SCHMIDT, L. F. MAY 1964

JPL-418

To measure the direction of the sun over a spherical field of view, a cube-shaped solar sensor with a photocell on each side is used. The outputs from the six cells are fed into a computer for determining the position of the sun relative to an orthogonal coordinate system.

B63-10344

COOLING METHOD PROLONGS LIFE OF HOT-WIRE TRANSDUCER

BALDWIN, L. V. SANDBORN, V. A. JUN. 1964

LEWIS-41

To cool a hot-wire transducer, the two ends of the wire are supported on thermally and electrically conductive rods, surrounded by a fluid cooling medium. By keeping the supporting rods at a substantially constant temperature, the probe is prevented from overheating.

B63-10346

NEW METHOD USED TO FABRICATE LIGHT-WEIGHT HEAT EXCHANGER FOR ROCKET MOTOR

BAEHR, E. F. MAR. 1964

LEWIS-43

A grooved capstrip, to straddle the metal edges of regenerative cooling channels, increases the strength and heat transfer characteristics of lightweight motor cases. This capstrip is so designed as to form a firm joint between the channels that form the rocket casing wall.

B63-10421

MIRROR DEVICE ALIGNS MACHINE SURFACE PERPENDICULAR TO SIGHT LINES

KISSLER, H. R. /RCA/ MAY 1964

WOO-5

A sight alignment device is used to align two machines so that an axis of the first machine is parallel to a flat surface on the second. This sighting device depends on the reflection of a light beam from the surface to be aligned.

B65-10036

IONIZATION VACUUM GAGE STARTS QUICKLY, IS UNAFFECTED BY SPURIOUS CURRENTS

GARWOOD, D. C. FEB. 1965

JPL-304

Ionization vacuum gauge with a switch-operated starting device and a microammeter begins functioning quickly in a high vacuum. The microammeter is also protected by its circuit design from spurious currents.

B65-10046

WIDE-APERTURE SOLAR ENERGY COLLECTOR IS LIGHT IN WEIGHT

INNOVATOR NOT GIVEN /BECKMAN INSTRUMENTS/ FEB. 1965

JPL-SC-055

By mounting the Fresnel lens in eight steps above three paraboloidal reflector rings of epoxy resin with aluminized surfaces, a light weight, wide-aperture solar energy collector is devised.

B65-10071

SIMPLE OPTICAL SYSTEM USED TO ALIGN SPECTROGRAPH

EXTON, R. J. MAR. 1965

LANGLEY-92

Optically fast, portable spectrograph incorporates

auxiliary optics in a boresight technique to use the zero order of the grating for visual alignment. This device obtains moderately resolved spectra of a multitude of light sources.

B65-10081

MAGNETIC FIELD TEST COILS ARE TEMPERATURE COMPENSATED

INNOVATOR NOT GIVEN /SPECTRA PHYS./ APR. 1965

GSFC-294

Magnetic field test coils with auxiliary winding wound opposite to main coil winding eliminates changes in field configurations due to temperature changes. The auxiliary coil is made with aluminum wire.

B65-10082

MULTIPLE ELEMENT SOFT X-RAY SOURCE PRODUCES WIDE RANGE OF RADIATION

CARUSO, A. J. NEUPERT, W. M. MAR. 1965

GSFC-286

A rotating mount with target elements positioned independently for direct electron bombardment produces soft X-ray radiation with a wide range of characteristics. The device may be used to study solar radiation from a satellite.

B65-10084

MODIFIED CONTOUR PROJECTOR MAKES EXCELLENT CONTOUR DENSITOMETER

EXTON, R. J. MAR. 1965

LANGLEY-93

Thin glass beam splitter, densitometer head, and densitometer electronics are incorporated in a standard contour projector. The density contour of small areas of photographic film can be read. This instrument can be used as a research tool in process engineering.

B65-10100

ROTATING FILTERS PERMIT WIDE RANGE OF OPTICAL PYROMETRY

EXTON, R. J. SIVITER, J. H., JR. STRASS, H. K. APR. 1965

LANGLEY-33

Gear-driven dual filter disks of graduated density vary linearly with respect to rotation, allowing a wide range of photographic pyrometry. This technique is applicable in metallurgy, glass, plastics and refractory research, and crystallography.

B65-10122

MICROWAVE TECHNIQUE MEASURES PLASMA CHARACTERISTICS

LEONARD, W. F. APR. 1965

LANGLEY-134

Plasma electron density and temperature distribution is measured by passing a high frequency millimeter wave through plasma. Variations in density and temperature are determined by measuring insertion loss as the plasma travels between the microwave transmitting and receiving antennas.

B65-10129

APPARATUS PERMITS FLEXURE TESTING OF SPECIMENS AT CRYOGENIC TEMPERATURES

DENABURG, C. R. REECE, O. Y. MAY 1965

M-FS-257

Cryostat with support structure for test specimen allows flexure fatigue testing of honeycomb composite sandwich structures at cryogenic temperatures. The cryostat consists of a cryogen container enclosing two pairs of yokes which support two rotating end clamps.

B65-10132

SIMPLE CIRCUIT POSITIONS FILM FRAMES IN PROJECTOR

SILVER, R. H. MAY 1965

JPL-508

Individual frames on a photographic film strip in a projector are automatically positioned by a simple circuit. The circuit uses a photodiode that senses frame registry position and a relay that stops the film-advance motor to suspend the film at point of registry.

B65-10133

PROBE MEASURES CHARACTERISTICS OF HOT GAS  
STREAM

INNOVATOR NOT GIVEN /PLASMADYNE CORP./ MAY 1965  
M-FS-240

Shielded, tubular flow calorimeter operated by valve position measures characteristics of a hot gas stream of unknown composition. Measurements of mass flow density and total heat content per unit mass, total heat content per unit mass only, and pitot pressure are made.

B65-10157

INTERNAL COOLING INCREASES RANGE OF  
IMMERSION-TYPE TEMPERATURE PROBE

LANZO, C. D. JUN. 1965

LEWIS-171

Temperature probe used in a high temperature, high velocity gas stream consists of cooled outer shell and a cooled platinum sensing tube with iron constantan thermocouples.

B65-10171

FRESNEL ZONE PLATE FORMS IMAGES AT WAVELENGTHS  
BELOW 1000 ANGSTROMS

INNOVATOR NOT GIVEN /SMITHSONIAN INST./ JUN. 1965

GSFC-231

Fresnel zone plate with openings replacing the usual transparent rings produces images in a vacuum ultraviolet. The plate is made by etching and electrodeposition.

B65-10186

ELECTRONIC MODULES EASILY SEPARATED FROM HEAT  
SINK

INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
JUN. 1965 SEE ALSO B63-10033

MSC-142

Metal heat sink and electronic modules bonded to a thermal bridge can be easily cleaved for removal of the modules for replacement or repair. A thin film of grease between a fluorocarbon polymer film on the metal heat sink and an adhesive film on the modules acts as the cleavage plane.

B65-10188

REFRACTORY METAL SHIELDING /INSULATION/  
INCREASES OPERATING RANGE OF INDUCTION FURNACE

EBIHARA, B. T. JUN. 1965

LEWIS-202

Thermal radiation shield contains escaping heat from an induction furnace. The shield consists of a sheet of refractory metal foil and a loosely packed mat of refractory metal fibers in a concentric pattern. This shielding technique can be used for high temperature ovens, high temperature fluid lines, and chemical reaction vessels.

B65-10211

LIGHT RAY MODULATION CONTROLS OPTICAL SYSTEM  
ALIGNMENT

INNOVATOR NOT GIVEN /KOLLSMAN INSTR. CORP./ JUL.  
1965

GSFC-171

Light ray modulator maintains focus in optical system subject to severe thermal gradients, vibration and shock. The modulated signals drive a servo system that aligns the system optics.

B65-10224

HEATER DECOMPOSES OIL BACKSTREAMING FROM  
HIGH-VACUUM PUMPS

SHAPIRO, H. AUG. 1965

GSFC-356

Heater placed between an oil diffusion pump and a vacuum chamber prevents backstreaming of oil molecules into the work area of the chamber. It breaks the oil molecules into basic constituents that can be pumped away.

B65-10239

ION PUMP PROVIDES INCREASED VACUUM PUMPING  
SPEED

INNOVATOR NOT GIVEN /GEOPHYS. CORP. OF AM./ AUG.  
1965

NEO-13

Multiple-cell ion pumps with increased vacuum pumping speed are used for producing ultrahigh

vacuums in vacuum tubes and mass spectrometers. The pump has eight cathode-anode magnetron cells arranged in a cylinder which increase the surface area of the cathode.

B65-10240

INSULATION ACCELERATES RATE OF COOLING WITH  
CRYOGENIC FLUID

ALLEN, L. D. AUG. 1965

MSC-161

Thermal insulating material increases the rate of heat transfer from the interior of a chamber to a liquid nitrogen-filled metal jacket. A thin film of the material is bonded to the surface of the metal wall facing the liquid nitrogen.

B65-10252

DISTANT OBJECTS DETECTED VISUALLY WITH  
OPTICAL FILTERS

AUG. 1965

LANGLEY-166

Fluorescent coating aids visual daylight detection and identification of distant objects. An object appears as a blinking light when the area is alternately scanned with transmitting and obscuring filters. This method can be effective in search and rescue operations.

B65-10253

OIL-DAMPED MERCURY POOL MAKES PRECISE  
OPTICAL ALIGNMENT TOOL

THEKAEKARA, M. P. AUG. 1965

GSFC-353

Mercury pool with a cover layer of high viscosity oil provides a reference reflector for precise alignment of optical instruments. The cover layer effectively damps any ripples in the mercury from support structure vibrations.

B65-10272

INFRARED SHIELD FACILITATES OPTICAL PYROMETER  
MEASUREMENTS

EICHENBRENNER, F. F. ILLG, W. SEP. 1965

LANGLEY-133

Water-cooled shield facilitates optical pyrometer high temperature measurements of small sheet metal specimens subjected to tensile stress in fatigue tests. The shield excludes direct or reflected radiation from one face of the specimen and permits viewing of the infrared radiation only.

B65-10280

ELECTRON BOMBARDMENT IMPROVES VACUUM CHAMBER  
EFFICIENCY

PRZYBYSZESKI, J. SWIKER, M. A. WATSON, J. SEP.  
1965

LEWIS-160

Bombardment of vacuum chamber walls by an electron gun within the chamber achieves greater efficiency with less cost. The ultimate vacuum reached using the gun is greater than the system design level.

B65-10283

ELECTRON-BEAM DEFLECTION CONTROLLED BY DIGITAL  
SIGNALS

CRESSEY, J. R. SEP. 1965

GSFC-385

Electron-beam deflection in electronic image converters is controlled by a tapped magnetic deflection yoke and a series of current generators. The generators supply equal current to each tap through digitally controlled switches, thereby increasing the inherent accuracy of the system.

B65-10291

SPIRALED CHANNELS IMPROVE HEAT TRANSFER BETWEEN  
FLUIDS

HIGA, W. WIEBE, E. R. OCT. 1965

JPL-694

Spiral flow channels increase heat transfer between two fluids in a countercurrent heat exchanger of given volume. The heat exchanger is constructed by connecting a spiraled bellows-shaped ducting between two concentric cylindrical tubes.

B65-10292  
INTERFEROMETER CONSTRUCTION ASSURES  
PARALLELISM OF CRITICAL COMPONENTS  
CONNES, P. OCT. 1965  
JPL-704

Interferometer with rigidly mounted components assures parallelism of critical components. The interferometer is constructed for effective operation even if the total instrument is subjected to mechanical stress.

B65-10295  
UNIQUE CONSTRUCTION MAKES INTERFEROMETER  
INSENSITIVE TO MECHANICAL STRESSES  
BEER, R. OCT. 1965  
JPL-725

Michelson-type interferometer with a cat-eye reflector operates effectively even in the presence of random mechanical stresses. A cubical beamsplitter with dichroic surfaces permits operation in infrared or visible light.

B65-10296  
COAXIAL CAPACITOR USED TO DETERMINE FLUID  
DENSITY  
ATKISSON, E. A. OCT. 1965  
LEWIS-232

Sensing device measures directly the density of compressible fluid existing simultaneously in both liquid and gaseous phases. The device is comprised of a capacitor connected as one leg of a bridge circuit, a power source, and an indicator calibrated to indicate density as a direct measurement.

B65-10297  
SUPERCONDUCTOR SHIELDS TEST CHAMBER FROM  
AMBIENT MAGNETIC FIELDS  
HILDEBRANDT, A. F. OCT. 1965  
JPL-627

Shielding a test chamber for magnetic components enables it to maintain a constant, low magnetic field. The chamber is shielded from ambient magnetic fields by a lead foil cylinder maintained in a superconducting state by liquid helium.

B65-10330  
WEDGE IMMERSED THERMISTOR BOLOMETER MEASURES  
INFRARED RADIATION  
DREYFUS, M. G. /BARNES ENG. CO./ NOV. 1965  
GSFC-443

Wedge immersed-thermistor bolometer measures infrared radiation in the atmosphere. The thermistor flakes are immersed by optical contact on a wedge-shaped germanium lens whose narrow dimension is clamped between two complementary wedge-shaped germanium blocks bonded with a suitable adhesive.

B65-10331  
CLOSED FLUID SYSTEM WITHOUT MOVING PARTS  
CONTROLS TEMPERATURE  
STENGER, F. J. NOV. 1965  
LEWIS-222

Closed fluid system maintains a constant temperature in an insulated region without the use of any moving parts. Within the system, the energy for thermodynamic cycling of two-phase heat transfer fluid and a hydraulic fluid is entirely supplied by the heat generated in the thermally insulated region.

B65-10356  
SEGMENTED ELECTRODE INCREASES OPERATING  
PRESSURE OF MHD ACCELERATOR  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
NOV. 1965  
LANGLEY-95

Circumferentially segmented-ring electrode replaces the solid-ring electrode in a basic magnetohydrodynamic /MHD/ accelerator. This produces diffuse discharges at pressures as high as 100 atmospheres.

B65-10368  
VACUUM CHAMBER PROVIDES IMPROVED INSULATION  
AND SUPPORT FOR CRYOSTAT  
INNOVATOR NOT GIVEN /GE/ DEC. 1965  
M-FS-415

Taut wires in an evacuated cylinder minimize heat transfer through the walls and junctions of a liquid-helium-filled cryostat by suspending the cryostat.

B65-10373  
MODIFIED PROCEDURE SPEEDS CAMERA COPY LAYOUT  
FOR OFFSET PRINTING  
SMITH, L. F. DEC. 1965  
GSFC-424

Projecting a grid pattern on a steel layout board facilitates the alignment of camera copy for photo-offset reproduction. Small flat bar magnets fasten the copy to the board.

B65-10395  
OPTICAL OUTPUT ENHANCES FLOWMETER ACCURACY  
WOLPIN, E. G. /N. AM. AVIATION/ DEC. 1965  
M-FS-482

Magnetic flowmeter with a direct-coupled optical output increases accuracy and operates independently of other system inputs. The design includes simple external adjustment and signal amplitude control.

B66-10004  
COPPER FOIL PROVIDES UNIFORM HEAT SINK PATH  
PHILLIPS, I. E., JR. SCHREIHANS, F. A. /N. AM.  
AVIATION/ JAN. 1966  
MSC-262

Thermal path prevents voids and discontinuities which make heat sinks in electronic equipment inefficient. The thermal path combines the high thermal conductivity of copper with the resiliency of silicone rubber.

B66-10008  
AUTOMATIC FLUID SEPARATOR SUPPLIES OWN DRIVING  
POWER  
DECKER, M. S. MAJNERI, L. A. SPULGIS, I. S.  
/MIDLAND-ROSS CORP./ JAN. 1966  
WOO-085

Centrifugal separator suspended in the fuel tank of a space vehicle selects and vents gas vapor at zero gravity. Escaping vapor is used to drive an expander turbine that is magnetically coupled to the separator.

B66-10010  
OPTICAL PROJECTORS SIMULATE HUMAN EYES TO  
ESTABLISH OPERATOR'S FIELD OF VIEW  
BEAM, R. A. /N. AM. AVIATION/ JAN. 1966  
WOO-250

Device projects visual pattern limits of the field of view of an operator as his eyes are directed at a given point on a control panel. The device, which consists of two projectors, provides instant evaluation of visual ability at any point on a panel.

B66-10016  
SINGLE PROJECTOR ACCOMMODATES SLIDES OF  
DIFFERENT SIZE AND FORMAT  
GATES, G. M. JAN. 1966  
GSFC-439

Projector with two adjustable external units accommodates slides of different size and format. One external unit is the holder for different size slides and includes mounting means for appropriate condensing lens and heat filters. The other unit is a turret lens assembly. The machine is easily adaptable to rear-screen and front-screen projection over various distances.

B66-10017  
PTFE-ALUMINUM FILMS SERVE AS NEUTRAL DENSITY  
FILTERS  
BURKS, H. D. JAN. 1966  
LANGLEY-189

Polytetrafluoroethylene /PTFE/ films coated with aluminum films act as neutral density filters in the wavelength range 0.3 to 2.1 microns. These filters are effective in the calibration of photometric systems.

B66-10045  
COMPLEMENTARY SYSTEM VAPORIZES SUBCOOLED  
LIQUID, IMPROVES TRANSFORMER EFFICIENCY  
KETAILY, E. C. /N. AM. AVIATION/ FEB. 1966

M-FS-550

Complementary system converts subcooled liquid hydrogen or nitrogen to gas. The inherent induction heat losses of an electrical transformer are used in the vaporizing process. Transformer efficiency is improved in the process.

B66-10058

CALORIMETER ACCURATELY MEASURES THERMAL RADIATION ENERGY

ANDERSON, W. W., JR. MILLER, H. B. SWEET, G. E. FEB. 1966

LANGLEY-173

Calorimeter accurately measures steady-state and transient, low-level thermal radiation energy. The calorimeter uses a compensating shield between the sensor and the calorimeter mount to intercept sensor heat losses and to provide a reference for determining a correction factor.

B66-10060

THIN CARBON FILM SERVES AS UV BANDPASS FILTER INNOVATOR NOT GIVEN /GEOPHYS. CORP. OF AM./ FEB. 1966

ERC-8

Thin carbon film deposited on a 70 percent transparent screen provides a filter for narrow-band detectors in the extreme ultraviolet. The filter also suppresses scattered light and light of unwanted orders in vacuum spectrographs.

B66-10072

BEAM SPLITTER USED IN DUAL FILMING TECHNIQUE ZELDIN, S. /N. AM. AVIATION/ FEB. 1966

M-FS-501

Tubular tee is intersected at its junction by a reflecting/transmitting mirror angled to provide two images of an object for simultaneous photographing from two positions. This method is used when space and focal conditions are limited.

B66-10075

SPECIMEN HOLDER DESIGN IMPROVES ACCURACY OF X-RAY POWDER ANALYSIS

MACK, M. /N. AM. PHILLIPS CORP./ FEB. 1966

JPL-SC-165

Specimen holder for X-ray diffraction analysis presents the specimen to the incident X-rays in a curvature. This permits the use of an X-ray beam having a larger divergence angle, the beam intensity is increased, and the statistical accuracy of analysis is improved.

B66-10079

HIGH-PRESSURE, LOW TEMPERATURE ELECTRICAL CONNECTOR MAKES NO-LEAK SEAL

WEAKLEY, J. F. /N. AM. AVIATION/ MAR. 1966

MSC-276

Flow control of cryogenic liquids is achieved through use of an electrical feed-through connector with a solenoid-type valve. To prevent gas leakage, the connector is designed and structured so that extremely high pressure and low temperatures contribute to its sealing properties.

B66-10086

SCREEN OF CYLINDRICAL LENSES PRODUCES STEREOSCOPIC TELEVISION PICTURES

NORK, C. L. /SPACO, INC./ MAR. 1966

M-FS-273

Stereoscopic television pictures are produced by placing a colorless, transparent screen of adjacent parallel cylindrical lenses before a raster from two synchronized TV cameras. Alternate frames from alternate cameras are displayed. The viewer's sensory perception fuses the two images into one three-dimensional picture.

B66-10095

ULTRAVIOLET PHOTOGRAPHIC PYROMETER USED IN ROCKET EXHAUST ANALYSIS

LEVIN, B. P. /N. AM. AVIATION/ MAR. 1966

M-FS-499

Ultraviolet photographic pyrometer investigates the role of carbon as a thermal radiator and determines the geometry, location, and progress of afterburning phenomena in the exhaust plume of rocket engines using liquid oxygen/RP-1 as propellant.

B66-10096

INEXPENSIVE INFRARED SOURCE IMPROVED FROM FLASHLIGHT INNOVATOR NOT GIVEN /FAIRCHILD HILLER CORP./ MAR. 1966

M-FS-494

Inexpensive hand-held source of infrared energy is provided by a flashlight bulb coated with a paint which filters out the visible light emitted by the bulb and transmits only infrared radiation. This device can be used for checking infrared sensors and for experimental purposes.

B66-10098

NEW ENERGY STORAGE CONCEPT USES TAPES GRUBER, A. KAFESJIAN, R. R. /MONSANTO RES. CORP./ MAR. 1966

LEWIS-239

Energy storage system uses movable permeable tapes with cathode and electrolyte material that is drawn across an anode to produce electric power. The system features long shelf life, high efficiency, and flexible operation.

B66-10108

PLASTIC SCINTILLATOR CONVERTS STANDARD PHOTOMULTIPLIER TO ULTRAVIOLET RANGE

INNOVATOR NOT GIVEN /GEOPHYS. CORP. OF AM./ MAR. 1966

ERC-9

Commercially available plastic scintillators are attached to the glass windows of standard photomultiplier tubes for detection of ultraviolet radiation.

B66-10114

HIGHLY SENSITIVE SOLIDS MASS SPECTROMETER USES INERT-GAS ION SOURCE

INNOVATOR NOT GIVEN /GEOPHYS. CORP. OF AM./ MAR. 1966

ERC-11

Mass spectrometer provides a recorded analysis of solid material surfaces and bulk. A beam of high-energy inert-gas ions bombards the surface atoms of a sample and converts a percentage into an ionized vapor. The mass spectrum analyzer separates the vapor ionic constituents by mass-to-charge ratio.

B66-10121

COMPOUND IMPROVES THERMAL INTERFACE BETWEEN THERMOCOUPLE AND SENSED SURFACE

KALLIN, I. N. /WESTINGHOUSE ASTRONUCL. LAB./ MAR. 1966

NU-0028

Thermocouples and brittle materials are joined without welding by an epoxy resin cement mixer with a conducting material. This mixture does not form thermal barriers at cryogenic temperatures.

B66-10122

NIOBIUM THIN FILMS ARE SUPERCONDUCTIVE IN STRONG MAGNETIC FIELDS AT LOW TEMPERATURES

CLOUGH, P. J. /NATL. RES. CORP./ FOWLER, P. MAR. 1966

JPL-SC-174

Niobium film superconductor carries high currents in strong magnetic fields. The thin niobium film is formed on an inert substrate through evaporation in a vacuum environment. Control of temperature and vacuum results in rejection of gaseous impurities so that the film is of a very high purity.

B66-10143

SEXTANT MEASURES SPACECRAFT ALTITUDE WITHOUT GRAVITATIONAL REFERENCE

INNOVATOR NOT GIVEN /GEONAUTICS, INC./ APR. 1966

MSC-200

Horizon-sensing sextant measures the altitude of an orbiting spacecraft without gravitational reference by optically measuring the dip angle to the horizon along a line of sight in each of two planes. The sextant scans over a relatively limited field of view.

B66-10153

ARGON PURGE GAS COOLED BY CHILL BOX

SPIRO, L. W. /N. AM. AVIATION/ APR. 1966  
M-FS-560

Cooling argon purge gas by routing it through a shop-fabricated chill box reduces charring of tungsten inert gas torch head components. The argon gas is in a cooled state as it enters the torch and prevents buildup of char caused by the high concentrations of heat in the weld area during welding operations.

B66-10156  
CIRCULAR, EXPLOSION-PROOF LAMP PROVIDES  
UNIFORM ILLUMINATION  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ APR. 1966  
MSC-382

Circular explosion-proof fluorescent lamp is fitted around a TV camera lens to provide shadowless illumination with a low radiant heat flux. The lamp is mounted in a transparent acrylic housing sealed with clear silicone rubber.

B66-10157  
CRYOGENIC LIQUID TRANSFER SYSTEM REDUCES  
RESIDUAL BOILOFF  
HEGLAND, D. E. APR. 1966  
LEWIS-274

System for transferring cryogenic liquids to a dewar prevents boiloff of residual liquid by venting the boiloff to the atmosphere during the transfer tube cooling period. The system is most useful with liquids having very small heat vaporization.

B66-10173  
OFFSET LENSES AND VERSATILITY TO  
PHOTOTYPESETTING MACHINE  
JAMES, A. M. /DOCUMENTATION, INC./ APR. 1966  
HQ-9

Offset lenses facilitate the composition of inputs of other than straight baseline characters on the Photon phototypesetting machine. A number of lenses in the turret are mounted in an offset pattern that causes characters projected through them to fall on the photographic paper in the magazine above and below the baseline.

B66-10178  
FATIGUE CRACKS DETECTED AND MEASURED WITHOUT  
TEST INTERRUPTION  
FRECHE, J. C. KLIMA, S. J. LESCO, D. J. MAY 1966  
LEWIS-266

Ultrasonic flaw detector records cracks in materials undergoing fatigue tests, without interfering with test progress. The detector contains modified transducers clamped to the specimens, and an oscillograph readout.

B66-10181  
ALUMINUM DOPING IMPROVES SILICON SOLAR CELLS  
MAY 1966 SEE ALSO NASA-TN-D-2711  
LEWIS-206

Aluminum doped silicon solar cells with resistivities in the 10- to 20-ohm centimeter range have broad spectral response, high efficiency and long lifetimes in nuclear radiation environments. Production advantages include low material rejection and increased production yields, and close tolerance control.

B66-10183  
INSULATION FOR CRYOGENIC TANKS HAS REDUCED  
THICKNESS AND WEIGHT  
DUMIRE, P. E. MIDDLETON, R. L. SCHELL, J. T. STUCKEY, J. M. MAY 1966 SEE ALSO NASA-SP-5030  
M-FS-326

Dual seal insulation, consisting of an inner layer of sealed-cell Mylar honeycomb core and an outer helium purge channel of fiberglass reinforced phenolic honeycomb core, is used as a thin, lightweight insulation for external surfaces of cryogenic-propellant tanks.

B66-10186  
RADIATION USED TO TEMPERATURE COMPENSATE  
SEMICONDUCTOR STRAIN GAGES  
GROSS, C. MAY 1966  
LANGLEY-207  
Exposure to high energy electron radiation reduces

the temperature coefficients of resistance and gauge factor of a range of resistivities of n- and p-type semiconductor silicon strain gauges. After irradiation, the gauges are heated to a high temperature for a 24-hour period to stabilize their temperature coefficients.

B66-10187  
RUBBER-COATED BELLOWS IMPROVES VIBRATION  
DAMPING IN VACUUM LINES  
HEGLAND, D. E. SMITH, R. J. MAY 1966  
LEWIS-273

Compact vibration damping systems, consisting of rubber-coated metal bellows with a sliding O-ring connector, are used in vacuum lines. The device presents a metallic surface to the vacuum system and combines flexibility with the necessary stiffness. It protects against physical damage, reduces fatigue failure, and provides easy mating of nonparallel lines.

B66-10199  
MOUNT ENABLES PRECISION ADJUSTMENT OF  
OPTICAL-INSTRUMENTATION MIRROR  
INNOVATOR NOT GIVEN /MIT./ MAY 1966  
MSC-184

Mirror mount assembly allows the plane of a mirror to be adjusted through small angles about two orthogonal axes. The assembly, which has a mirror mount with two independently adjustable flexure joints, allows independent precise adjustment of the mirror mount with respect to each axis.

B66-10231  
SOLAR CELL SUBMODULE DESIGN FACILITATES  
ASSEMBLY OF LIGHTWEIGHT ARRAYS  
YASUI, R. K. MAY 1966  
JPL-728

Solar cell submodules with bus bars that leave tabs along one end of the submodule and wires with raised portions along the other end are assembled by interlocking the tabs and wires of adjacent submodules. This structural design is lightweight and reliable and requires no metallic substructure.

B66-10257  
FREON PROVIDES HEAT TRANSFER FOR SOLID CO<sub>2</sub>  
CALIBRATION STANDARD  
INNOVATOR NOT GIVEN /LEEDS AND NORTHROP CO./ JUN. 1966

M-FS-644  
Acetone and Freon as liquid heat transfer mediums bring a dry ice bath to, and keep it at, the temperature required when using solid carbon dioxide as a calibration standard. Although acetone gives better results, Freon TF is preferred since acetone reacts violently in the presence of liquid oxygen.

B66-10263  
OPTICAL DEVICE ENABLES SMALL DETECTOR TO SEE  
LARGE FIELD OF VIEW  
ARNDT, J. H. /TRW SPACE TECHNOL. LABS./ JUN. 1966  
W00-253

Optical device images the sun on a mask that transmits it or prevents its transmission to a photodetector behind the mask depending on image position on the mask. The device uses a pinhole as the image former to provide a large field of view and diffraction-limited resolution.

B66-10268  
HIGH-SPEED FURNACE USES INFRARED RADIATION  
FOR CONTROLLED BRAZING  
ECKLES, P. N. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0047

Furnace produces controlled heat for brazing and heat treating metals over a wide range of temperatures by using a near-infrared heat source positioned at one focus of an ellipsoidal reflector mounted below a cylindrical quartz chamber. This furnace maintains a pure atmosphere, has rapid heatup and cooldown, and permits visual observation.

B66-10289

ULTRASONIC HAND TOOL ALLOWS CONVENIENT  
SCANNING OF SPOT WELDSMITCHELL, D. K. /BOEING CO./ JUL. 1966  
M-FS-539

Small, portable, electrically powered hand tool, coupled with auxiliary ultrasonic equipment, allows convenient scanning of spot welds for discontinuities.

B66-10290

## MODIFIED MCLEOD GAGE RECORDS AUTOMATICALLY

FAETH, P. A. JUL. 1966  
LEWIS-290

Modified McLeod gauge records pressure measurements automatically. The measurements can be programmed in advance by means of an automatic timer.

B66-10307

COMMERCIAL FILM PRODUCES POSITIVE X-RAY PHOTO  
IN TEN SECONDSINNOVATOR NOT GIVEN /N. AM. AVIATION/ JUL. 1966  
M-FS-521

Type 52 Polaroid Land Film Packet provides a rapid, inexpensive method of producing positive X-ray photographs of various objects.

B66-10316

LEGIBILITY OF ELECTROLUMINESCENT INSTRUMENT  
PANELS INVESTIGATEDMC LEAN, M. V. MILLER, G. E. /N. AM. AVIATION/  
AUG. 1966

MSC-494 MSC-496 MSC-501 MSC-505

Legibility studies of several EL /electroluminescent/ displays correlate reading time and accuracy with number size, stroke/width ratio, indicia size, pointer width, contrast, ambient illumination, and color background and contrast. Human factor criteria established on non-EL displays may not apply to EL displays.

B66-10325

BIMETALLIC DEVICES HELP MAINTAIN CONSTANT  
SEALING FORCES DOWN TO CRYOGENIC TEMPERATURESDE BOSKEY, W. R. /MELPAR/ JUL. 1966  
M-FS-800

Tantalum washers compensate for different thermal coefficients of expansion between stainless steel and an aluminum O-ring. The washers have sufficient thickness to maintain a vacuum seal from room to cryogenic temperatures.

B66-10348

INEXPENSIVE INSULATION IS EFFECTIVE FOR  
CRYOGENIC TRANSFER LINESLINDGREN, A. R. /N. AM. AVIATION/ AUG. 1966  
MSC-618

Matting cover thermally insulates cryogenic-liquid transfer pipelines. The matting consists of layers of commercially available fiberglass tape in which the fibers are randomly oriented in parallel planes.

B66-10372

SPECIAL TREATMENT REDUCES HELIUM PERMEATION OF  
GLASS IN VACUUM SYSTEMSBRYANT, P. J. GOSSELIN, C. M. /MIDWEST RES.  
INST./ AUG. 1966

HQ-25

Internal surfaces of the glass component of a vacuum system are exposed to cesium in gaseous form to reduce helium permeation. The cesium gas is derived from decomposition of cesium nitrate through heating. Several minutes of exposure of the internal surfaces of the glass vessel are sufficient to complete the treatment.

B66-10388

AUXILIARY TITANIUM SUBLIMATION PUMP PRODUCES  
ULTRAHIGH /10 TO THE MINUS 11 TORR/ VACUUMOUTLAW, R. A. SEP. 1966  
LANGLEY-212

Sublimated titanium as a gettering agent in conjunction with a turbine-type pump provides a two-step procedure for obtaining an ultrahigh vacuum of 10 to the minus 11 torr. The pump alone evacuates the chamber to a pressure of 10 to the minus 9 torr. The residual gas is removed by

the gettering agent at a pumping speed of 15 liters per second per square inch.

B66-10435

CHEMICAL REGENERATION OF EMITTER SURFACE  
INCREASES THERMIONIC DIODE LIFEBREITWIESER, R. OCT. 1966 SEE NASA-TN-D-1877  
LEWIS-17

Chemical regeneration of sublimated emitter electrode increases the operating efficiency and life of thermionic diodes. A gas which forms chemical compounds with the sublimated emitter material is introduced into the space between the emitter and the collector. The compounds migrate to the emitter where they decompose and redeposit the emitter material.

B66-10474

GAS PRESSURE FEEDS FILM INTO CAMERA AT HIGH  
SPEEDKEIGHNER, P. J. NOV. 1966  
ARG-97

Blast of gas blows a loop of unexposed film as a wave across a vacuum platen to feed film smoothly into a camera so that 2 successive lengths can be exposed within 50 milliseconds. This technique can be readily applied to multiple aperture cameras as well as to various types of films.

B66-10483

UNIFORM REFLECTIVE FILMS DEPOSITED ON LARGE  
SURFACESNOV. 1966 SEE ALSO NASA-TN-D-3357  
GSFC-507

Specially designed baffle which intercepts varying amounts of the vapor stream from an evaporant source, vacuum deposits films of uniform thickness on large substrates, using a single small area evaporation source. A mirror coated by this method will have a reflectance as high as 82 percent at 1216 angstroms with a variation of only plus/minus 2 percent over the surface.

B66-10499

CRYOGENIC COOLING REDUCES HIGH VOLTAGE ARCING  
BETWEEN ELECTRODES OPERATING IN A VACUUMDE GEETER, D. J. NOV. 1966  
ARG-109

Cooling to a temperature of approximately liquid nitrogen or lower, reduces arcing, or high voltage breakdown, between two closely spaced electrodes operating in a vacuum. This cooling technique can be applied to electrodes having other than hemispherical shapes.

B66-10507

PANELS ILLUMINATED BY EDGE-LIGHTED LENS  
TECHNIQUEHAAG, G. E. HORSFALL, R. B. /N. AM. AVIATION/  
NOV. 1966

MSC-871

Electroluminescent lamps used to edge-light a specially ground lens provide nonflare, reduced eye strain panel illumination. There is no noticeable falloff in brightness along the lens edge. Light intensity diminishes toward the lens center. A slight halo, observed along the lens edge, has no detrimental effect.

B66-10508

EXPERIMENTAL INVESTIGATION OF MEGAWATT DC  
ARC HEATING OF NITROGENBOLDMAN, D. R. CAMPBELL, J. P. DEC. 1966  
LEWIS-313

Four types of arc heaters, each with the capability of providing arc power levels in excess of 1 megawatt in nitrogen, were tested over a range of power levels and nitrogen flow rates to determine their value as heaters for hypersonic tunnels. The data derived should be useful in the design of high energy heaters for various industrial processes.

B66-10532

LIGHT-INTENSITY MODULATOR WITHSTANDS HIGH  
HEAT FLUXESMAPLES, H. G. STRASS, H. K. NOV. 1966  
MSC-246

Mechanism modulates and controls the intensity of



luminous radiation in light beams associated with high-intensity heat flux. This modulator incorporating two fluid-cooled, externally grooved, contracting metal cylinders which when rotated about their longitudinal axes present a circular aperture of varying size depending on the degree of rotation.

B66-10547

HIGH INTENSITY RADIATION HEAT SOURCE IS CAPABLE OF SUSTAINED OPERATION  
GEIDEMAN, W. A. MULLER, K. /TEXRON ELECTRONICS/  
NOV. 1966  
ARC-61

Water cooled, high intensity radiation source rated at 125 kw, with an efficiency of 31 to 34 percent is used in the evaluation of ablative materials under simulated conditions of high velocity entry into planetary atmospheres. The source operates repeatedly at maximum power for periods of 10 to 20 minutes.

B66-10554

CALCULATION OF INFRARED SPECTRAL TRANSMITTANCES OF INHOMOGENEOUS GASES  
HUFFAKER, R. M. DEC. 1966  
M-FS-1563

Calculation of spectral transmittance for a particular inhomogeneous gas path is made by combining known data on gases at constant temperature, pressure, and concentration. The spectral transmittances of the inhomogeneous plume gases is needed to calculate the heat radiated from the exhaust plume to the rocket base of a multiple engine rocket.

B66-10560

LASER MEASURING SYSTEM ACCURATELY LOCATES POINT COORDINATES ON PHOTOGRAPH  
DOEDE, J. H. LINDENMEYER, C. W. VONDEROHE, R. H.  
DEC. 1966  
ARG-74

Laser activated ultraprecision ranging apparatus interfaced with a computer determines point coordinates on a photograph. A helium-neon gas CW laser provides collimated light for a null balancing optical system. This system has no mechanical connection between the ranging apparatus and the photograph.

B66-10565

MIXER CONDITIONS TEMPERATURE OF LIQUIFIED GAS STREAMS  
TALMOR, E. /N. AM. AVIATION/ DEC. 1966  
M-FS-1784

Room temperature gaseous hydrogen mixed with liquified hydrogen in a venturi produces a two-phased liquid hydrogen stream at a stable temperature. This technique is useful in a laboratory testing where presently, temperature control is maintained by a calibrated heat leak that results in considerable expenditure of cryogenic refrigerants.

B66-10583

NEON ISOTOPES CANCEL ERRORS IN GAS LASER  
MACEK, W. M. OLTHUIS, R. W. SCHNEIDER, J. R. /SPERRY GYROSCOPE CO./ DEC. 1966  
M-FS-1476

Neon isotopes cancel frequency pushing errors arising from unequal gain in the two contracirculating beams of a helium-neon filled discharge tube used in a ring laser.

B66-10596

OPTICAL AUTOMATIC GAIN CHANNEL  
MRUS, G. ZUKOWSKY, W. /PERKIN-ELMER CORP./ DEC. 1966  
M-FS-1550

Automatic Gain Control /AGC/ channel automatically compensates for gain changes in the azimuth error channel due to time varying optical sight degrading effects. This system is useful in remote television monitors, automatic navigation systems, and surveying and mapping instrumentation.

B66-10602

EXPOSURE VALUE /EV/ SYSTEM EXPANDED TO

INCLUDE FILTER FACTORS AND TRANSMITTANCE

LINDSEY, W. F. DEC. 1966

LANGLEY-190

Application of the exposure value system requires that the system be extended to high brightness level, and expanded to include filter factors. A minimum of four photographic factors are involved in the evaluation of an exposure which when determined from tables of 1-stop interval could introduce noticeable error.

B66-10615

FEED-THRU FLANGE IS USEFUL IN VACUUM APPLICATIONS TO CRYOGENIC TEMPERATURES  
YAGER, S. P. DEC. 1966  
JPL-846

Feed-thru flange seals inner and outer walls of high vacuum test chambers. It is used in vacuum applications at both cryogenic and higher than cryogenic temperatures. A damaged flange can still be used for partial vacuum, noncryogenic applications in conjunction with an appropriate rubber seal.

B66-10630

TECHNIQUE FOR MEASURING ABSORPTANCE AND EMITTANCE BY USING CYCLIC INCIDENT RADIATION  
JACK, J. R. DEC. 1966 SEE ALSO NASA-TM-X-52193  
LEWIS-321

Cyclic radiation technique has been developed for determining absorptance and emittance of metal surfaces. Using this technique both absorptance and emittance can be determined from one set of data, and variable and controlled temperature levels are possible.

B66-10638

TWIN HELIX SYSTEM PRODUCES FAST SCAN IN INFRARED DETECTOR  
VANZETTI, R. /N. AM. AVIATION/ DEC. 1966  
M-FS-1598

Two rotating wheels in orthogonal relationship with helicoidal reflecting surfaces mounted on their outer rims achieve a linear speed without normal time loss in their return motion. The pitch of the helicoidal surfaces equals the displacement that the mirrors must traverse.

B66-10652

ROCKET ENGINE VIBRATION ACCURATELY MEASURED BY PHOTOGRAPHY  
CRAIG, K. A. /N. AM. AVIATION/ DEC. 1966  
M-FS-1916

High speed instrumentation camera focused on a partially masked light bulb which is securely mounted to the test fixture permits measurement of engine performance parameters when usual electronic vibration instrumentation is unavailable. Vibration is recorded as a light trace deviating from the light rays photographed in the static hardware condition.

B66-10654

CRYOGENIC FLUID SAMPLING DEVICE PERMITS TESTING UNDER HAZARDOUS CONDITIONS  
MITCHELL, J. A. /N. AM. AVIATION/ DEC. 1966  
M-FS-1927

Remotely controlled sampling device obtains timed sample of flowing cryogenic liquid propellants in remote or hazardous testing conditions. The device consists of a calibrated container, a dewar, a solenoid valve, a pressure gauge, and a manual bleed valve.

B66-10657

SIMPLE TECHNIQUE DETERMINES AC PROPERTIES OF HARD SUPERCONDUCTIVE MATERIALS  
HARPER, C. M. HECHT, R. /RCA/ DEC. 1966  
M-FS-1818

Critical current density of a neodymium-titanium alloy samples is analyzed from magnetization curves to determine the ac properties of hard semiconductive materials. A complete family of magnetization curves is obtained, each curve representing performance at a different temperature.

B66-10660

PROCESS PRODUCES ACCURATE REGISTRY BETWEEN

## CIRCUIT BOARD PRINTS

INNOVATOR NOT GIVEN /BENDIX CORP./ DEC. 1966  
LANGLEY-288

Tapes and quick-mount circles of contrasting colors aid in obtaining precise registry between the two circuits of two-sided printed circuit boards. The tapes and circles are mounted on opposite sides of transparent plastic film to define the conductive path and feed-through hole locations.

B66-10682

PRIMARY CELLS UTILIZE HALOGEN-ORGANIC  
CHARGE TRANSFER COMPLEX

GUTHMANN, F. HERMANN, A. M. REMBAUM, A. DEC.  
1966

JPL-926

Electrochemical cells with solid state components, employ charge transfer complexes or donor-acceptor complexes in which the donor component is an organic compound and the acceptor component is a halogen. A minor proportion of graphite added to these compositions helps reduce the resistivity.

B66-10693

LASER DOPPLER FLOWMETER MEASURES GAS  
VELOCITY

FOREMAN, W. /BROWN ENG. CORP./ HUFFAKER, R. M.  
DEC. 1966

M-FS-1747

Utilizing the large magnitudes of Doppler shifts obtainable from a CW gas laser local velocity vectors are measured by using the visible light from the laser. This technique is applicable for the measurement of velocity of any moving surface.

B66-10700

PROBLEM OF OSCILLATING CONE IN SUPERSONIC  
FLOW IS SOLVED BY SMALL PERTURBATION  
TECHNIQUES

PAO, T.-H. /MIT/ DEC. 1966

M-FS-869

Small perturbation technique solves the problem of an oscillating cone in supersonic flow. The logic of the program is straightforward, as reflected in the actual instructions for solving the problem.

B67-10008

POLAROID FILM HELPS LOCATE OBJECTS IN  
INACCESSIBLE AREAS QUICKLY

GRIFFIN, H. G. MC CLELLAND, G. W. /N. AM.  
AVIATION/ JAN. 1967

MSC-960

Polaroid film is used with conventional portable X-ray equipment to locate and shoot items or objects in difficult areas. Polaroid film development time is about 20 seconds.

B67-10021

POLARIMETER PROVIDES TRANSIENT RESPONSE  
IN NANOSECOND RANGE

JOHNSTON, A. R. FEB. 1967

JPL-890

Conventional polarimeter with a Senarmont compensator improves transient response and eliminates manual manipulation. A sampled photomultiplier output is fed to a low pass filter, resulting in a signal representing the optical state existing at the instant of sampling. With this technique, an unknown transient-induced retardation can be measured.

B67-10024

PLASMA JET ELECTRODE HAS LONGER OPERATING  
LIFE

GRACEY, C. M. /AEROJET GEN. CORP./ FEB. 1967  
NU-0098

Water-cooled, silver-infiltrated tungsten electrode has twice the operating lifetime of the pure tungsten electrode used in plasma jet generators. This electrode reduces the erosion rate, ensures excellent heat transfer, and reduces thermal stresses.

B67-10036

NEUTRON ACTIVATION ANALYSIS TRACES COPPER  
ARTIFACTS TO GEOGRAPHICAL POINT OF ORIGIN

CONWAY, M. FIELDS, P. FRIEDMAN, A. KASTNER, M.  
METTA, D. MILSTED, J. OLSEN, E. MAR. 1967

ARG-119

Impurities remaining in the metallic copper are identified and quantified by spectrographic and neutron activation analysis. Determination of the type of ore used for the copper artifact places the geographic point of origin of the artifact.

B67-10037

CORRELATION ESTABLISHED BETWEEN HEAT TRANSFER  
AND ULTRASONIC TRANSMISSION PROPERTIES OF  
COPPER BRAZE BONDS

DINOVI, R. A. MAR. 1967 SEE ALSO ANL-7074  
ARG-247

Measuring and correlating the thermal conductivity and ultrasonic transmission of seven hot-brazed-bonded copper plates established a relationship between heat transfer and ultrasonic transmission properties of the bonds. This relationship permits the prediction of heat transfer characteristics from ultrasonic transmission tests.

B67-10054

METHOD ACCURATELY MEASURES MEAN PARTICLE  
DIAMETERS OF MONODISPERSE POLYSTYRENE  
LATEXES

KUBITSCHKE, H. E. MAR. 1967

ARG-207

Photomicrographic method determines mean particle diameters of monodisperse polystyrene latexes. Many diameters are measured simultaneously by measuring row lengths of particles in a triangular array at a glass-oil interface. The method provides size standards for electronic particle counters and prevents distortions, softening, and flattening.

B67-10057

MECHANISMS OF SUPERCONDUCTIVITY  
INVESTIGATED BY NUCLEAR RADIATION

AUTLER, S. H. COFFEY, H. T. KELLER, E. L.  
PATTERSON, A. MAR. 1967

M-FS-1944

Investigation focused on the behavior of superconducting magnet and its constituent materials during and after exposure to nuclear radiation. The results will indicate the feasibility of their use in diverse applications and various environments.

B67-10068

STUDY MADE OF INTERACTION BETWEEN SOUND  
FIELDS AND STRUCTURAL VIBRATIONS

LYON, R. H. SMITH, P. W., JR. /BOLT, BERANEK,  
AND NEWMAN/ APR. 1967

HQ-26

Study analyzes structural vibrations and the interactions between them and sound fields. It outlines a conceptual framework to analyze the vibrations of systems and their interactions, incorporating the results of earlier studies and establishing a unified basis for continuing research.

B67-10071

ELECTRONIC FILTER DISCRIMINATES BETWEEN  
TRUE AND FALSE REFLECTIONS

MERCHANT, J. /HONEYWELL INC./ APR. 1967  
HQ-55

Electronic filtering system discriminates between true corneal and false reflections, solving the problem of spurious reflections of the CRT light in newly designed oculometer.

B67-10072

AN IMPROVED SOFT X-RAY PHOTOIONIZATION  
DETECTOR

STOBER, A. K. YOUNG, R. M. APR. 1967  
GSFC-540

Photoionization detector with an alumina shell, a beryllium foil window, and a xenon gas fill measures small incident photon fluxes from soft X-rays. It has high spectral selectivity and quantum efficiencies, and a long shelf life. It minimizes electrical leakage and recontamination, and will hold a high vacuum.

B67-10075  
STUDY MADE OF FAR INFRARED SPECTRA OF  
SILICATE MINERALS  
INNOVATOR NOT GIVEN, /ARTHUR D. LITTLE, INC./  
APR. 1967  
M-FS-1811

Study of mineral in the far infrared region of the spectrum examines the problems and feasibility of remote sensing of the composition of the moon or tenuous atmosphere planets. Most of the work described utilized reflection techniques.

B67-10082  
FATIGUE ZONES IN METALS IDENTIFIED BY  
POLARIZED LIGHT PHOTOGRAPHY  
WALSH, F. D. /BOEING CO./ APR. 1967  
W00-286

Polarized light technique clearly defines the fatigue zones in metal for measuring and photographing. White light is passed through a vertical polarizing filter and then is reflected onto the surface of the fracture specimen.

B67-10088  
EXPERIMENTAL SCALING STUDY OF FLUID  
AMPLIFIER ELEMENTS  
ABLER, J. GREBER, I. TAFT, C. /CASE INST. OF  
TECH./ APR. 1967  
M-FS-1882

Study examines scaling parameters of three fluid amplifier elements - a bistable device, a boundary layer control device, and a vortex device. Variations in performance due to size, fluid, and other conditions are studied. Even with restricted examples the large number of variables impedes the establishment of these scaling laws.

B67-10109  
SPECIAL PURPOSE REFLECTOMETER USES MODIFIED  
ULBRICHT SPHERE  
GORSTEIN, M. /MIT/ MAY 1967  
MSC-1135

Modified Ulbricht sphere measures stray radiation caused by irregularities in the reflective surface of an optical test specimen. The test specimen is positioned between a light source and exit port and all diffusely scattered radiation is measured by a photomultiplier tube in the sphere.

B67-10110  
STAR/HORIZON SIMULATOR USED TO TEST SPACE  
GUIDANCE SYSTEM  
SCHMIDT, W. C. /MIT/ MAY 1967  
MSC-407

Star/horizon simulator is used for alignment and optical plus photoelectric tests of the sextant for the Apollo guidance and navigation system optical unit assembly. The unit is basically a refractive collimator with a two inch objective lens system and a twenty-four inch focal length.

B67-10120  
VISUAL ATTITUDE ORIENTATION AND ALIGNMENT  
SYSTEM  
BEAM, R. A. MORRIS, D. B. /N. AM. AVIATION/ MAY 1967  
MSC-647

Active vehicle optical alignment aid and a passive vehicle three-dimensional alignment target ensure proper orientation and alignment plus control of the closure range and rate between two bodies, one in controlled motion and one at rest.

B67-10126  
HIGH-ENERGY-RATE MAGNETOHYDRAULIC METAL  
FORMING SYSTEM  
INNOVATOR NOT GIVEN /ADVAN. KINET./ MAY 1967  
M-FS-2142

In the magnetohydraulic metal forming system, a sonic shock wave is generated in a liquid medium by a coil energized by an electrical discharge. These waves transfer energy from a metal diaphragm, actuated by a pulsed magnetic field, to a metal workpiece. In this development a study was made of the pressure pulse phenomenon in a liquid medium.

B67-10128  
IMPROVED CRYOGENIC REFRIGERATION SYSTEM

HIGA, W. H. MAY 1967  
JPL-731

Two-position shuttle valve simplifies valving arrangement and crank-shaft configuration in gas-balancing and Stirling-cycle refrigeration systems used to produce temperatures below 173 degrees K. It connects the displacer and regenerator alternately to the supply line or the return line of the compressor, and establishes constant pressure on the drive piston.

B67-10131  
NEUTRON DIFFRACTOMETER ALLOWS BOTH MAGNETIC  
AND CRYSTALLOGRAPHIC ANALYSES  
ATOJI, M. JUN. 1967 SEE ALSO ANL-6920  
ARG-191

Automatic double-crystal neutron diffractometer performs both crystal and magnetic structural analyses. This shielded installation has a goniometric turntable and electronic controls, and auxiliary equipment including a goniometer, diffraction electromagnet, two cryogenic dewars, and two diffraction furnaces.

B67-10134  
CRYOGENIC SEAL REMAINS LEAKTIGHT DURING  
THERMAL DISPLACEMENT  
FIELDS, T. H. MARTIN, K. B. PEWITT, E. G. MAY 1967  
ARG-96

Cryogenic seals protect the surfaces of a plastic member in a low-pressure system subjected to extreme temperature changes. The outer seal is an aluminum expansion ring bonded to the lens outer surface and the inner seal consists of a resin-filled aluminum U-ring bonded to the inner surface.

B67-10164  
SOLAR X-RAY SPECTRUM REPRODUCED IN VACUUM  
ERDMAN, C. A. KIRCHNER, L. P. /IIT RES. INST./  
JUN. 1967  
MSC-228 MSC-1168

Desired low energy X-rays are produced by modifying commercial ion tubes and combining them with standard power supplies and control circuitry. These X-rays have less deviation from the solar X-ray spectrum in energy and intensity.

B67-10216  
ELECTRON BEAM WELDER X-RAYS ITS OWN WELDS  
RODEN, W. A. /GEN. DYN./CONVAIR DIV./ JUN. 1967  
LEWIS-10111

Beam of an electron beam welder X-rays its own welds, enabling rapid weld quality checks to be made without removing the work from the vacuum chamber. A tungsten target produces X-rays when hit by the beam. They are directed at the weld specimen and recorded on polaroid film.

B67-10218  
X-RAY SOURCE USES INTERCHANGEABLE TARGET  
ANODES TO VARY X-RAY WAVELENGTH  
SHIELDS, R. A. JUL. 1967  
NPO-10036

Compact laboratory X-ray tube generates X-rays of various wavelengths by using interchangeable target anodes. The wavelength of the X-rays depends on the metal from which the anode is made.

B67-10247  
WATER COOLED ANODE INCREASES LIFE OF HIGH  
TEMPERATURE ARC LAMP  
RIISE, H. N. NOV. 1967  
NPO-10180

Water cooling system increases the life of the anode of a high temperature compact arc lamp. A shaped water passage is provided through the tip or hottest point of the anode so that water will flow through it at a relatively high velocity.

B67-10264  
INEXPENSIVE CRYOGENIC INSULATION REPLACES  
VACUUM JACKETED LINE  
FUCHS, C. E. /WESTINGHOUSE ASTRONUCL. LAB./ JUL. 1967  
NUC-10061

Commercially available aluminized Mylar, cork and fiberglass form a multilayered sealed system and provide rugged and economical field installed insulation for cryogenic /liquid nitrogen or oxygen/ pipe lines in an exposed environment.

**B67-10288**  
LASER SYSTEM GENERATES SINGLE-FREQUENCY LIGHT

TARG, R. /SYLVANIA ELECTRON. SYSTEMS/ AUG. 1967  
M-FS-2556

Program eliminates major sources of noise in the laser output, with minimum sacrifice of total laser output power. Results include the design and development of a CW laser system which features high power single-frequency output in the S-20 photocathode response region.

**B67-10295**  
IMPROVED ULTRASONIC TV IMAGES ACHIEVED BY USE OF LAMB-WAVE ORIENTATION TECHNIQUE

BERGER, H. AUG. 1967 SEE ALSO ANL-7042  
ARG-203

Lamb-wave sample orientation technique minimizes the interference from standing waves in continuous wave ultrasonic television imaging techniques used with thin metallic samples. The sample under investigation is oriented such that the wave incident upon it is not normal, but slightly angled.

**B67-10296**  
THERMAL NEUTRON IMAGE INTENSIFIER TUBE PROVIDES BRIGHTLY VISIBLE RADIOGRAPHIC PATTERN

BERGER, H. KRASKA, I. /ARGONNE/ NIKLAS, W. SCHMIDT, A. /THE RAULAND CORP./ AUG. 1967  
ARG-120

Vacuum-type neutron image intensifier tube improves image detection in thermal neutron radiographic inspection. This system converts images to an electron image, and with electron acceleration and demagnification between the input target and output screen, produces a bright image viewed through a closed circuit television system.

**B67-10297**  
FRESNEL DIFFRACTION PLATES ARE SIMPLE AND INEXPENSIVE

HOOVER, R. B. AUG. 1967  
M-FS-12731

Fresnel plate demonstrates diffraction phenomena simply and inexpensively. A large number of identical diffracting apertures are made in random orientation on photographic film. When a small source of light is viewed through the plate, the diffraction pattern typical of the diffracting aperture is readily seen.

**B67-10316**  
RADIATION COUNTING TECHNIQUE ALLOWS DENSITY MEASUREMENT OF METALS IN HIGH-PRESSURE - HIGH-TEMPERATURE ENVIRONMENT

DILLION, I. G. NELSON, P. A. SWANSON, B. S. SEP. 1967  
ARG-124

Radioactive tracers induced by neutron irradiation provide a gamma ray flux proportional to the density of a metal, allowing density measurement of these metals in extreme high-temperature and high-pressure environments. This concept is applicable to most metals, as well as other substances.

**B67-10326**  
PORTABLE SPECTROMETER MONITORS INERT GAS SHIELD IN WELDING PROCESS

GROVE, E. L. /IIT RES. INST./ SEP. 1967  
M-FS-12144

Portable spectrometer using photosensitive readouts monitors the amount of oxygen and hydrogen in the inert gas shield of a tungsten-inert gas welding process. A fiber optic bundle transmits the light from the welding arc to the spectrometer.

**B67-10337**  
LOW-ENERGY GAMMA RAY INSPECTION OF BRAZED ALUMINUM JOINTS

BROWN, J. A. /N. AM. AVIATION/ SEP. 1967  
MSC-1189

Americium 241 serves as a suitable radioisotope /gamma ray source/ and exposure probe for radiographic inspection of brazed aluminum joints in areas of limited accessibility. The powdered isotope is contained in a sealed capsule mounted at the end of a spring-loaded pushrod in the probe assembly.

**B67-10342**  
SIMPLIFIED TECHNIQUE DEMONSTRATES MAGNETIC DOMAIN SWITCHING

INNOVATOR NOT GIVEN /SPERRY RAND CORP./ OCT. 1967  
M-FS-13153

Light from a conventional photographic light source is polarized and projected through thin samples of gadolinium iron garnet and then observed with a conventional polarizing microscope. A distinctive change in color from red to yellow is observed as the magnetic domains are switched.

**B67-10352**  
PRACTICAL NEW METHOD OF MEASURING THERMAL-NEUTRON FLUENCE

SIEBOLD, J. R. WARMAN, E. A. /AEROJET-GEN. CORP./ OCT. 1967  
NUC-10086

Thermoluminescence dosimeter technique measures thermal-neutron fluence by encapsulating lithium fluoride phosphor powder and exposing it to a neutron environment. The capsule is heated in a dosimeter reader, which results in light emission proportional to the neutron fluence.

**B67-10371**  
MEASURING COPLANARITY OF SURFACES

WERNER, M. M. /KOLLSMAN INSTR. CORP./ OCT. 1967  
MSC-12044

Interferometric technique is used to measure the coplanarity and flatness of lapped surfaces on which a high-precision mirror is to be mounted. The measurement of minute height variations of several small discrete surfaces is accomplished simultaneously.

**B67-10372**  
ELECTRON BEAM PARALLEL X-RAY GENERATOR

PAYNE, P. /AM. SCI. AND ENG./ OCT. 1967  
MSC-11022

Broad X-ray source produces a highly collimated beam of low energy X-rays - A beam with 2 to 5 arc minutes of divergence at energies between 1 and 6 keV in less than 5 feet. The X-ray beam is generated by electron bombardment of a target from a large area electron beam gun.

**B67-10388**  
MODIFIED BLACKBODY DEVICE EMITS HIGH-DENSITY RADIATION

SCHUMACHER, P. E. /N. AM. AVIATION/ OCT. 1967  
M-FS-12744

Modified device provides a versatile, precisely controllable source of blackbody radiation to calibrate radiometers used for spectrometric analysis of large rocket engine plumes.

**B67-10391**  
METHOD PREVENTS SECONDARY RADIATION IN RADIOGRAPHIC INSPECTION

STRUCKUS, A. A. /N. AM. AVIATION/ OCT. 1967  
M-FS-13383

Thin-walled neoprene containers prevent secondary radiation, scatter, and undercut during radiographic inspection. The containers are filled with a mixture of barium sulfate, red lead, and petroleum jelly that achieves the required absorption rate.

**B67-10394**  
EXPERIMENTS TO INVESTIGATE PARTICULATE MATERIALS IN REDUCED GRAVITY FIELDS

BOWDEN, M. EDEN, H. F. FELSETHAL, P. GLASER, P. E. WECHSLER, A. E. /ARTHUR D. LITTLE/ OCT. 1967  
M-FS-13308

Study investigates agglomeration and the macroscopic behavior in reduced gravity fields of

particles of known properties by measuring and correlating thermal and acoustical properties of particulate materials. Experiment evaluations provide a basis for a particle behavior theory and measure bulk properties of particulate materials in reduced gravity.

B67-10398

AERIAL-IMAGE ENABLES DIAGRAMS AND ANIMATION TO BE INSERTED IN MOTION PICTURES  
ANDREWS, S. J., JR. TRESSEL, G. W. OCT. 1967  
ARG-165

Aerial-image unit makes it possible to insert diagrams and animation into live motion pictures, and also lift an element from a confusing background by suppressing general details. The unit includes a combination of two separate lens systems, the camera-projector system and the field lens system.

B67-10413

STUDY OF HYDROGEN SLUSH-HYDROGEN GEL UTILIZATION  
KELLER, C. W. /LOCKHEED MISSILES AND SPACE CO./  
OCT. 1967  
M-FS-13068

Study of hydrogen slush-hydrogen gel utilization is presented in two volume publication. The first volume contains the physical and thermal property data for hydrogen used in the study. In the second volume, details of the technical effort are presented including parametric analysis of effects on vehicle systems.

B67-10420

CONCEPT FOR CRYOGENIC LIQUID RECLAMATION SYSTEM  
DADERIAN, S. M. NOV. 1967  
NPO-10322

Cryogenic liquid reclamation system is used as an add-on unit to the nitrogen system of environmental test laboratories to salvage liquid nitrogen presently being treated as waste. The system may be installed indoors or outdoors provided the gas boiled off from the cryogenic liquid is vented to the outside.

B67-10428

ULTRASONICS USED TO MEASURE RESIDUAL STRESS  
INNOVATOR NOT GIVEN /R. W. BENSON AND ASSOCIATES/  
NOV. 1967  
M-FS-12449

Ultrasonic method is used to measure residual stress in metal structures. By using this method, various forms of wave propagation in metals are possible, and more thorough analysis of complex geometric structures may be had.

B67-10430

STUDY MADE OF ACOUSTICAL MONITORING FOR MECHANICAL CHECKOUT  
SAVELLE, C. NOV. 1967  
M-FS-13372

Study demonstrates that sonic signal analysis technique provides a powerful tool for mechanical component checkout. The technique also provides the unique capability of predicting component failures by detecting incipient malfunctions.

B67-10431

CAMERA LENS ADAPTER MAGNIFIES IMAGE  
MOFFITT, F. L. NOV. 1967  
M-FS-11955

Polaroid Land camera with an illuminated 7-power magnifier adapted to the lens, photographs weld flaws. The flaws are located by inspection with a 10-power magnifying glass and then photographed with this device, thus providing immediate pictorial data for use in remedial procedures.

B67-10443

CODED PHOTOGRAPHIC PROOF PAPER COULD SERVE AS CONVENIENT DENSITOMETER  
WINSLOW, D. J. NOV. 1967  
M-FS-13374

Standard print-out proofing paper, preprinted with an identifying code, serves as convenient densitometer. Exposure to light darkens the paper and gives a measure of the density of the

resultant photographic image or the total amount of exposure sustained by the paper.

B67-10452

PROPOSED METHOD OF ROTARY DYNAMIC BALANCING BY LASER  
PERKINS, W. E. /N. AM. AVIATION/ NOV. 1967  
M-FS-12422

Laser method, where high energies of monochromatic light can be precisely collimated to perform welding and machining processes, is proposed for rotary dynamic balancing. The unbalance, as detected with the velocity pickup, would trigger the laser system which would emit high energy pulses directed at the component's heavy side.

B67-10462

FLUID BEHAVIORAL PATTERNS FOUND IN SUBSCALE GEYSERING STUDY  
BURKHALTER, J. E. GLASGOW, V. L. /BOEING CO./  
NOV. 1967  
M-FS-13582

Study provides a fundamental understanding of geysering mechanisms necessary for formulating theoretical analyses. An algebraic relationship between average heating rate, reservoir temperature, and geysering period was established and areas for future studies were identified.

B67-10465

STUDY MADE OF TRANSFER OF HEAT ENERGY THROUGH METAL JOINTS IN VACUUM ENVIRONMENT  
ELLIOT, D. H. /DOUGLAS AIRCRAFT CO./ NOV. 1967  
M-FS-12534

Heat energy transfer is concentrated closely around a melted joint and the temperature drop across it decreases rapidly as the bolt and nut are tightened to a minimum torque level. Flat metal surfaces pressed together display a cyclical improvement in heat energy transfer as the interface pressure is increased.

B67-10474

METHOD FOR X-RAY STUDY UNDER EXTREME TEMPERATURE AND PRESSURE CONDITIONS  
PAUS, L. L. /BENDIX CORP./ DEC. 1967  
MSC-1232

Vacuum chamber environmental simulator and X-ray camera are used to study the stability of various minerals in extreme environmental conditions. An ion pump creates the desired vacuum. Exact sample positioning is obtained with a bellows sealed linear motion feed-through. Temperature control is by means of fluid conductive heat transfer.

B67-10477

TRAINING COURSE FOR RADIATION SAFETY TECHNICIANS  
LASUK, S. R. MOE, H. J. DEC. 1967 SEE ALSO  
ANL-6991  
ARG-216

Course of instruction includes sections on basic information, natural radioactivity, properties of alpha, beta, gamma, X-rays, and, neutrons, concepts of radiation units and dose determinations, shielding, biological effects, background radiation, radiation protection standards, and internal dose calculation.

B67-10485

DUAL PHOTOCHEMICAL REPLENISHER SYSTEM REDUCES CHEMICAL LOSSES  
KOLBER, J. M. DEC. 1967  
KSC-67-111

Dual replenisher system reduces chemical losses and maintain optimum solution concentration during long nonprocessing cycles of photo processing machines. Using a single 3-position switch and solenoid control valves the system provides instantaneous flow control to each processing tank.

B67-10486

ULTRASONIC HAND TOOL ALLOWS CONVENIENT DIAGNOSTIC SCANNING OF BONE INTEGRITY  
BEAL, J. B. DEC. 1967 SEE ALSO B66-10289  
M-FS-14102

Electrically powered ultrasonic hand tool rapidly

scans bone integrity and determines density without the need for surgery or X-rays. This portable tool eliminates bulky equipment, although it is limited to bone surfaces not hidden by other bones.

**B67-10508**  
GLANCING INCIDENCE TELESCOPE FOR FAR  
ULTRAVIOLET AND SOFT X-RAYS  
NEUPERT, W. M. UNDERWOOD, J. H. DEC. 1967  
GSFC-10052

Glancing-incidence telescope makes observations of distant celestial radiant bodies at wavelengths in the spectral region between 3 and 500 angstroms. The device can be used as a fore-optics system for a laboratory extreme ultraviolet spectrometer, or for the collection or \*\*imaging\*\* of thermal neutrons.

**B67-10516**  
NOISE STUDY OF SINGLE STAGE COMPRESSOR  
ROTOR-STATOR INTERACTION  
COPELAND, W. L. CRIGLER, J. L. DEC. 1967  
LANGLEY-137

Study made of noise radiation from rotor-stator interaction in axial-flow compressors. The collected data were reduced to the form of radiation patterns and frequency spectra. These data show how the radiation patterns are affected by the relative number of rotor blades and stator vanes.

**B67-10542**  
PLASTIC SHOE FACILITATES ULTRASONIC  
INSPECTION OF THIN WALL METAL TUBING  
LAMBERMEYER, D. J. PETERSON, R. M. /AEROJET GEN.  
CORP./ DEC. 1967  
NUC-10010

Plastic shoe aids inspection of thin walled stainless steel welded tubing to locate voids or other material defects in critical component equipment. Incorporated in available ultrasonic inspection equipment, it couples the transducer to the tube at desired incident angles.

**B67-10564**  
MECHANIZES X-RAY INSPECTION SYSTEM  
FOR LARGE TANKS  
OCCHIPINTI, G. C. /BOEING CO./ DEC. 1967  
M-FS-12867 M-FS-12868 M-FS-13065 M-FS-13815

Mechanized X-ray equipment provides nondestructive inspection of structural weldments at various positions on very large tanks. It mechanizes the placement of the film, automates the identification process, adheres to safety requirements, and eliminates all the usual time-consuming manual operations in industrial radiography.

**B67-10597**  
NEUTRON DETECTOR SIMULTANEOUSLY MEASURES  
FLUENCE AND DOSE EQUIVALENT  
DVORAK, R. F. DYER, N. C. DEC. 1967 SEE ALSO  
ANL-7085  
ARG-10071

Neutron detector acts as both an area monitoring instrument and a criticality dosimeter by simultaneously measuring dose equivalent and fluence. The fluence is determined by activation of six foils one inch below the surface of the moderator. The dose equivalent is determined from activation of three inter locked foils at the center of the moderator.

**B67-10601**  
ANALYTICAL DRAFTING CURVES PROVIDE EXACT  
EQUATIONS FOR PLOTTED DATA  
STEWART, R. B. DEC. 1967  
LANGLEY-285

Analytical drafting curves provide explicit mathematical expressions for any numerical data that appears in the form of graphical plots. The curves each have a reference coordinate axis system indicated on the curve as well as the mathematical equation from which the curve was generated.

**B67-10602**  
NEW TECHNIQUE FOR DETERMINATION OF CROSS-

POWER SPECTRAL DENSITY WITH DAMPED  
OSCILLATORS  
SIMON, W. E. WALKER, L. A. /MARTIN CO./ DEC.  
1967  
M-FS-14022

New cross-power spectral density computation technique has been developed, as well as a technique for discrimination between periodic and random signals. This development is applicable to analysis of any stationary random process, and can be used in the aerospace and transportation fields.

**B67-10605**  
LAMB WAVES INCREASE SENSITIVITY IN  
NONDESTRUCTIVE TESTING  
DINOVI, R. DEC. 1967 SEE ALSO ANL-6630, ANL-6329  
ARG-10009

Lamb waves improve sensitivity and resolution in the detection of small defects in thin plates and small diameter, thin-walled tubing. This improvement over shear waves applies to both longitudinal and transverse flaws in the specimens.

**B67-10609**  
GIMBALED-MIRROR SCANNING SYSTEM CAPABLE  
OF SPIRAL PATTERN  
HAERTSCH, O. C. WILSON, M. W. DEC. 1967  
GSFC-10170

Gimbaled-mirror infrared radiation scanner, with a lightweight torque motor direct coupled to each axis, is capable of scanning in a highly efficient spiral pattern. The scanner is lightweight and can be remotely positioned in previously inaccessible areas because the radiometer head and the gimbaled-mirror scanner can be separated.

**B67-10610**  
HANDBOOK OF CRYOGENIC DATA IN GRAPHIC FORM  
LOEB, M. B. /BOEING CO./ DEC. 1967  
KSC-10009

Handbook of Cryogenic Data is written in graphic form and concentrates extensive data on common materials of construction and properties of fluids frequently encountered in designing cryogenic systems. All data are presented in the British system of units.

**B67-10613**  
POLYSTYRENE CRYOSTAT FACILITATES TESTING  
TENSILE SPECIMENS UNDER LIQUID NITROGEN  
SHOGAN, R. P. SKALKA, R. J. /WESTINGHOUSE  
ASTRONUCL. LAB./ DEC. 1967  
NUC-10522

Lightweight cryostat made of expanded polystyrene reduces eccentricity in a tensile system being tested under liquid nitrogen. The cryostat is attached directly to the tensile system by a special seal, reducing misalignment effects due to cryostat weight, and facilitates viewing and loading of the specimens.

**B67-10617**  
TEST SYSTEM ACCURATELY DETERMINES TENSILE  
PROPERTIES OF IRRADIATED METALS AT CRYOGENIC  
TEMPERATURES  
LEVINE, P. J. SKALKA, R. J. VANDERGRIFT, E. F.  
/WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1967  
NUC-10521

Modified testing system determines tensile properties of irradiated brittle-type metals at cryogenic temperatures. The system includes a lightweight cryostat, split-screw grips, a universal joint, and a special temperature control system.

**B67-10618**  
ENVIRONMENTAL CONTROL SYSTEM FOR CRYOGENIC  
TESTING OF TENSILE SPECIMENS  
VANDERGRIFT, E. F. YATSKO, G. O. /WESTINGHOUSE  
ASTRONUCL. LAB./ DEC. 1967  
NUC-10523

Environmental control system uses a special coil to permit the tensile testing of specimens which may be subjected to temperatures anywhere between liquid nitrogen and room temperature. The test specimen zone is surrounded by the coil which permits the selective flooding of the specimen

with warm or cold gas.

B67-10621  
JET ENGINE POWERS LARGE, HIGH-TEMPERATURE  
WIND TUNNEL  
BENHAM, T. F. MULLIKEN, S. R. /N. AM. AVIATION/  
DEC. 1967  
M-FS-13544

Wind tunnel for large component testing uses a jet engine with afterburner to provide high temperatures /1200 degrees to 2000 degrees F/ and controlled high velocity gas. This economical wind tunnel can accommodate parts ten feet by ten feet or larger, and is a useful technique for qualitative information.

B67-10633  
DEVELOPMENT OF CURIE POINT SWITCHING FOR  
THIN FILM, RANDOM ACCESS, MEMORY DEVICE  
LEWICKI, G. W. TCHERNEV, D. I. DEC. 1967  
NPO-10402

Manganese bismuthide films are used in the development of a random access memory device of high packing density and nondestructive readout capability. Memory entry is by Curie point switching using a laser beam. Readout is accomplished by microoptical or micromagnetic scanning.

B67-10636  
RONCHI TEST APPLIED TO MEASUREMENT OF  
SURFACE ROUGHNESS  
GALLAY, H. M. VIZENOR, R. /SCHJELDAHL /G.T./  
CO./ DEC. 1967  
M-FS-12583

Ronchi test is applied to measure microscopic variations in surface roughness or flatness of metalized test specimens. Light is projected through a diffraction grating onto the test specimen, and the light reflected from the specimen is viewed or photographed through the grating.

B67-10640  
REVIEW OF PHYSICS, INSTRUMENTATION AND  
DOSIMETRY OF RADIOACTIVE ISOTOPIES  
SINCLAIR, W. K. DEC. 1967  
ARG-10037

General radioactive isotope information, stressing radioactivity, methods of measurement, and dosimetry of radioactive nuclides has been reviewed to serve as a reference for the medical profession. Instability of radionuclides, principal types of emission, and measurement of ionizing radiation are among the topics discussed.

B67-10644  
DEVELOPMENT OF DUAL SOLID CRYOGENS FOR  
HIGH RELIABILITY REFRIGERATION SYSTEM  
CAREN, R. P. COSTON, R. M. /LOCKHEED MISSILES  
AND SPACE CO./ DEC. 1967  
GSFC-10188

High reliability solid cryogen refrigeration system consists of a container initially filled with a solid cryogen which is coupled thermally to an infrared detector by means of a link of high thermal conductivity extending from a heat exchanger within the cryogen container.

B67-10648  
ADAPTIVE CONTROL CIRCUIT PREVENTS AMPLIFIER  
SATURATION  
NONDSIECK, A. J. /GEN. MOTORS CORP./ JAN. 1968  
ERC-10026

Adaptive control circuit prevents saturation of push-pull output amplifiers used in low-power, low-torque suspension system. The adaptive control circuit senses how near the output amplifiers are to saturation and sets the B voltage in such a way as to keep them just clear of saturation.

B67-10653  
NONRECIPROCAL GAIN CONTROL FOR RING LASER  
DUEKER, G. LEE, P. /PERKIN-ELMER CORP./ DEC.  
1967  
M-FS-14041

Nonreciprocal gain control is used in a ring laser where the two contracirculating beams may have

differing intensities because of the residual Faraday rotation and other secondary nonreciprocal effects.

B67-10671  
TELESCOPE MOUNT WITH AZIMUTH-ONLY PRIMARY  
WELLS, W. H. JAN. 1968  
NPO-10468

In large aperture telescope primary reflectors, the primary mirror is fixed with respect to the gravity vector to avoid varying gravity deflection problems. The primary reflector does not become distorted in various positions nor in changing positions.

## 03 MATERIALS (CHEMISTRY)

B63-10004  
REFERENCE BLACK BODY IS COMPACT, CONVENIENT TO  
USE  
DIMEFF, J. NEEL, C. B. APR. 1964  
ARC-3

To replace the classical hollow sphere, a compact reference black body has been constructed from stacked razor blades. Treated with a deposit of black oxide on the surfaces or notches between the upper edges of the blades, the device is useful over a wide range of incident angles.

B63-10207  
THERMALLY CONDUCTIVE METAL WOOL-SILICONE  
RUBBER MATERIAL CAN BE USED AS SHOCK AND  
VIBRATION DAMPER  
HOUGH, W. W. APR. 1964  
JPL-321

Bronze wool pads, impregnated with silicon rubber, meet the requirement for a thermally conductive, shock and vibration absorbing material. They serve as spacers in equipment mounting and are resistant to high temperatures.

B63-10234  
FILTER FOR HIGH-PRESSURE GASES HAS EASY TAKE-  
DOWN, ASSEMBLY  
MAC GLASHAN, W. F. FEB. 1964  
JPL-373

A small metal filter body, for use in tubing supplying sterilization gases, has an inlet end that can be unscrewed. Inside, the high pressure filter is supported on both sides and sealed by an O-ring. Design facilitates assembly and disassembly of parts.

B63-10235  
CRYOGENIC FILTER METHOD PRODUCES SUPER-PURE  
HELIUM AND HELIUM ISOTOPIES  
HILDEBRANDT, A. F. MAR. 1964  
JPL-374

To purify helium, it is cooled in a low pressure environment until it becomes superfluid. The liquid helium is then filtered through iron oxide particles. Heating, cooling and filtering processes continue until the purified liquid helium is heated to a gas.

B63-10263  
FRESNEL CUP REFLECTOR DIRECTS MAXIMUM ENERGY  
FROM LIGHT SOURCE  
LAUE, E. G. YOUNGBERG, C. L. MAY 1964  
JPL-424

To minimize shielding and overheating, a composite Fresnel cup reflector design directs the maximum energy from a light source. It consists of a uniformly ellipsoidal end surface and an extension comprising a series of confocal ellipsoidal and concentric spherical surfaces.

B63-10311  
OIL-SMEARED MODELS AID WIND TUNNEL  
MEASUREMENTS  
KATZOFF, S. LOVING, D. K. 1 APR. 1964 /SEE  
NASA-MEMO-3-17-59L/  
LANGLEY-4

For visualizing flow characteristics in wind tunnel tests, model surfaces are smeared with any common petroleum-base oils. These fluoresce under

ultraviolet light and the flow patterns are readily visualized.

B63-10318

QUICK-HARDENING PROBLEMS ARE ELIMINATED WITH SPRAY GUN MODIFICATION WHICH MIXES RESIN AND ACCELERATOR LIQUIDS DURING APPLICATION  
JOHNSON, O. W. MAR. 1964 /SEE U.S. PATENT NO. 2,930,532/  
LANGLEY-6A

A modified spray gun, with separate containers for resin and additive components, solves the problems of quick hardening and nozzle clogging. At application, separate atomizers spray the liquids in front of the nozzle face where they blend.

B63-10337

GALLIUM USEFUL BEARING LUBRICANT IN HIGH-VACUUM ENVIRONMENT  
BUCKLEY, D. H. MAY 1964 /SEE U.S. PATENT NO. 3,072,574/  
LEWIS-12

Solid gallium is used as a lubricant on bearings made of compatible materials. Such lubricants perform well in a high vacuum and under low temperature.

B63-10345

APPARATUS FACILITATES HIGH-TEMPERATURE TENSILE TESTING IN VACUUM  
SIKORA, P. F. JUN. 1964  
LEWIS-42

An apparatus for heating refractory materials to high temperatures during tensile testing includes a water-cooled stainless steel vacuum chamber. This contains a resistance heater consisting of a slit tube of tantalum or tungsten to enclose the tensile test rod.

B63-10351

NEW COBALT ALLOYS HAVE HIGH-TEMPERATURE STRENGTH AND LONG LIFE IN VACUUM ENVIRONMENTS  
ASHBROOK, R. L. FRECHE, J. C. KLIMA, S. J. MAR. 1964  
LEWIS-47

Cobalt refractory metal alloys combine sheet formability with high temperature strength and low material loss in vacuum.

B63-10365

LOW-COST INSULATION SYSTEM FOR CRYOSTATS ELIMINATES NEED FOR A VACUUM  
CALVERT, H. F. MAY 1964  
LEWIS-64

In order to eliminate the hazard caused by residual air trapped between the concentric shells of a cryostat, these annular spaces are pressurized with helium gas. This system is more economical than the use of powdered insulation maintained at low vacuums.

B63-10378

LIQUID-LEVEL METER HAS NO MOVING PARTS  
ESCUE, W. T. /BENDIX CORP./ JUN. 1964  
M-FS-3

An electro-optical system, without moving parts, reliably indicates liquid levels at cryogenic temperatures. Glass prisms, which act as liquid level probes inside the tank, extend from optically aligned photoelectric assemblies mounted on the outside.

B63-10389

LIGHTWEIGHT MAGNESIUM-LITHIUM ALLOYS SHOW PROMISE  
ADAMS, W. T. CATALDO, C. E. JUN. 1964  
M-FS-17

Evaluation tests show that magnesium-lithium alloys are lighter and more ductile than other magnesium alloys. They are being used for packaging, housings, containers, etc., where light weight is more important than strength.

B63-10424

VARIABLE LIGHT SOURCE WITH A MILLION-TO-ONE INTENSITY RATIO  
SNOW, W. B. /SPACE TECHNOL. LAB./ MAY 1964  
JPL-WOO-008

A wide range, variable intensity light source of

constant color characteristics has been developed for testing and calibrating photomultiplier tubes. A light attenuator first diffuses light from a constant source, then permits variable attenuation through a series of chambers and adjustable apertures.

B63-10429

WELDED PRESSURE TRANSDUCER MADE AS SMALL AS 1/8TH-INCH IN DIAMETER  
COON, G. W. MAR. 1964 /SEE U.S. PATENT NO. 3,027,769/  
ARC-11

A special spot welding technique is used to make miniature capacitance transducers for placing in a wind tunnel model. Rugged and relatively low in cost, they have a flat response up to one-third of the resonant frequency.

B63-10453

MOLYBDENUM DISULFIDE MIXTURES MAKE EFFECTIVE HIGH-VACUUM LUBRICANTS  
INNOVATOR NOT GIVEN /MIDWEST RES. INST./ NOV. 1964  
M-FS-54

Five different mixtures of molybdenum disulfide are found to be effective bearing lubricants when tested at very low pressures and high temperatures.

B63-10476

CESIUM IODIDE CRYSTALS FUSED TO VACUUM TUBE FACEPLATES  
FLECK, H. G. /ELECTRO-MECHANICAL RES. INC./ MAY 1964  
GSFC-67

A cesium iodide crystal is fused to the lithium fluoride faceplate of a photon scintillator image tube. The conventional silver chloride solder is then used to attach the faceplate to the metal support.

B63-10479

IMPROVED MOLYBDENUM DISULFIDE-SILVER MOTOR BRUSHES HAVE EXTENDED LIFE  
HORTON, J. C. KING, H. M. MAY 1964  
M-FS-64

Motor brushes of proper quantities of molybdenum disulfide and copper or silver are manufactured by sintering techniques. Graphite molds are used. These brushes operate satisfactorily for long periods in normal atmosphere or in a high-vacuum environment.

B63-10481

REFRACTORY CERAMIC HAS WIDE USAGE, LOW FABRICATION COST  
INNOVATOR NOT GIVEN /GEORGIA INST. OF TECH./ APR. 1964  
M-FS-67

Particulate, fused amorphous silica is formed into complex shapes by casting in plaster molds. High temperature firing is not required. This ceramic is resistant to thermal shock and exhibits good strength properties.

B63-10528

VARIABLE-TRANSPARENCY WALL REGULATES TEMPERATURES OF STRUCTURES  
OSULLIVAN, W. J., JR. JUN. 1964  
LANGLEY-25

An effective temperature regulating wall consists of one layer /e.g., one of the paraffins/ relatively opaque to thermal radiation in the solid state and transparent to it in the molten state and placed between two transparent layers. A mirror coating is applied to back layer.

B63-10546

TEST DEVICE PREVENTS MOLECULAR BOUNCE-BACK  
HARDGROVE, W. F. SHAPIRO, H. JUL. 1964  
GSFC-82

A test device, which consists of six pyramidal reflectors joined together, acts as a baffle to impede the free path of the molecule to the test item by interposing a slanted surface which imparts an angular vector to the molecule and bounces it back to the chamber wall.



B63-10557

RAPID HELIUM-AIR ANALYZER CAN MEASURE OTHER  
BINARY GAS MIXTURES  
MELFI, L. T. WOOD, G. M. YEAGER, P. R. FEB.  
1964

LANGLEY-16

An instrument comprised of an ionization pressure  
gauge and a diaphragm pressure gauge consisting of  
strain gauges to make a four-arm bridge, and a  
ratio meter is constructed for analyzing gas  
mixtures. The ratio of the outputs of the two  
gauges is proportional to the mixture composition.

B63-10562

GATE VALVE WITH CERAMIC-COATED BASE OPERATES  
AT HIGH TEMPERATURES  
BRASS, A. JUL. 1964

ARC-23

A copper base insert coated with a layer of  
aluminum oxide ceramic prevents frictional binding  
between the gate and base surfaces of a gate valve  
which are subject to rapid sliding action and high  
temperatures.

B63-10612

METALS PLATED ON FLUOROCARBON POLYMERS  
FORD, H. KRASINSKY, J. B. VANGO, S. P. OCT.  
1964

JPL-544

Electroplating lead on fluorocarbon polymer parts  
is accomplished by etching the parts to be plated  
with sodium, followed by successive depositions of  
silver and lead from ultrasonically agitated  
plating solutions. Metals other than lead may be  
electroplated on the silvered parts.

B64-10068

MECHANICAL PROPERTIES OF PLASTICS PREDETERMINED  
BY EMPIRICAL METHOD

LOHR, J. J. PARKER, J. A. JUL. 1964

ARC-28

To predetermine the mechanical properties of rigid  
plastics as a function of plasticizer content and  
composition, a set of equations has been  
empirically derived. These relate strain rate,  
yield stress, temperature, and weight fraction of  
the plasticizer.

B64-10099

REFRACTORY THERMAL INSULATION FOR SMOOTH  
METAL SURFACES  
INNOVATOR NOT GIVEN /GOODYEAR AEROSPACE CORP./  
OCT. 1964

M-FS-160

To protect rocket metal surfaces from engine-  
exhaust heat, a refractory thermal insulation  
mixture, which adheres to smooth metals, has been  
developed. Insulation protection over a wide  
temperature range can be controlled by thickness  
of the applied mixture.

B64-10113

ELASTOMERS BONDED TO METAL SURFACES SEAL  
ELECTROCHEMICAL CELLS

SHERFEY, J. M. AUG. 1964

GSFC-168

A leakproof seal secondary cell containing  
alkaline electrolytes was developed by bonding an  
alkali-resistant elastomer, such as neoprene, to  
metal contact surfaces. Test results of several  
different elastomers strongly indicate the  
feasibility of this sealing method.

B64-10116

LEAD OXIDE CERAMIC MAKES EXCELLENT HIGH-  
TEMPERATURE LUBRICANT

JOHNSON, R. L. SLINNEY, H. E. AUG. 1964

LEWIS-144

A dry lubricant coating in ceramic form consisting  
of 95 percent lead monoxide and 5 percent silicon  
dioxide withstood a temperature of 1200 deg F,  
with a bearing operating at various atmospheric  
pressures. From this testing, there was no  
galling or metal transfer of the bearing.

B64-10138

NOVEL SHOCK ABSORBER FEATURES VARYING YIELD  
STRENGTHS

GEIER, D. J. JUL. 1964

MSC-63A

A shock absorbent webbing of partially drawn  
synthetic strands is arranged in sections of  
varying density related to the varying mass of the  
human body. This is contoured to protect the body  
at points of contact, when subjected to large  
acceleration or deceleration forces.

B64-10142

STRINGENT CLEANING TECHNIQUE ASSURES RELIABLE  
EPOXY BOND

INNOVATOR NOT GIVEN /RCA/ JUN. 1964

GSFC-161

For reliable aluminum bonding to withstand stress,  
the mating surfaces are carefully cleaned, etched,  
rinsed and dried. An epoxy and hardener designed  
for metal-to-metal bonding is then used for a  
rigid assembly.

B64-10151

PLASTIC FILMS FOR REFLECTIVE SURFACES  
REPRODUCED FROM MASTERS

INNOVATOR NOT GIVEN /MINNEAPOLIS HONEYWELL/ OCT. 1964

GSFC-188

Accurate reproduction in plastic of the surface of  
the optical master to which a reflective finish  
may be applied is done by using backing from any  
suitable material to which cured plastic will  
adhere tightly. Plastics used for reflectors  
should be of the thermosetting or catalytically  
hardened type.

B64-10166

FILLER DEVICE FOR HANDLING HOT CORROSIVE  
MATERIALS

INNOVATOR NOT GIVEN /PRATT AND WHITNEY AIRCRAFT/ OCT. 1964

MSC-85

A bellows-type bag with its own heating element is  
developed for safe handling and injection of hot  
corrosive liquids into modules.

B64-10206

SOLDER FLUX LEAVES CORROSION-RESISTANT  
COATING ON METAL

BAUMAN, A. J. OCT. 1964

JPL-611

A soldering flux consisting of perfluoro-octanoic  
acid hydrazine provides a corrosion resistant film  
on metal surface, particularly copper. It is  
ineffective for soldering aluminum.

B64-10270

PRESSURE MOLDING OF POWDERED MATERIALS  
IMPROVED BY RUBBER MOLD INSERT

INNOVATOR NOT GIVEN /ELECTRO-OPTICAL SYSTEMS CORP./ NOV. 1964

WOO-100

Pressure molding tungsten microspheres is  
accomplished by applying hydraulic pressure to a  
silicone rubber mold insert with several barrel  
shaped chambers which is placed in a steel die  
cavity. This technique eliminates castings  
containing shear fractures.

B64-10282

FINE-MESH SCREEN MADE BY SIMPLIFIED METHOD

INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ DEC. 1964

WOO-104

Strong fine-mesh screens are fabricated by a  
method involving uniform distribution of fine  
ferromagnetic particles on a nonmagnetic plate.  
Such screens are commonly used for grids in  
electron tubes and ion devices.

B64-10319

GAS DIFFUSION CELL REMOVES CARBON DIOXIDE FROM  
OCCUPIED AIRTIGHT ENCLOSURES

INNOVATOR NOT GIVEN /IOWA U./ DEC. 1964

MSC-118

A small, lightweight permeable cell package  
separates and removes carbon dioxide from  
respiratory regenerative while chemically inert in  
the presence of carbon dioxide so that only  
adsorption takes place.

B65-10004

SCREENING TECHNIQUE MAKES RELIABLE BOND AT ROOM TEMPERATURE

INNOVATOR NOT GIVEN /IBM/ JAN. 1965

M-FS-227

Stainless-steel screen used to lay room temperature curing epoxy adhesive permits reliable bonding of electronic circuits boards. This technique would be useful with thin-walled structures that warp during conventional bonding operations.

B65-10015

IMPROVED CONDUCTIVE PASTE SECURES BIOMEDICAL ELECTRODES

INNOVATOR NOT GIVEN /BAYLOR UNIV./ JAN. 1965 SEE

ALSO B64-10025

MSC-107

Nontoxic paste consisting of a dispersion of graphite or silver granules in a mixture of polyvinylpyrrolidone and diluted glycerol secures biomedical electrodes to human skin. Silver paste has a high electrical conductivity and forms a bond between metal and moist or dry skin.

B65-10016

ADHESIVE FOR VACUUM ENVIRONMENTS RESISTS SHOCK AND VIBRATION

INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ FEB. 1965

MSC-56

A mixture of a polyamide, an epoxy resin, and fine silica or glass microballoons provides an adhesive which is flexible, resistant to shock and vibration, and has improved heat-transfer characteristics.

B65-10024

FLUID PRESSURE USED TO TEST TURBOPUMP BEARINGS

INNOVATOR NOT GIVEN /AEROJET-GEN. CORP./ FEB. 1965

NU-0001

Testing of turbopump bearings operating in an intense radiation field is accomplished by the use of a fluid bearing tester providing radial and axial loading.

B65-10032

WIRE WINDING INCREASES LIFETIME OF OXIDE-COATED CATHODES

KERSLAKE, W. VARGO, D. FEB. 1965 SEE ALSO AIAA PAPER-64-683

LEWIS-154

Refractory-metal heater base wound with a thin refractory metal wire increases the longevity of oxide-coated cathodes. The wire-wound unit is impregnated with the required thickness of metal oxide. This cathode is useful in magneto-hydrodynamic systems and in electron tubes.

B65-10034

GAGE MEASURES ELECTRICAL CONNECTOR PIN RETENTION FORCE

INNOVATOR NOT GIVEN /RCA/ FEB. 1965

JPL-SC-071

The retention force of a female connector pin is measured by observing the action of a calibrated spring in a gauge consisting of housing, a plunger terminating in a male subminiature connector pin and the tension spring.

B65-10043

MOUTHPIECE ADAPTER FOR PIPETTES PROTECTS MOUTH FROM HARMFUL LIQUIDS

MC SMITH, D. G. FEB. 1965

LANGLEY-47

To prevent the laboratory technicians mouth from contacting harmful liquids, a device with a hermetically sealed elastic bellows is attached to a standard pipette.

B65-10044

FLEXIBLE CURTAIN SHIELDS EQUIPMENT FROM INTENSE HEAT FLUXES

INNOVATOR NOT GIVEN /ARROWHEAD PROD./ MAR. 1965

M-FS-48

Flexible, high strength curtain made of fiberglass-silicone elastomer laminate provides thermal shielding for equipment.

B65-10065

SPHERICAL MODEL PROVIDES VISUAL AID FOR CUBIC CRYSTAL STUDY

BACIGALUPI, R. J. SPAKOWSKI, A. E. MAR. 1965

LEWIS-108

Transparent sphere of polymethylmethacrylate with major zones and poles of cubic crystals is used to make crystallographic visualizations and to interpret Laue X-ray diffraction of single cubic crystals.

B65-10083

DIDYMIUM COMPOUND IMPROVES NICKEL-CADMIUM CELL

INNOVATOR NOT GIVEN /GE/ MAR. 1965

GSFC-295

Nickel electrodes impregnated with an additive solution of didymium hydrate and nitric acid mixed with nickel nitrate increases ampere-hour capacity of cells and does not affect the voltage characteristics.

B65-10088

FIBERGLASS PARTS CURED DURING FILAMENT WINDING ELIMINATES OVEN, SAVES TIME

CARMODY, R. J. APR. 1965

M-FS-14

Resistance wire layer is introduced during winding of the fiberglass filaments with simultaneous heating. Emission of heat from the wire layer cures second fiberglass layer.

B65-10092

LIGHTWEIGHT ALUMINUM CASTING ALLOY IS USEFUL AT CRYOGENIC TEMPERATURES

APR. 1965

M-FS-267

M-45, a lightweight, high purity aluminum casting alloy has superior tensile properties for use at cryogenic temperatures.

B65-10095

CARBON-ARC ROD HOLDER HAS LONG LIFE, REDUCES ARC SPLATTER

INNOVATOR NOT GIVEN /RCA/ APR. 1965 1965

MSC-144

Carbon-arc rod holder with front end of beryllium oxide, a high electrical resistor and good thermal conductor, prevents nonuniform burning of the positive carbon rod and corrosion of the rod holder. Useful in optical instrument light sources.

B65-10106

MINIATURE BEARINGS LUBRICATED BY SONIC DISPERSION METHOD

INNOVATOR NOT GIVEN /LITTON IND./ APR. 1965

M-FS-202

Evenly distributing a monomolecular film over the balls and tracks of miniature precision ball bearings by sonic dispersion results in precise lubrication which prevents lubricant bleed out to adjacent components. Varying the lubricant-to-solvent ratio of the mixture causes varying lubricant coating thicknesses.

B65-10107

CRACK DETECTION METHOD IS SAFE IN PRESENCE OF LIQUID OXYGEN

INNOVATOR NOT GIVEN /BOEING CO./ APR. 1965

M-FS-236

Visual flaw detection method for metals utilizes color precipitate. This method can be used safely in the presence of liquid oxygen.

B65-10117

DOUBLE GLOVES REDUCE CONTAMINATION OF DRY BOX ATMOSPHERE

HERBELL, T. P. QUANTINETZ, M. REINHARDT, G. APR. 1965

LEWIS-211

Pair of encased low permeability hand gloves between which an inert gas circulates reduces dry box contamination. This innovation is applicable to dry boxes using radioactive and alkali metal compounds, submicron powders, and liquid metals.

B65-10136

VAPOR PRESSURE MEASURED WITH INFLATABLE

PLASTIC BAG  
INNOVATOR NOT GIVEN /GEOPHYS. CORP. OF AM./ MAY 1965  
GSFC-281

Deflated plastic bag in a vacuum chamber measures initial low vapor pressures of materials. The bag captures the test sample vapors and visual observation of the vapor-inflated bag under increasing external pressures yields pertinent data.

B65-10140  
GALVANIC CORROSION REDUCED IN ALUMINUM FABRICATIONS  
INNOVATOR NOT GIVEN MAY 1965  
M-FS-272

Titanium alloy fasteners dipped in zinc chromate primer are installed while wet in protective coated aluminum panels to reduce galvanic corrosion. Moisture tight seals at fastener points are also provided.

B65-10156  
INORGANIC PAINT IS DURABLE, FIREPROOF, EASY TO APPLY  
SCHUTT, J. B. JUN. 1965  
GSFC-366

Inorganic paint with a water-potassium silicate base is impervious to water. It is also fireproof and adheres to various surfaces exposed to wide temperature fluctuations.

B65-10162  
ELECTROLESS NICKEL RESIST USED IN ALKALI-ETCHING OF ALUMINUM  
INNOVATOR NOT GIVEN /SCHJELDAHL /G.T./ CO./ JUN. 1965  
GSFC-284

Electroless nickel resist is unaffected by caustic soda applied as a milling or etching agent on aluminum.

B65-10164  
IRRADIATION IMPROVES PROPERTIES OF AN AROMATIC POLYESTER  
BELL, V. L., JR. JUN. 1965  
LANGLEY-115

Aromatic polyester, PEN-2,6, is improved through cross-linking effected by radiation. Polymer retains properties of high tensile strength and toughness and stability at high temperatures.

B65-10167  
REFRACTORY OXIDES EVALUATED FOR HIGH-TEMPERATURE USE  
JUN. 1965  
LANGLEY-121

Partially calcia-stabilized zirconia used for insulation and heat-storage in high temperature /3000 deg to 4000 deg F/ cyclically operated pebble bed air heater.

B65-10172  
ALUMINUM ALLOYS PROTECTED AGAINST STRESS-CORROSION CRACKING  
INNOVATOR NOT GIVEN /ALCOA RES. LABS./ JUN. 1965  
M-FS-235

Topcoat of epoxy-polyamide paint is effective protection for aluminum alloys against stress corrosion cracking. The paint can be used on unprimed surfaces.

B65-10173  
PEEL RESISTANCE OF ADHESIVE BONDS ACCURATELY MEASURED  
INNOVATOR NOT GIVEN /RCA/ JUN. 1965  
GSFC-320

Strength of adhesive bond between layers of laminated material is tested by peel force to the facing with a tensile testing machine. Testing jig has stainless steel rollers which constrain material to move horizontally while maintaining free end of facing at constant 90 deg angle.

B65-10175  
TANTALUM CATHODE IMPROVES ELECTRON-BEAM EVAPORATION OF TANTALUM  
INNOVATOR NOT GIVEN /ELECTRO-OPTICAL SYSTEMS/ JUN. 1965

JPL-W00-021

Tantalum cathode is used in assembly for electron beam evaporation of tantalum onto a substrate. The cathode and anode are made of pure tantalum rather than tungsten to prevent contamination of the tantalum film deposited on the substrate.

B65-10179  
REUSABLE NEOPRENE JACKET PROTECTS PARTS FOR CHEMICAL MILLING  
INNOVATOR NOT GIVEN /RYAN AERONAUTICAL CO./ JUN. 1965  
W00-071

Reusable neoprene jacket is used to prepare metal part or panel for chemical milling. Jacket covers back and upper rim of part and is sealed before the masking solution is applied to surface to be milled. This reduces amount of masking material required for milling identical parts and increases production.

B65-10189  
TESTING DEVICE SUBJECTS ELASTIC MATERIALS TO BIAXIAL DEFORMATIONS  
BECKER, G. W. JUN. 1965  
JPL-616

Testing device stretches elastic materials biaxially over large deformation ranges and varies strain ratios in two perpendicular directions. The device is used in conjunction with a tensile testing machine, which holds the specimen and permits control over the direction and magnitude of the stresses applied.

B65-10190  
IR-TRANSMISSION GLASSES FORMED FROM OXIDES OF BISMUTH AND TELLURIUM  
ULRICH, D. R. JUN. 1965  
M-FS-279

Bismuth trioxide-tellurium dioxide glasses have improved infrared transmission characteristics.

B65-10214  
EMERGENCY SOLAR STILL DESALTS SEAWATER  
INNOVATOR NOT GIVEN /MELPAR/ JUL. 1965  
MSC-135

Solar energy apparatus distills seawater into fresh water. The inflatable buoyant still produces two pints of drinking water a day.

B65-10217  
THIN TRANSPARENT FILMS FORMED FROM POWDERED GLASS  
INNOVATOR NOT GIVEN /HOFFMAN ELECTRON./ JUL. 1965  
GSFC-352

Glass film less than five mils thick is formed from powdered glass dispersed in an organic liquid, deposited on a substrate, and fused into place. The thin films can be cut and shaped for contact lenses, optical filters and insulating layers.

B65-10220  
THORIATED NICKEL BONDED BY SOLID-STATE DIFFUSION METHOD  
BALES, T. T. MANNING, R. C., JR. AUG. 1965  
LANGLEY-116

Solid-state diffusion bonding in an inert-gas atmosphere forms high-strength joints between butting or overlapping surfaces of thoriated nickel. This method eliminates inert-phase agglomeration.

B65-10250  
COATING METHOD ENABLES LOW-TEMPERATURE BRAZING OF STAINLESS STEEL  
SEAMAN, F. D. /WESTINGHOUSE ELEC. CO./ AUG. 1965  
NU-0030

Gold coated stainless steel tubes containing insulated electrical conductors are brazed at a low temperature to a copper coated stainless steel sealing block with a gold-copper eutectic. This produces an effective seal without using flux or damaging the electrical conductors.

B65-10261  
BORON CARBIDE WHISKERS PRODUCED BY VAPOR DEPOSITION  
INNOVATOR NOT GIVEN /GE/ SEP. 1965

HQ-24

Boron carbide whiskers have an excellent combination of properties for use as a reinforcement material. They are produced by vaporizing boron carbide powder and condensing the vapors on a substrate. Certain catalysts promote the growth rate and size of the whiskers.

B65-10270

CERAMIC MATERIALS PURIFIED BY EXPERIMENTAL

METHOD

INNOVATOR NOT GIVEN /IIT RES. INST./ SEP. 1965

LEWIS-225

Crystalline ceramic materials are purified for use as high-temperature electrical insulators. Any impurities migrate to the cathode when a dc voltage is applied across the material while it is heated in an inert gas atmosphere.

B65-10288

ORGANIC REACTANTS RAPIDLY PRODUCE PLASTIC FOAM

LOOK, G. F. SEP. 1965 SEE ALSO B65-10090

LANGLEY-37

Adding trichlorofluoromethane to polyether resin accelerates the reaction between the resin and toluene diisocyanate. This accelerated reaction instantaneously produces a plastic foam of low density and uniform porosity needed to provide buoyancy for flotation recovery of instrument packages dropped into the sea from spacecraft.

B65-10294

ADHERENT PROTECTIVE COATINGS PLATED ON

MAGNESIUM-LITHIUM ALLOY

INNOVATOR NOT GIVEN /IBM/ OCT. 1965 SEE ALSO

B63-10389

M-FS-365

Zinc is plated on a magnesium-lithium alloy by using a modification of the standard zinc-plate immersion bath. Further protection is given the alloy by applying a light plating of copper on the zinc plating. Other metals are plated on the copper by using conventional plating baths.

B65-10302

BURNISHING TECHNIQUE IMPROVES LUBRICATION OF  
THREADED FASTENERS

GRUPER, J. L. /LOCKHEED MISSILES AND SPACE CO./

OCT. 1965

LEWIS-217

Burnishing a molydisulfide coating into the thread surfaces of fasteners eliminates the need for binders and vehicles which ensure coverage and retention of the lubricant during fastening. The coating may be applied by any convenient method.

B65-10303

NICKEL SOLUTION PREPARED FOR PRECISION

ELECTROFORMING

INNOVATOR NOT GIVEN /ELECTRO-OPTICAL SYSTEMS/

OCT. 1965

WOO-070

Lightweight, precision optical reflectors are made by electroforming nickel onto masters. Steps for the plating bath preparation, process control testing, and bath composition adjustments are prescribed to avoid internal stresses and maintain dimensional accuracy of the electrodeposited metal.

B65-10316

REMOVABLE WELL IN REACTION FLASK FACILITATES

CARBON DIOXIDE COLLECTION

OCT. 1965

ARC-47

Removable plastic well with a flange that seats on the rim of an Erlenmeyer screwcap flask aids quantitative collection of carbon dioxide liberated in the flask. The well can be removed without danger of cross-contamination. It can collect other gases using appropriate absorbents.

B65-10321

PLATED NICKEL WIRE MESH MAKES SUPERIOR

CATALYST BED

SILL, M. /BELL AEROSYSTEMS CO./ OCT. 1965

MSC-216

Porous nickel mesh screen catalyst bed produces gas evolution in hydrogen peroxide thrust chambers

used for attitude control of space vehicles. The nickel wire mesh disks in the catalyst bed are plated in rugose form with a silver-gold coating.

B65-10335

MAGNETIC FLUID READILY CONTROLLED IN ZERO  
GRAVITY ENVIRONMENT

PAPELL, S. S. NOV. 1965

LEWIS-126

Colloid composed of finely ground iron oxide in a fluid such as heptane, is controlled and directed magnetically in a zero gravity environment. It will not separate on standing for long periods or after exposure to magnetic or centrifugal forces. Because of its low density and low viscosity, it is easily pumped.

B65-10336

ANODIZATION PROCESS PRODUCES OPAQUE,

REFLECTIVE COATINGS ON ALUMINUM

INNOVATOR NOT GIVEN /LOCKHEED MISSILES AND SPACE  
CO./ NOV. 1965

M-FS-348

Opaque, reflective coatings are produced on aluminum articles by an anodizing process wherein the anodizing bath contains an aqueous dispersion of finely divided insoluble inorganic compounds. These particles appear as uniformly distributed occlusions in the anodic deposit on the aluminum.

B65-10337

SPECIAL COATINGS CONTROL TEMPERATURE OF  
STRUCTURES

FULK, M. M. MAYER, R. W. /BALL BROTHERS RES.

CORP./ NOV. 1965

GSFC-444

Special coatings in the form of paints that exhibit controlled ratios of sunlight absorptivity to grey-body emissivity control the temperature of structures in space flight. These finishes exhibit good resistance to ultraviolet radiation and do not discolor.

B65-10341

LIGHTWEIGHT HINGED BELLOWS RESTRAINT HAS

HIGH LOAD CAPACITY

IMUS, E. E. /N. AM. AVIATION/ NOV. 1965

WOO-151

High angular stresses in fluid-handling ducts are accommodated by a lightweight hinged bellows restraint. This device transmits angular stress to points close to the axis center and spreads it over a rigid configuration.

B65-10344

SOLUBLE UNDERCOATING FACILITATES REMOVAL OF

FOAMED-IN-PLACE INSULATION

DUNCAN, A. C. HILL, C. L., JR. NOV. 1965

LEWIS-193

Foamed-in-place insulation can be removed and reused by coating the surface with a soluble peel coat before applying the foam mixture. Removal of the insulation is effected by slitting it and pouring a solvent in the slit to dissolve the peel coat. The insulation can then be stripped off intact.

B65-10354

PIGMENTED COATING RESISTS THERMAL SHOCK

HARADA, Y. /IIT RES. INST./ RECHTER, H. L. NOV.  
1965

JPL-SC-083

Coating pigment composed of zinc oxide and potassium silicate resists the effects of thermal shock and long exposure to direct sunlight.

B65-10357

AIR-CURED CERAMIC COATING INSULATES AGAINST

HIGH HEAT FLUXES

SEITZINGER, V. F. NOV. 1965

M-FS-150

Reflective insulating ceramic coating protects supporting structures in area adjacent to rocket engines from the intense heat fluxes in the rocket exhaust plumes.

B65-10364

POROUS GLASS MAKES EFFECTIVE SUBSTRATE FOR  
OZONE-SENSING REAGENT

# INNOVATOR NOT GIVEN /PARAMETRICS/ DEC. 1965 GSFC-388

Porous-glass substrate is used for absorption of a dye used in measuring the concentration of atmospheric ozone at high altitudes. This measurement is based on the chemiluminescence produced in the reaction between ozone and the dye, rhodamine B. The porous glass provides a large interstitial surface area which promotes this reaction.

B65-10366

## UNIQUE GEAR DESIGN PROVIDES SELF-LUBRICATION WINIARSKI, F. J. /SPACE TECHNOL. LAB./ DEC. 1965 JPL-SC-079

Composite gear configuration provides a reliable automatic means for replenishing gear mechanism lubricants that dissipate in the harsh environment of space. The center or hub section of the gear consists of a porous, oil-impregnated material, and the outer or toothed section has radially drilled passages to cause the oil to gradually flow to the gear teeth surfaces.

B65-10372

## WIRE BUNDLE FORMED INTO GRIDS WITH MINUTE INTERSTICES

TODD, H. H. /ELECTRO-OPTICAL SYSTEMS/ DEC. 1965  
WOO-089

Deforming the ends of a bundle of closely packed parallel wires to restrict the interstices to substantially uniform and minute dimensions produces grids or filters for ion engines. Porous metal structures made by this process are also used as fuel cell electrodes, diffusion membranes, and catalysts.

B65-10374

## PLASTIC PLUS STAINLESS-STEEL FIBERS MAKE RESILIENT, IMPERMEABLE MATERIAL

SMIRRA, J. R. /THOMPSON RAMO WOOLDRIDGE/ DEC. 1965  
WOO-246

Plastic material combined with stainless-steel fibers and molded under heat and pressure into a desired configuration is both soft enough to deform under a load and resilient enough to return to its original shape when the load is removed.

B65-10384

## PROBE SAMPLES COMPONENTS OF ROCKET ENGINE EXHAUST

SCHUMACHER, P. E. /N. AM. AVIATION/ DEC. 1965  
M-FS-485

Water-cooled, cantilevered probe samples the exhaust plume of rocket engines to recover particles for examination. The probe withstands the stresses of a rocket exhaust plume environment for a sufficient period to obtain a useful sample of the exhaust components.

B65-10390

## TEST STRIPS DETECT DIFFERENT CO<sub>2</sub> CONCENTRATIONS IN CLOSED COMPARTMENTS

INNOVATOR NOT GIVEN /MELPAR/ DEC. 1965  
MSC-210

Four different test strips, using crystal violet for one pair of strips and basic fuchsin as a dye for the second pair, give unambiguous colorimetric indications of four different concentrations of carbon dioxide in the atmosphere of a closed compartment. Tetraethylene pentamine is used as a dye decoloring agent.

B65-10397

## NEW BRAZING ALLOY ELIMINATES METAL-STRESS CRACKING

HUSCHLER, E., JR. R. /N. AM. AVIATION/ ROEDER,  
E. R. DEC. 1965  
WOO-249

Silver 15 zinc brazing alloy avoids the liquid-metal stress cracking of base metals when applied to 347, 316, and 410 stainless steels and certain other alloys.

B65-10398

## NICKEL/TIN COATING PROTECTS THREADED FASTENERS IN CORROSIVE ENVIRONMENT

CHARLES, J. VFFDER, L. /N. AM. AVIATION/ DEC.

1965

MSC-253

Threaded fasteners used in corrosive environments are plated with electroless nickel and electroplated, over the nickel, with tin. This provides a corrosion-resistant coating for the fasteners.

B66-10005

## FLUORIDE COATINGS MAKE EFFECTIVE LUBRICANTS IN MOLTEN SODIUM ENVIRONMENT

JAN. 1966 SEE ALSO NASA-TN-D-2348  
LEVIS-229

Coating bearing surfaces with calcium fluoride-barium fluoride film provides effective lubrication against sliding friction in molten sodium and other severe environments at high and low temperatures.

B66-10009

## COILED SHEET METAL STRIP OPENS INTO TUBULAR CONFIGURATION

PARK, J. J. JAN. 1966 SEE ALSO B64-10011  
GSFC-425

Copper alloy is converted into a spring material that can be rolled into a compact coil which will spontaneously open to form a tube in the long direction of the strip. The copper alloy is passed through a furnace at a prescribed temperature while restraining the strip in the desired tubular configuration.

B66-10024

## ALUMINIZED FIBER GLASS INSULATION CONFORMS TO CURVED SURFACES

INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
M-FS-477

Layers of fiber glass with outer reflective films of vacuum-deposited aluminum or other reflective metal, provide thermal insulation which conforms to curved surfaces. This insulation has good potential for cryogenic systems.

B66-10027

## FLEXIBLE PROTECTIVE COATINGS MADE FROM SILICON-NITROGEN MATERIALS

INNOVATOR NOT GIVEN /SOUTHERN RES. INST./ JAN. 1966  
M-FS-528

Flexible protective coatings formed from either of two polymers endure high temperatures for long periods. One polymer is a byproduct in hexaphenylcyclotrisilazane preparation, the other is obtained by heating bis/methylamino-/diphenylsilane.

B66-10029

## EPOXY BLANKET PROTECTS MILLED PART DURING EXPLOSIVE FORMING

INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
M-FS-307

Epoxy blanket protects chemically milled or machined sections of large, complex structural parts during explosive forming. The blanket uniformly covers all exposed surfaces and fills any voids to support and protect the entire part.

B66-10033

## ELECTRON BEAM SEALS OUTER SURFACES OF POROUS BODIES

HERZ, W. H. /KULITE TUNGSTEN CO./ KURTZ, A. D.  
KURTZ, R. A. FEB. 1966  
M-FS-562

Porous tungsten plugs provide even airflow for frictionless bearings used in air bearing supported gyros. The plugs have their outer cylindrical surface sealed by an electron beam process to ensure unidirectional airflow through their exit ends.

B66-10037

## PROCESS REDUCES PORE DIAMETERS TO PRODUCE SUPERIOR FILTERS

TODD, H. H. /ELECTRO-OPTICAL SYSTEMS/ FEB. 1966  
WOO-093

Porous metal structure with very small pore diameters is produced by heating the structure in oxygen for an oxidized surface layer, cooling it, and heating it in hydrogen to deoxidize the

oxidized portion. Such structures are superior catalyst beds and filters.

**B66-10043**  
POLYMER FILM EXHIBITS THERMAL AND RADIATION STABILITY

BELL, V. L., JR. FEB. 1966  
M-FS-100

Aromatic/heterocyclic polymers /Pyrrones/ have the ability to absorb large quantities of photolytic, thermal and radiolytic energies while retaining their useful properties. They are prepared from the room temperature reaction of tetraamines and tetraacids.

**B66-10044**  
PROTECTIVE COATING WITHSTANDS HIGH TEMPERATURE IN OXIDIZING ATMOSPHERE

MELLOR, C. H. /FENWAL, INC./ FEB. 1966  
M-FS-529

Protective coating containing a plasma arc sprayed mixture of hafnium oxide and zirconium diboride will withstand high temperatures in an oxygen rich atmosphere. Used on a homogeneous tungsten thermocouple, it does not flake or crack on subsequent cooling and reheating, and does not degrade the thermocouple response time.

**B66-10053**  
SPRAY-ON TECHNIQUE SIMPLIFIES FABRICATION OF COMPLEX THERMAL INSULATION BLANKET

BOND, W. E. G. RAYMOND, R. /N. AM. AVIATION/ FEB. 1966  
M-FS-497

Spray-on process constructs molds used in forming sections of thermal insulation blankets. The process simplifies the fabrication of blankets by eliminating much of the equipment formerly required and decreasing the time involved.

**B66-10070**  
REFLECTIVE INSULATOR LAYERS SEPARATED BY BONDED SILICA BEADS

ZUVER, N. T., JR. /GRUMMAN AIRCRAFT CORP./ FEB. 1966  
MSC-215

Nonconductive silica beads are bonded to metallic reflecting insulation sheets prior to fabrication of multilayer reflectors. This eliminates the need for separate nonconductive sheets and simplifies the fabrication process.

**B66-10081**  
POLYTETRAFLUOROETHYLENE LUBRICATES BALL BEARINGS IN VACUUM ENVIRONMENT

INNOVATOR NOT GIVEN /BENDIX CORP./ MAR. 1966  
SEE ALSO NASA-SP-5014  
M-FS-379

Polytetrafluoroethylene /PTFE/ balls are interspersed among steel ball bearings to provide a dry lubricant in a high vacuum environment. The steel balls are lubricated by the film worn off the PTFE balls.

**B66-10083**  
CRYOSTAT MODIFIED TO AID ROTATING BEAM FATIGUE TEST

DURHAM, T. F. /N. AM. AVIATION/ MAR. 1966  
M-FS-435

Modified stainless steel dewar aids rotating beam fatigue test in a cryogenic environment. The dewar is modified to receive extended specimen supporting members through specially designed rotary seals. The test set can be fully enclosed and pressurized with an inert gas to make the system explosion proof.

**B66-10087**  
SOLID-FILM LUBRICANT IS EFFECTIVE AT HIGH TEMPERATURES IN VACUUM

SLINEY, H. E. MAR. 1966 SEE ALSO B63-10453 AND B63-10562  
LEWIS-228

Calcium fluoride with a suitable inorganic binder forms a stable solid-film lubricant when fused to the surface to be lubricated. It is effective in environments at elevated temperatures and gas pressures ranging from atmospheric to high vacuum. It is not stable in reducing atmospheres.

**B66-10090**  
RADIOACTIVE TRACER SYSTEM DETECTS OIL CONTAMINANTS IN FLUID LINES  
ROTH, B. /N. AM. AVIATION/ MAR. 1966  
M-FS-512

Radioactive tracer system continuously detects and monitors lubricating oil contamination in high pressure fluid lines.

**B66-10104**  
VAPOR CONDENSATION PROCESS PRODUCES SLURRY OF MAGNESIUM PARTICLES IN LIQUID HYDROCARBONS  
PROK, G. M. WALSH, T. J. WITZKE, W. R. MAR. 1966  
LEWIS-263

Vapor condensation apparatus produces a physically stable, homogeneous slurry of finely divided magnesium and liquid hydrocarbons. The magnesium is vaporized and the resultant vapor is cooled rapidly with a liquid hydrocarbon spray, which also serves as the dispersing medium for the condensed magnesium particles.

**B66-10110**  
ETCHING PROCESS MILLS PH 14-8 MO ALLOY STEEL TO PRECISE TOLERANCES

CHIPMAN, B. L. /N. AM. AVIATION/ MULLAND, P. W. MAY 1966  
MSC-270

Chemical milling process, which combines an aqua regia etchant with a sulfonate wetting agent, produces finishes on PH 14-8 molybdenum alloy steel to precise tolerances. This process permits precision removal of excess metal from the steel in annealed and/or aged conditions.

**B66-10111**  
STORAGE-STABLE FOAMABLE POLYURETHANE IS ACTIVATED BY HEAT

INNOVATOR NOT GIVEN /GOODYEAR AEROSPACE CORP./ MAY 1966  
LANGLEY-187

Polyurethane foamable mixture remains inert in storage unit activated to produce a rapid foaming reaction. The storage-stable foamable composition is spread as a paste on the surface of an expandable structure and, when heated, yields a rigid open-cell polyurethane foam that is self-bondable to the substrate.

**B66-10119**  
SMALL, HIGH-INTENSITY FLASHER PERMITS CONTINUOUS CLOSE-IN PHOTOGRAPHY  
PASCALE, C. /PRINCETON UNIV./ MAR. 1966  
NU-0043

Compact, high-intensity spark-flash unit is used as a light source for continuous rapid photography. The spark-breakdown flash source is enclosed in polymethylmethacrylate and incorporates a parabolic reflector.

**B66-10120**  
OXYGEN-HYDROGEN TORCH IS A SMALL-SCALE STEAM GENERATOR  
MASKELL, C. E. /AEROJET-GEN. CORP./ MAR. 1966  
NU-0042

Standard oxygen-hydrogen torch generates steam for corrosion-rate analysis of various metals. The steam is generated through local combustion inside a test chamber under constant temperature and pressure control.

**B66-10131**  
SURFACTANT FOR DYE-PENETRANT INSPECTION IS INSENSITIVE TO LIQUID OXYGEN  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1966  
M-FS-475

LOX insensitive solvent is blended into a mixture of commercially available surfactants to clean metal surfaces which are to be investigated by the dye-penetrant method. The surfactant mixture is applied before and after application of the dye.

**B66-10138**  
BISMUTH ALLOY POTTING SEALS ALUMINUM CONNECTOR IN CRYOGENIC APPLICATION  
FLOWER, J. F. /DOUGLAS AIRCRAFT CO./ STAFFORD, R. L. APR. 1966  
W00-260

Bismuth alloy potting seals feedthrough electrical connector for instrumentation within a pressurized vessel filled with cryogenic liquids. The seal combines the transformation of high-bismuth content alloys with the thermal contraction of an external aluminum tube.

B66-10139  
HOT-WIRE DETECTOR FOR CHEMICALLY ACTIVE  
MATERIALS USED IN GAS CHROMATOGRAPHY  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ APR. 1966  
MSC-269

Hot-filament detector analyzes chemically active materials used in gas chromatography. The detector reacts chemically with the effluent vapors in the gas chromatographic apparatus to change the electrical resistance of the filament as a function of the affluent composition. Due to the changes produced by chemical action on the filament, the system is often calibrated.

B66-10140  
CORROSION OF METAL SAMPLES RAPIDLY MEASURED  
MASKELL, C. E. /AEROJET-GEN. CORP./ APR. 1966  
NU-0041

Corrosion of a large number of metal samples that have been exposed to controlled environment is accurately and rapidly measured. Wire samples of the metal are embedded in clear plastic and sectioned for microexamination. Unexposed wire can be included in the matrix as a reference.

B66-10165  
GALLIUM ALLOY FILMS INVESTIGATED FOR USE  
AS BOUNDARY LUBRICANTS  
APR. 1966 SEE ALSO NASA-TN-D-2721 AND B63-10337  
LEWIS-245

Gallium alloyed with other low melting point metals has excellent lubricant properties of fluidity and low vapor pressure for high temperature or vacuum environments. The addition of other soft metals reduces the corrosivity and formation of undesirable alloys normally found with gallium.

B66-10166  
DISPENSER LEAK-TESTS AND STERILIZES RUBBER  
GLOVES  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ APR. 1966  
MSC-285

Portable vacuum-operated apparatus leak-tests and sterilizes rubber gloves. The gloves are fitted to the hands directly from the apparatus without external handling.

B66-10185  
IMPROVED ADHESIVE FOR CRYOGENIC APPLICATIONS  
CURES AT ROOM TEMPERATURE  
KLINGER, H. J. SMITH, M. B. /TELECOMPUTING  
CORP./ MAY 1966  
WOO-132

Adhesive cured at room temperature provides an effective adhesive bond over the range from room temperature down to the temperature of liquid hydrogen. The adhesive consists of one part of 200-mesh powdered nylon filler to two parts of an epoxy-polyamine resin.

B66-10194  
SILAZANE POLYMERS SHOW PROMISE FOR HIGH-  
TEMPERATURE APPLICATION  
JUN. 1966 SEE ALSO NASA-SP-5030  
M-FS-466

Several silazane intermediate compounds and polymers have been prepared which are potentially useful as high temperature coatings and elastomers. These silazane polymers exhibit stability in a temperature range of 300 to 400 degrees C.

B66-10196  
FIBERS OF NEWLY DEVELOPED REFRACTORY CERAMICS  
PRODUCED BY IMPROVED PROCESS  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ MAY  
1966  
WOO-169

Rods of refractory ceramic material and glasses having relatively high fusion temperatures and tensile strengths are converted to fiber by

subjecting these rods to alternate fusion and gas-jet bursts. The refractory, high-tensile-strength fibers produced are combined with suitable binder to produce heat-resistant fabrics and rigid structures.

B66-10207  
WHITE PRIMER PERMITS A CORROSION-RESISTANT  
COATING OF MINIMUM WEIGHT  
ALBRECHT, R. H. JENSEN, D. P. SCHNAKE, P.  
/SHERWIN WILLIAMS CO./ MAY 1966  
M-FS-304

White primer for coating 2219 aluminum alloy supplies a base for a top coating of enamel. A formulation of pigments and vehicle results in a primer with high corrosion resistance and minimum film thickness.

B66-10221  
SUBMICRON METAL POWDERS PRODUCED BY BALL  
MILLING WITH GRINDING AIDS  
QUATINETZ, M. SCHAFER, R. J. MAY 1966 SEE ALSO  
NASA-TN-D-879  
LEWIS-188

In ball milling metal powders to submicron size, various salts are more effective as grinding aids than conventional surfactants. Absolute ethyl alcohol is used as the grinding liquid.

B66-10222  
NICKEL-BASE SUPERALLOYS DEVELOPED FOR HIGH-  
TEMPERATURE APPLICATIONS  
FRECHÉ, J. C. MAY 1966 SEE ALSO  
NASA-MEMO-4-13-59E, NASA-TN-D-260,  
NASA-TN-D-1531, AND NASA-TN-D-2495  
LEWIS-226

Class of nickel-base superalloys containing varying percentages of alloying elements have good workability and high strength at elevated temperatures /1500 to 2200 degrees F/.

B66-10227  
CHROMIUM OXIDE COATINGS IMPROVE THERMAL  
EMISSION OF ALUMINA  
UPSHAW, V. /HUGHES AIRCRAFT CO./ MAY 1966  
WOO-263

Chromium oxide coatings improve thermal radiation characteristics of alumina-coated heater-cathode systems in vacuum tubes. Chromium oxide is applied either as a surface layer or as a doping material. The new coatings eliminate the high-temperature migration problems of carbon surface treatments.

B66-10230  
ELECTRIC ARC HEATER IS SELF STARTING  
BROWN, R. D. MAY 1966  
LANGLEY-208

Remote method initiates an electric arc over a large range of gaps between two water-cooled electrodes of an arc-heated wind tunnel without disassembling the arc unit. This type of starting system can be used on both three-phase ac arc heaters and dc arc heaters.

B66-10234  
STANDARDS FOR ELECTRON PROBE MICROANALYSIS OF  
SILICATES PREPARED BY CONVENIENT METHOD  
WALTER, L. S. JUN. 1966  
GSFC-469

Standard compositions suitable for electron probe microanalysis of various silicates are prepared by coprecipitation of specified salts with colloidal silica to form a gel which is decomposed into a powdered oxide mixture and compressed into thin pellets. These pellets of predetermined standard are compared with a silicate sample to determine its composition.

B66-10256  
DRY FILM LUBRICANT IS EFFECTIVE AT EXTREME  
LOADS  
INNOVATOR NOT GIVEN /MIDWEST RES. INST./ JUN.  
1966 SEE ALSO NASA-TN-X-53331  
M-FS-628

Dry film lubricant protects low speed sliding surfaces under extreme loading. The lubricant in an inorganic binder is applied to substrates with sufficient hardness to prevent surface deformation

in the applicable load range.

**B66-10259**  
SUBSTITUTED SILANE-DIOL POLYMERS HAVE  
IMPROVED THERMAL STABILITY  
BYRD, J. D. CURRY, J. E. JUN. 1966  
M-FS-469

Organosilicon polymers were synthesized to produce improved physical and chemical properties, including high thermal stability. Of the polymers produced, poly(4, 4 prime-bisoxymethyl-phenylene/diphenylsilane, formed from bis(anilino)diphenylsilane and p, p prime-biphenol, was found to have the most desirable properties.

**B66-10273**  
BORON-DEOXIDIZED COPPER WITHSTANDS BRAZING  
TEMPERATURES  
SCHMIDT, E. H. /N. AM. AVIATION/ JUN. 1966  
M-FS-762

Boron-deoxidized high-conductivity copper is used for fabrication of heat transfer components that are brazed in a hydrogen atmosphere. This copper has high strength and ductility at elevated temperatures and does not exhibit massive intergranular failure.

**B66-10281**  
VAPOR DIFFUSION ELECTRODE IMPROVES FUEL CELL  
OPERATION  
SMITH, J. O. /MONSANTO RES. CORP./ JUN. 1966  
LEWIS-187

Vapor diffusion type fuel cell electrode presents a nonwetting barrier to the liquid feedstocks so they may contact the electrolyte only in the vapor state. Thus, it effects feedstock mixing with the electrolyte at the electrolyte/catalyst interface but prevents feedstock decomposition and catalyst poisoning from liquid mingling.

**B66-10288**  
IMPROVED THERMAL INSULATION MATERIALS MADE OF  
FOAMED REFRACTORY OXIDES  
MOUNTVALA, A. J. NAKAMURA, H. H. RECHTER, H. L.  
/IIT RES. INST./ JUN. 1966 SEE ALSO B65-10357  
M-FS-735

Foamed refractory oxides provide lightweight, reflective thermal insulation materials. The materials have a low bulk density and high thermal shock resistance.

**B66-10296**  
APPARATUS ENABLES ACCURATE DETERMINATION OF  
ALKALI OXIDES IN ALKALI METALS  
DUPRAW, W. A. GAHN, R. F. GRAAB, J. W. MAPLE,  
W. E. ROSENBLUM, L. JUL. 1966  
LEWIS-256

Evacuated apparatus determines the alkali oxide content of an alkali metal by separating the metal from the oxide by amalgamation with mercury. The apparatus prevents oxygen and moisture from inadvertently entering the system during the sampling and analytical procedure.

**B66-10298**  
ULTRASONIC CLEANING RESTORES DEPTH-TYPE  
FILTERS  
INNOVATOR NOT GIVEN /LITTLE /ARTHUR D./ INC./  
JUL. 1966  
M-FS-540

Cleaning process uses a nonionic surfactant and ultrasonic agitation to restore depth-type fibrous filters to maximum effectiveness.

**B66-10299**  
ELECTROLYTIC ETCHING PROCESS PROVIDES  
EFFECTIVE BONDING SURFACE ON STAINLESS STEEL  
INNOVATOR NOT GIVEN /RCA/ JUL. 1966  
GSFC-484

Electrolytic etching process prepares surfaces of a stainless steel shell for reliable, high strength adhesive bonding to dielectric materials. The process uses a 25 percent aqueous solution of phosphoric acid.

**B66-10305**  
SIMPLE, NONDESTRUCTIVE TEST IDENTIFIES METALS  
DODDS, D. J. /N. AM. AVIATION/ JUL. 1966

**MSC-525**

Rapid, nondestructive test for identifying metals measures the characteristic potential difference produced by galvanic reaction between a reference electrode and the test metal. A drop of water is used as an electrolyte.

**B66-10312**  
CHEMICAL MILLING SOLUTION PRODUCES SMOOTH  
SURFACE FINISH ON ALUMINUM  
LORENZEN, H. C. /N. AM. AVIATION/ JUL. 1966  
MSC-549

Elementary sulfur mixed into a solution of caustic soda and salts produces an etchant which will chemically mill end-grain surfaces on aluminum plate. This composition results in the least amount of thickness variation and pitting.

**B66-10313**  
SEA DYE MARKER PROVIDES VISIBILITY FOR 20  
HOURS  
DE LAAT, F. /N. AM. AVIATION/ JUL. 1966  
MSC-714

Sea dye marker block releases a visible slick which lasts at least twelve hours. The dye marker uses a fluorescent dye in a heat cured binder which, when immersed in seawater, releases the dye at a controlled rate.

**B66-10322**  
VALVE SEAT PORES SEALED WITH THERMOSETTING  
MONOMER  
OLMORE, A. B. /N. AM. AVIATION/ JUL. 1966  
M-FS-900

Hard anodic coating provides a smooth wear-resistant valve seating surface on a cast aluminum alloy valve body. Vacuum impregnation with a thermosetting monomer, diallyl phthalate, seals the pores on the coating to prevent galvanic corrosion.

**B66-10327**  
INFLATABLE HOLDING FIXTURE PERMITS X-RAYS TO  
BE TAKEN OF INNER WELD AREAS  
HENDRICKSON, D. R. SPENCE, T. M. /N. AM.  
AVIATION/ JUL. 1966  
M-FS-856

Inflatable rubber gland positions and holds X-ray film in positive contact with inner weld areas of manifold torus assemblies for verifying the weld quality. The gland is constructed to conform to the inside diameter of the manifold torus.

**B66-10340**  
DEVICE REMOVES HYDROGEN GAS FROM ENCLOSED  
SPACES  
CARSON, W. N. /GE/ JUL. 1966  
GSFC-495

Hydrogen-oxidant galvanic cell removes small amounts of hydrogen gas continually released from equipment, such as vented silver-zinc batteries, in enclosed compartments where air venting is not feasible. These cells are used in satellite compartments.

**B66-10358**  
ELECTROCHEMICAL MILLING REMOVES BURRS AND  
SOLDER FROM TUBING ENDS  
HINSHAW, J. O. /N. AM. AVIATION/ AUG. 1966  
M-FS-714

Electrochemical milling removes burrs and solder from the cut ends of stainless steel capillary tubing. An electrolyte consisting primarily of a solution of sulfuric and phosphoric acids is used.

**B66-10373**  
BEARING ALLOYS WITH HEXAGONAL CRYSTAL  
STRUCTURES PROVIDE IMPROVED FRICTION AND WEAR  
CHARACTERISTICS  
BUCKLEY, D. H. JOHNSON, R. L. AUG. 1966 SEE  
ALSO NASA-TN-D-2523, NASA-TN-D- 2524,  
NASA-TN-D-2671, NASA-TN-D-3235  
LEWIS-320

Bearings of titanium, cobalt, and other hexagonal crystal alloys are used in vacuum and high temperature environments. These temperature-stabilized alloys have reduced friction and wear characteristics and therefore have potential use



in aircraft seals, hydraulic equipment, and artificial human joints.

B66-10380

SUBMICRON HOLES IN THIN FILMS INCREASE SAMPLING RANGE OF MASS SPECTROMETERS

WILLENS, R. H. /CONSOLIDATED SYSTEMS/ AUG. 1966  
JPL-SC-097

Gold film is vapor deposited onto a glass slide containing submicron latex spheres which are removed, leaving submicron holes in the film. These thin-film apertures allow accurate mass spectrometer sampling of gas mixtures at pressures on the order of 100 torr.

B66-10387

SELF-SUPPORTED ALUMINUM THIN FILMS PRODUCED BY VACUUM DEPOSITION PROCESS

NEFF, J. E. TIMME, R. W. SEP. 1966  
ARC-58

Self-supported aluminum thin film is produced by vacuum depositing the film on a polyvinyl formal resin film and then removing the resin by radiant heating in the vacuum. The aluminum film can be used as soon as the resin is eliminated.

B66-10395

COMPOSITE GASKETS ARE COMPATIBLE WITH LIQUID OXYGEN, RESIST COMPRESSION SET

GOSNELL, R. B. /WHITTAKER CORP./ SEP. 1966  
SEP. 1966  
M-FS-455

Gaskets fabricated by laminating fluorocarbon polymers with fiber glass cloth have a low compression set. Their flexibility is not subject to drastic changes at the temperature of liquid oxygen with which they are used. The fabrication process is controlled so that the fibers are not impregnated with the polymer.

B66-10398

THIN-FILM FERRITES VAPOR DEPOSITED BY ONE-STEP PROCESS IN VACUUM

HACKSKAYLO, M. /MELPAR/ SEP. 1966 SEP. 1966  
MSC-259

Thin-film ferrites are formed by vapor deposition of a mixture of powdered ferrites and powdered boron oxide at controlled temperatures in a vacuum chamber. These films are used in memory devices for computers and as thin-film inductors in communications and telemetry systems.

B66-10400

SYSTEM FOR ETCHING THICK ALUMINUM LAYERS MINIMIZES BRIDGING AND UNDERCUTTING

INNOVATOR NOT GIVEN /BENDIX CORP./ SEP. 1966  
M-FS-1366

Four step photoresist process for etching thick aluminum layers for semiconductor device contacts produces uniform contact surfaces, eliminates bridging, minimizes undercutting, and may be used on various materials of any thickness.

B66-10421

COPPER WIRE PLATED WITH NICKEL AND SILVER RESISTS CORROSION

INNOVATOR NOT GIVEN /N. AM. AVIATION/ SEP. 1966  
M-FS-761

Copper wire for electrical harnesses, when plated with both nickel and silver, resists galvanic corrosion and high temperatures while maintaining electrical properties and solderability.

B66-10445

WELDABLE ALUMINUM ALLOY HAS IMPROVED MECHANICAL PROPERTIES

WESTERLUND, R. W. /ALCOA RES. LABS./ OCT. 1966  
M-FS-295

Weldable aluminum alloy has good resistance to stress-corrosion cracking, shows unchanged strength and formability after storage at room temperature, and can be pre-aged, stretched, and aged. Since toxic fumes of cadmium oxide are evolved when the new alloy is welded, adequate ventilation must be provided.

B66-10448

THERMAL STRESS-RELIEF TREATMENTS FOR 2219 ALUMINUM ALLOY ARE EVALUATED

INNOVATOR NOT GIVEN /BOEING CO./ OCT. 1966  
M-FS-1213

Evaluation of three thermal stress relief treatments for 2219 aluminum alloy in terms of their effect on residual stress, mechanical properties, and stress corrosion resistance. The treatments are post aging and stress relieving fullscale and subscale parts formed in the aged T81 condition, and aging subscale parts formed in the unaged T31 condition.

B66-10451

REUSABLE CHELATING RESINS CONCENTRATE METAL IONS FROM HIGHLY DILUTE SOLUTIONS

BAUMAN, A. J. WEETAL, H. H. WELIKY, N. OCT. 1966

JPL-758

Column chromatographic method uses new metal chelating resins for recovering heavy-metal ions from highly dilute solutions. The absorbed heavy-metal cations may be removed from the chelating resins by acid or base washes. The resins are reusable after the washes are completed.

B66-10453

THERMOPLASTIC RUBBERLIKE MATERIAL PRODUCED AT LOW COST

HENDEL, F. J. OCT. 1966  
JPL-793

Thermoplastic rubberlike material is prepared by blending a copolymer of ethylene and vinyl acetate with asphalt and a petroleum distillate. This low cost material is easily molded or extruded and is compatible with a variety of fillers.

B66-10454

GAGE OF 6.5 PER CENT SI-FE SHEET IS CHEMICALLY REDUCED

GOLDMAN, A. PAVLOVIC, D. M. /WESTINGHOUSE ELEC. CORP./ OCT. 1966  
MSC-537

Chemical milling process aids the production of 6.5 per cent silicon-iron soft magnetic-alloy sheets to very thin gauges. Following conventional rolling to safe gauge limits, the material is chemically reduced to the desired gauge.

B66-10458

HEAT TREATMENT STABILIZES WELDED ALUMINUM JIG AND TOOL STRUCTURES

MEHNERT, R. S. /N. AM. AVIATION/ OCT. 1966  
MSC-800

Heat treatment processes, applied after welding but before machining, imparts above normal stability to welded aluminum jigs and tool structures. Weight saving will not be realized in these tools if rigidity equal to that of a comparable steel tool is required.

B66-10467

XENON FORMS STABLE COMPOUND WITH FLUORINE

CLAASSEN, H. H. MALM, J. G. SELIG, H. H. OCT. 1966

ARG-4

Experiments show that xenon and fluorine combine readily at 400 deg C to form xenon tetrafluoride, which is colorless, crystalline, chemically stable and solid at room temperature. This process can be used for the separation of xenon from mixtures with other noble gases.

B66-10475

BORATE GLASS EFFICIENTLY TRANSMITS ULTRAVIOLET LIGHT

BISHAY, A. NOV. 1966  
ARG-91

Borate glass has high ultraviolet transmissibility characteristics. Applications for the borate glass include germicidal lamps, window glass, and optical instruments.

B66-10479

ELECTROLESS NICKEL PLATING ON STAINLESS STEELS AND ALUMINUM

INNOVATOR NOT GIVEN /GE/ NOV. 1966  
GSFC-533

Procedures for applying an adherent electroless

nickel plating on 303 SE, 304, and 17-7 PH stainless steels, and 7075 aluminum alloy was developed. When heat treated, the electroless nickel plating provides a hard surface coating on a high strength, corrosion resistant substrate.

B66-10487

ADHESIVE FOR POLYESTER FILMS CURES AT ROOM TEMPERATURE, HAS HIGH INITIAL TACK  
CHRISTIAN, C. M. FUST, G. W. WELCHEL, C. J.  
/THIOLKOL CHEM. CORP./ NOV. 1966  
M-FS-938

Quick room-temperature-cure adhesive bonds polyester-insulated flat electrical cables to metal surfaces and various other substrates. The bond strength of the adhesive may be considerably increased by first applying a commercially available polyamide primer to the polyester film.

B66-10517

COLD TRAP INCREASES SENSITIVITY OF GAS CHROMATOGRAPH  
GARRARD, G. G. WESLEY, R. D. /N. AM. AVIATION/  
DEC. 1966  
M-FS-1617

Cold trap concentrates oxygen and argon to determine trace amounts /as low as 0.1 ppm/ in helium by gas chromatography.

B66-10519

BRAZE ALLOY HOLDS BONDING STRENGTH OVER WIDE TEMPERATURE RANGE  
INNOVATOR NOT GIVEN /AEROJET-GEN. CORP./ NOV. 1966  
LEWIS-337

Copper-based quaternary alloys of the solid solution type is used for vacuum furnace brazing of large stainless steel components at a maximum temperature of 1975 deg F. The alloy has high bonding strength and good ductility over a temperature range extending from the cryogenic region to approximately 800 deg F.

B66-10527

CRUCIBLE CAST FROM BERYLLIUM OXIDE AND REFRACTORY CEMENT IS IMPERVIOUS TO FLUX AND MOLTEN METAL  
JASTRZEBSKI, Z. D. NOV. 1966  
ARG-22

Crucible from a mixture of a beryllium oxide aggregate and hydraulic refractory cement, and coated with an impervious refractory oxide will not deteriorate in the presence of fused salt-molten metal mixtures such as uranium-magnesium-zinc-halide salt systems. Vessels cast by this process are used in the flux reduction of oxides of thorium and uranium.

B66-10528

LOWER-COST TUNGSTEN-RHENIUM ALLOYS  
KLOPP, W. D. RAFFO, P. L. WITZKE, W. R. DEC. 1966  
LEWIS-332

Tungsten-rhenium alloys with a substantially more dilute rhenium content have ductilities and other mechanical properties which compare favorably with the tungsten-rhenium alloys having much higher concentrations of the costly rhenium.

B66-10535

PROCESS YIELDS CO-Fe ALLOYS WITH SUPERIOR HIGH TEMPERATURE MAGNETIC PROPERTIES  
BARRANGER, J. P. NOV. 1966  
LEWIS-333

Cobalt-iron alloys containing from 7.0 to 9.3 percent iron prepared from ultrapure cobalt and iron have the highest Curie point of all known magnetically soft materials. Their high permeability, low hysteresis loss, good saturation induction, and squareloop characteristics recommend them for use in power transformers and rotating machinery.

B66-10538

TUNGSTEN INSULATED SUSCEPTOR CUP FOR HIGH TEMPERATURE INDUCTION FURNACE ELIMINATES CONTAMINATION  
GERINGER, H. J. NOV. 1966  
LEWIS-283

METILUR /Materials Experimental Tungsten

Induction Laboratory Unit Replacement/ is an improved, unitized design of a susceptor cup and shielding that uses only one type of construction material /tungsten/ which eliminates contamination. Cycling runs can be accomplished with METILUR.

B66-10540

SILVER-BASE TERNARY ALLOY PROVES SUPERIOR FOR SLIP RING LEAD WIRES  
ERNST, R. H. WILLIAMS, D. N. NOV. 1966  
M-FS-1540

Slip ring lead wires composed of ternary alloys of silver, have high electrical conductivity, a tensile strength of at least 30,000 psi, high ductility, and are solderable and weldable. An unexpected advantage of these alloys is their resistance to discoloration on heating in air.

B66-10551

NEW TUNGSTEN ALLOY HAS HIGH STRENGTH AT ELEVATED TEMPERATURES  
DEC. 1966 SEE ALSO NASA-TN-D-3248  
LEWIS-336

Tungsten-hafnium-carbon alloy has tensile strengths of 88,200 psi at 3000 deg F and 62,500 psi at 3500 deg F. Possible industrial applications for this alloy would include electrical components such as switches and spark plugs, die materials for die casting steels, and heating elements.

B66-10558

TANTALUM ALLOYS RESIST CREEP DEFORMATION AT ELEVATED TEMPERATURES  
BUCKMAN, R. W., JR. /WESTINGHOUSE ELEC. CORP./  
DEC. 1966  
LEWIS-350

Dispersion-strengthened tantalum-base alloys possess high strength and good resistance to creep deformation at elevated temperatures in high vacuum environments. They also have ease of fabrication, good weldability, and corrosion resistance to molten alkali metals.

B66-10572

TUNGSTEN FIBER-REINFORCED COPPER COMPOSITES FORM HIGH STRENGTH ELECTRICAL CONDUCTORS  
MC DANIELS, D. L. SIGNORELLI, R. A. DEC. 1966  
SEE ALSO NASA-TN-D-3590  
LEWIS-338

Tungsten fiber-reinforced copper composites have tensile strength, yield strength, and modulus of elasticity proportional to fiber content. The composites form high strength electrical conductors.

B66-10578

SPRAYABLE BIREFRINGENT COATING ENABLES STRAIN MEASUREMENTS ON LARGE SURFACES  
HUMPHREY, F. T. MC GEE, W. M. /LOCKHEED AIRCRAFT CORP./ DEC. 1966  
M-FS-1484

Birefringent coating for strain measurements on large surfaces contains constituents that can be premixed and sprayed as a single component with conventional paint spray equipment. Elevated temperatures are not required for spraying or curing of the coating material which has long pot life.

B66-10586

GAS CHROMATOGRAPHIC COLUMN ENABLES ANALYSIS OF PROPELLANT HYDRAZINES  
WELZ, E. A., JR. /N. AM. AVIATION/ DEC. 1966  
MSC-1161

Stainless steel column is used in gas chromatographic analysis of propellant-grade hydrazine. The column has also been found effective for the separation of other amines and alcohols and nitriles.

B66-10594

USE OF STEEL AND TANTALUM APPARATUS FOR MOLTEN CD-MG-ZN ALLOYS  
BENNETT, G. A. BURRIS, L., JR. KYLE, M. L. NELSON, P. A. DEC. 1966

ARG-199 ARG-200

Steel and tantalum apparatus contains various ternary alloys of cadmium, zinc, and magnesium used in pyrochemical processes for the recovery of uranium-base reactor fuels. These materials exhibit good corrosion resistance at the high temperatures necessary for fuel separation in liquid metal-molten salt solvents.

B66-10609

FILM COATING PERMITS LOW-FORCE SCRIBING  
WILLING, R. /N. AM. AVIATION/ DEC. 1966  
MSC-990

Film coating requires low scribing force, is relatively unaffected by aging, and gives off a soft, fine scribe residue containing a proven lubricant.

B66-10616

HEAT-TREATMENT OF METAL PARTS FACILITATED  
BY SAND EMBEDMENT  
BRISCOE, C. C. KELLEY, R. C. /BOEING CO./ DEC. 1966

M-FS-1543

Embedding metal parts of complex shape in sand contained in a steel box prevents strains and warping during heat treatment. The sand not only provides a simple, inexpensive support for the parts but also ensures more uniform distribution of heat to the parts.

B66-10631

SILVER-PALLADIUM BRAZE ALLOY RECOVERED FROM  
MASKING MATERIALS  
CIERNIAK, R. COLMAN, G. DECARLO, F. /N. AM. AVIATION/ DEC. 1966  
M-FS-1845

Method for recovering powdered silver-palladium braze alloy from an acrylic spray binder and rubber masking adhesive used in spray brazing is devised. The process involves agitation and dissolution of masking materials and recovery of suspended precious metal particles on a filter.

B66-10639

PROCESS FOR PREPARING DISPERSIONS OF  
ALKALI METALS  
LANDEL, R. F. REMBAUM, A. /JPL/ JPL-734

Finely divided particles of alkali metals are produced by combining alkali metals with certain aromatic compounds in selected solvents to form low-temperature soluble complexes from which the pure alkali metals precipitate quantitatively when the solutions are warmed. All operations must be carried out in an inert gas atmosphere.

B66-10643

COMBUSTION CHAMBER STRUTS CAN BE EFFECTIVELY  
TRANSPARATION COOLED  
PALMER, G. H. /N. AM. AVIATION/ DEC. 1966  
M-FS-1830

Vapor-deposited sintering technique increases the feasible temperature range of transpiration-cooled structural members in combustion chambers. This technique produces a porous mass of refractory metal wires around a combustion chamber structural member. This mass acts as a transpiration-cooled surface for a thick-walled tube.

B66-10646

PROCESS PRODUCES CHLORINATED AROMATIC  
ISOCYANATE IN HIGH YIELD  
TRISCHLER, F. /WHITTAKER CORP./ DEC. 1966  
M-FS-1658

Tetrachloreterephthaloyl chloride reacts with sodium azide in an atmosphere of nitrogen to form a high yield of tetrachloro-p-phenylene diisocyanate. The chlorinated diisocyanate should have application as an intermediate in the preparation of polyurethane foams. The high halogen content would impart added flame resistance to these foams.

B66-10651

INTERGRANULAR METAL PHASE INCREASES THERMAL  
SHOCK RESISTANCE OF CERAMIC COATING  
CARPENTER, H. W. /N. AM. AVIATION/ DEC. 1966

M-FS-1862 M-FS-1865

Dispersed copper phase increases the thermal shock resistance of a plasma-arc-sprayed coating of zirconia used as a heat barrier on a metal substrate. A small amount of copper is deposited on the granules of the zirconia powder before arc-spraying the resultant powder composite onto the substrate.

B66-10666

WIRE MATERIAL REDUCES COMPRESSOR BLADE  
VIBRATION  
JOHNSON, R. L. DEC. 1966  
LEWIS-357

Wire material /Inconel/ having high friction and low wear characteristics, reduces vibratory stress and prevents compressor blade failure.

B66-10673

\*\*COLD\*\* SOLID PROPELLANT MOTOR HAS STOP-  
RESTART CAPABILITY  
HENDEL, F. J. DEC. 1966  
JPL-836

Solid propellant rocket is kept and fired at low temperatures in launch vehicles or spacecraft. The motor is capable of developing a specific impulse comparable to that of liquid propellant motors, is started, stopped, and restarted, and is stored in space without solar radiation causing hot spots on the motor casing.

B66-10681

THIN PLASTIC SHEET ELIMINATES NEED FOR  
EXPENSIVE PLATING  
STREMEL, R. L. /N. AM. AVIATION/ DEC. 1966  
M-FS-1896

Gasket of a commercially available plastic material is interposed between the mating surfaces in axial joints where a hard and a soft metal are in intimate contact under stress conditions. This eliminates the fretting problem and is quicker and less expensive than the plating process.

B66-10684

IMPROVED METHOD OF EDGE COATING FLAT RIBBON  
WIRE  
INNOVATOR NOT GIVEN /SCHJELDAHL /G.T./ CO. / DEC. 1966  
M-FS-902

Method to coat the edges of flat ribbon wire is devised by using enamel with modified flow properties due to addition of 2 to 4 percent silicon. Conventional coating procedures several edge coatings to minimize oxidation and additional conventional coats are applied after edge coating to build up thickness.

B66-10701

TRACE LEVELS OF METALLIC CORROSION IN WATER  
DETERMINED BY EMISSION SPECTROGRAPHY  
SNELL, H. H. /N. AM. AVIATION/ DEC. 1966  
MSC-1193

Emission spectrographic method determines trace amounts of inorganic impurities in potable water. The capability of this innovation should arouse considerable interest among plant biologists, chemists working in organic synthesis, and pathologists.

B66-10705

GLASS FORMULATION HAS HIGH COEFFICIENT OF  
THERMAL EXPANSION  
DAVIS, E. K. SEIDEL, J. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1966 SEE ALSO B66-10704  
NU-0084

Glass formulation has a high coefficient of thermal expansion. The glass makes a good hermetic seal for the end of a stainless steel or copper tube such as a sheath of an instrumentation cable.

B66-10710

RADIOACTIVE METHOD ENABLES DETERMINATION OF  
SURFACE AREAS RAPIDLY AND ACCURATELY  
ROESMER, J. ROLL, J. A. RYMER, G. T. SUNDAY, J. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1966  
NU-0088

Radioactive krypton adsorption technique is used

to determine the surface area of more than one sample of material simultaneously.

**B67-10003**  
NEW ELECTROLYTE MAY INCREASE LIFE OF  
POLAROGRAPHIC OXYGEN SENSORS  
ALBRIGHT, C. F. /GARRETT CORP./ JAN. 1967  
MSC-1049

Electrolyte increases life on oxygen sensors in a polarograph used for measuring the partial pressure of oxygen in a gas mixture. It consists of a solution of lithium chloride, dimethyl acetamide and water.

**B67-10007**  
COMPOSITES OF POROUS METAL AND SOLID  
LUBRICANTS INCREASE BEARING LIFE  
SLINEY, H. E. JAN. 1967  
LEWIS-307

Self-lubricating composites of porous nickel and nickel-chromium alloy impregnated with a barium fluoride-calcium fluoride eutectic, and a thin film of solid lubricant increase wear life of load bearing surfaces.

**B67-10012**  
CRYSTAL MICROBALANCE MEASURES CONDENSABLE  
MOLECULAR FLUXES  
STEPHENS, J. B. JAN. 1967  
JPL-845

Quartz crystal quantitatively measures molecular fluxes emanating from and condensing on spacecraft surfaces. Vibrating in a thickness shear mode the crystal is frequency sensitive to changes in mass on its surface and can measure a fractional monolayer of a condensate.

**B67-10014**  
ABRADED CADMIUM-PLATED CABLE CONNECTORS  
REPAIRED BY CONVERSION COATING  
SIMMONS, J. R. /BOEING CO./ JAN. 1967  
M-FS-1424

Conversion coating procedures repairs scratched and abraded cadmium-plated aluminum cable connectors while they are in assembly.

**B67-10016**  
DISPERSION OF BORAX IN PLASTIC IS EXCELLENT  
FIRE-RETARDANT HEAT INSULATOR  
EVANS, H. HUGHES, J. SCHMITZ, F. JAN. 1967  
ARG-5

A mix of borax powder and a chlorinated anhydrous polyester resin yields a plastic composition that is fire-retardant, yields a minimum of toxic gases when heated, and exhibits high thermal insulating properties. This composition can be used as a coating or can be converted into laminated or cast shapes.

**B67-10026**  
BERYLLIUM FLUORIDE FILM PROTECTS BERYLLIUM  
AGAINST CORROSION  
ODONNELL, P. M. FEB. 1967  
LEWIS-363

Film of beryllium fluoride protects beryllium against corrosion and stress corrosion cracking in water containing chloride ion concentrations. The film is formed by exposing the beryllium to fluorine gas at 525 degrees C or higher and makes beryllium suitable for space applications.

**B67-10032**  
FLUID-BED FLUORIDE VOLATILITY PROCESS  
RECOVERS URANIUM FROM SPENT URANIUM ALLOY  
FUELS  
BARGHUSEN, J. J. CHILENSKAS, A. A. GUNDERSON, G. E. HOLMES, J. T. JONKE, A. A. KINCINAS, J. E. LEVITZ, N. M. POTTS, G. L. RAMASWAMI, D. STETHERS, H. TURNER, K. S. MAR. 1967 SEE ALSO  
ANL-6979, ANL-6829, ANL-6830, ANL-6973, ANL-6992, ANL-6994  
ARG-232

Fluid-bed fluoride volatility process recovers uranium from uranium fuels containing either zirconium or aluminum. The uranium is recovered as uranium hexafluoride. The process requires few operations in simple, compact equipment, and eliminates aqueous radioactive wastes.

**B67-10033**  
HYDRATED MULTIVALENT CATIONS ARE NEW CLASS  
OF MOLTEN SALT MIXTURES  
ANGELL, C. A. MAR. 1967  
ARG-211

Electrical conductance and activation energy measurements on mixtures of calcium and potassium nitrate show the hydrated form to be a new class of molten salt. The theoretical glass transition temperature of the hydrate changed inversely to the anhydrous mixture.

**B67-10034**  
TWO TECHNIQUES ENABLE SAMPLING OF FILTERED  
AND UNFILTERED MOLTEN METALS  
BURRIS, L., JR. PIERCE, R. D. TOBIAS, K. R. WINSCH, I. O. MAR. 1967 SEE ALSO ANL-7088  
ARG-150

Filtered samples of molten metals are obtained by filtering through a plug of porous material fitted in the end of a sample tube, and unfiltered samples are obtained by using a capillary-tube extension rod with a perforated bucket. With these methods there are no sampling errors or loss of liquid.

**B67-10044**  
IRRADIATED GASES TRANSFERRED WITHOUT  
CONTAMINATION OR DILUTION  
BONN, J. L. KERN, W. MAR. 1967  
LEWIS-278

Vacuum chamber apparatus opens sealed canisters of irradiated gases and transfers the contents without contaminating the surrounding area, diluting or polluting the contained gases. The apparatus consists of the chamber, a valved piping manifold, and a special drill and sealed drilling access.

**B67-10049**  
CRYOGENIC FATIGUE DATA DEVELOPED FOR INCONEL  
718  
SCHMIDT, E. H. /N. AM. AVIATION/ MAR. 1967  
M-FS-702

Data were obtained on the cryogenic fatigue properties of Inconel 718 bar using axial loading and rotating beam fatigue tests. Results also disclosed the fatigue properties of Inconel 718 sheet materials.

**B67-10050**  
ZIRCONIUM ALLOYS WITH SMALL AMOUNTS OF IRON  
AND COPPER OR NICKEL SHOW IMPROVED CORROSION  
RESISTANCE IN SUPERHEATED STEAM  
GREENBERG, S. YOUNGDAHL, C. A. MAR. 1967  
ARG-226

Heat treating various compositions of zirconium alloys improve their corrosion resistance to superheated steam at temperatures higher than 500 degrees C. This increases their potential as fuel cladding for superheated-steam nuclear-fueled reactors as well as in autoclaves operating at modest pressures.

**B67-10051**  
STUDY MADE OF CORROSION RESISTANCE OF  
STAINLESS STEEL AND NICKEL ALLOYS IN NUCLEAR  
REACTOR SUPERHEATERS  
GREENBERG, S. HART, R. K. LEE, R. H. RUTHER, W. E. SCHLUETER, R. R. MAR. 1967  
ARG-230

Experiments performed under conditions found in nuclear reactor superheaters determine the corrosion rate of stainless steel and nickel alloys used in them. Electropolishing was the primary surface treatment before the corrosion test. Corrosion is determined by weight loss of specimens after defilming.

**B67-10058**  
ADDITION OF SOLID OXIDIZER INCREASES LIQUID  
FUEL SPECIFIC IMPULSE  
HENDEL, F. J. APR. 1967  
JPL-861

Adding soluble solid oxidizers to hydrazine and similar fuels makes them useful in low temperature bipropellant systems. The oxidizers improve the low specific impulse, high freezing point, low boiling point, and low density of the fuels.

B67-10062  
RECOMMENDED VALUES OF THE THERMOPHYSICAL  
PROPERTIES OF EIGHT ALLOYS, THEIR MAJOR  
CONSTITUENTS AND OXIDES  
TOULOUKIAN, Y. S. /PURDUE UNIV./ MAR. 1967  
MU-0095

Reference work provides in tabular and graphical  
form the thermophysical properties of basic  
alloys, their constituents and oxides. This is  
useful for personnel who deal with extreme  
temperature environments.

B67-10069  
CONTROLLED FERRITE CONTENT IMPROVES  
WELDABILITY OF CORROSION-RESISTANT STEEL  
MALIN, C. O. /N. AM. AVIATION/ APR. 1967  
M-FS-568

Corrosion-resistant steel that adds restrictions  
on chemical composition to ensure sufficient  
ferrite content decreases the tendency of CRES to  
develop cracks during welding. The equations  
restricting composition are based on the  
Schaeffler constitution diagram.

B67-10070  
RADIAL FURNACE SHOWS PROMISE FOR GROWING  
STRAIGHT BORON CARBIDE WHISKERS  
FEINGOLD, E. /GE/ APR. 1967  
HQ-50

Radial furnace, with a long graphite vaporization  
tube, maintains a uniform thermal gradient,  
favoring the growth of straight boron carbide  
whiskers. This concept seems to offer potential  
for both the quality and yield of whiskers.

B67-10078  
PURIFICATION TRAIN PRODUCES ULTRAPURE  
HYDROGEN GAS  
WALTER, R. J. /N. AM. AVIATION/ APR. 1967  
M-FS-1913

Three-stage purification train produces ultrapure  
hydrogen gas at 1000 psi from K-bottles of  
high-purity hydrogen. The continuous process  
incorporates deoxidation and dehydration units and  
a molecular sieve.

B67-10079  
ARYLENESILOXANE COPOLYMERS  
BREED, L. W. ELLIOTT, R. L. /MIDWEST RES. INST./  
APR. 1967  
M-FS-1812

Arylenesiloxane copolymers with regularly ordered  
structures were discovered during efforts to  
develop organosilicon polymers. Arylenesilane and  
siloxane monomers were both synthesized in these  
experiments.

B67-10083  
EFFECTS OF HELIUM AND NITROGEN AS  
PRESSURANTS IN NITROGEN TETROXIDE TRANSFER  
BIZJAK, F. SIMKIN, D. J. /N. AM. AVIATION/ APR.  
1967  
MSC-924 MSC-925

Study investigates effects of helium and nitrogen  
as pressurants in nitrogen tetroxide transfer from  
one vessel to another at a higher elevation.  
Results may contribute to creation of new  
environmental systems and improved oxygen  
solubility in water to promote fish life.

B67-10089  
MATERIALS DATA HANDBOOKS PREPARED FOR  
ALUMINUM ALLOYS 2014, 2219, AND 5456, AND  
STAINLESS STEEL ALLOY 301  
INNOVATOR NOT GIVEN. /SYRACUSE UNIV. RES. INST./  
APR. 1967  
M-FS-1959 M-FS-1960 M-FS-1961 M-FS-1962

Materials data handbooks summarize all presently  
known properties of commercially available  
structural aluminum alloys 2014, 2219, and 5456  
and structural stainless steel alloy 301. The  
information includes physical and mechanical  
property data and design data presented in tables,  
illustrations, and text.

B67-10095  
IMPROVED CHLORATE CANDLE PROVIDES  
CONCENTRATED OXYGEN SOURCE  
HAUG, R. D. MYERS, D. A. TANZAR, G. F. /GARRETT

CORP./ MAR. 1967  
MSC-1137

Improved chlorate candle is used as a solid,  
portable source of oxygen in emergency situations.  
It contains sodium chlorate, iron, barium  
peroxide, and glass, mixed in powdered form. The  
oxygen evolves from the decomposition of the  
sodium chlorate when an ignition pellet is  
electrically initiated.

B67-10100  
SYNTHESIS OF VARIOUS HIGHLY HALOGENATED  
MONOMERS AND POLYMERS  
HOLLANDER, J. TRISCHLER, F. D. /WHITTAKER CORP./  
APR. 1967 SEE ALSO B66-10646  
M-FS-2143

Halogenated polyurethane and polycarbonate are  
synthesized and found to be LOX compatible but  
dependent upon the type nitrogen bonding.

B67-10102  
SIMPLIFIED METHOD INTRODUCES DRIFT FIELDS  
INTO CELLS  
GOLDSTEIN, B. RAPPAPORT, P. WYSOCKI, J. J.  
/RCA/ APR. 1967  
GSFC-572

Drift fields are simply introduced into solar  
cells at low temperatures in short periods. This  
is done after their rectifying junctions and  
output contacts are applied.

B67-10112  
THERMODYNAMIC PROPERTIES RELATED TO  
EXPANSION OF TWO-COMPONENT GAS  
BIZJAK, F. /N. AM. AVIATION/ APR. 1967  
MSC-1133

Theoretical equations were derived from basic  
thermodynamic equations to relate the  
thermodynamic properties of a two-component gas  
mixture to the expansion of the gas during tank  
ullage blowdown.

B67-10113  
NONWOVEN GLASS FIBER MAT REINFORCES  
POLYURETHANE ADHESIVE  
ROSLAND, L. M. /DOUGLAS AIRCRAFT CO./ MAY 1967  
M-FS-2309

Nonwoven glass fiber mat reinforces the adhesive  
properties of a polyurethane adhesive that fastens  
hardware to exterior surfaces of aluminum tanks.  
The mat is embedded in the uncured adhesive. It  
ensures good control of the bond line and  
increases the peel strength.

B67-10121  
PORTABLE FIXTURE FACILITATES PRESSURE  
TESTING OF INSTRUMENTATION FITTINGS  
OLSON, G. A. /BOEING CO./ MAY 1967  
M-FS-2032

Portable fixture facilitates pressure testing to  
detect possible leaks in instrumentation fittings  
mounted on tank bulkheads. It uses a vacuum cup  
which seals a pressure regulator adapter around  
one side of the fitting to be pressure tested.  
Leakage is detected with a gas sniffer.

B67-10122  
EVALUATION OF HIGH TEMPERATURE STRANDED  
HOOKUP WIRE  
DONNELLY, J. H. MOORE, H. J., JR. MAY 1967 SEE  
ALSO NASA-TM-X-53522  
M-FS-2478

Tests are performed on wire and insulation  
materials to determine selection for electronic  
space assemblies. Wire characteristics of  
tensile strength, flexibility, conductivity, and  
general workability are tested. Knowledge of the  
advantages and limitations of these materials  
should prevent overspecification.

B67-10124  
SILVER PLATING ENSURES RELIABLE DIFFUSION  
BONDING OF DISSIMILAR METALS  
INNOVATOR NOT GIVEN /BOEING CO./ MAY 1967  
M-FS-1975

Dissimilar metals are reliably joined by diffusion  
bonding when the surfaces are electroplated with  
silver. The process involves cleaning and  
etching, anodization, silver striking, and silver

plating with a conventional plating bath. It minimizes the formation of detrimental intermetallic phases and provides greater tolerance of processing parameters.

B67-10132

STATIC ELECTRICITY OF POLYMERS REDUCED BY TREATMENT WITH IODINE

HERMANN, A. M. LANDEL, R. F. REMBAUM, A. MAY 1967

NPO-10062

Treating organic polymers with iodine improves the electrical conductivity. Diffusion enables products of desired properties to be custom formulated. This eliminates a buildup of static electricity and the need for fillers or bound metal salts.

B67-10133

XENON FLUORIDE SOLUTIONS EFFECTIVE AS FLUORINATING AGENTS

HYMAN, H. H. QUARTERMAN, L. A. SHEFT, I. MAY 1967

ARG-217

Solutions of xenon fluorides in anhydrous hydrogen fluoride have few disruptive effects and leave a residue consisting of gaseous xenon, which can be recovered and refluorinated. This mild agent can be used with materials which normally must be fluorinated with fluorine alone at high temperatures.

B67-10138

STATUS OF ULTRACHEMICAL ANALYSIS FOR SEMICONDUCTORS

DILTS, R. V. HALL, L. C. /VANDERBILT UNIV./ MAY 1967

M-FS-2254

Status of ultratrace chemical analyses of materials for semiconductors was studied. This study covered atomic absorption spectroscopy, emission spectroscopy, and activation analyses. It makes recommendations to improve sensitivity, reliability and versatility for ultratrace chemical analysis.

B67-10141

STUDY TO MINIMIZE HYDROGEN EMBRITTLEMENT OF ULTRAHIGH-STRENGTH STEELS

ELSEA, S. T. FLETCHER, E. E. GROENEVELD, T. P. /BATTELLE MEM. INST./ MAY 1967

M-FS-2455

Hydrogen-stress cracking in high-strength steels is influenced by hydrogen content of the material and its hydrogen absorption tendency. Non-embrittling cleaning, pickling, and electroplating processes are being studied. Protection from this hydrogen embrittlement is important to the aerospace and aircraft industries.

B67-10147

DEGREASING OF TITANIUM TO MINIMIZE STRESS CORROSION

CARPENTER, S. R. /GEN. DYN./CONVAIR DIV./ MAY 1967

LEWIS-382

Stress corrosion of titanium and its alloys at elevated temperatures is minimized by replacing trichloroethylene with methanol or methyl ethyl ketone as a degreasing agent. Wearing cotton gloves reduces stress corrosion from perspiration before the metal components are processed.

B67-10148

CRACKS IN GLASS ELECTRICAL CONNECTOR HEADERS REMOVED BY DRY BLASTING WITH FINE ABRASIVE

ECKERT, R. W. /GEN. DYN./CONVAIR DIV./ MAY 1967

LEWIS-381

Cracking that causes pressure leakage in glass connector headers can be alleviated by manipulating the pin bridgewire connectors. This initiates the surface and meniscus cracks. Dry blasting the header surface with a fine abrasive then removes the cracks.

B67-10149

COATING PROTECTS MAGNESIUM-LITHIUM ALLOYS AGAINST CORROSION

INNOVATOR NOT GIVEN /AM. MACHINE AND FOUNDRY CO./ MAY 1967 SEE ALSO NASA-SP-50-68

M-FS-2446

Coating protects newly developed magnesium-lithium alloys against corrosion. The procedure includes heating the ingots in a salt bath and rolling them to the desired sheet thickness. The black coating, which is tough though thin and ductile, is derived mainly from chromium.

B67-10159

HEAT TREATMENT STUDY OF ALUMINUM CASTING ALLOY M45

LOVOY, C. V. JUN. 1967 SEE ALSO B65-10092

M-FS-2397

Study determines the heat treatment cycle of aluminum casting alloy M45 which will increase the strength levels of the alloy while maintaining optimum stress corrosion resistance. Evidence indicates that present production castings are overaged too severely to take full advantage of the strength of the alloy.

B67-10163

EFFECTS OF HEAT INPUT RATES ON T-1 AND T-1A STEEL WELDS

DAVIS, R. A. OLSEN, M. G. WORDEN, S. W. JUN. 1967 SEE ALSO NASA TM-X-53537

M-FS-2475

Technology of T-1 and T-1A steels is emphasized in investigation of their weld-fabrication. Welding heat input rate, production weldment circumstances, and standards of welding control are considered.

B67-10168

ISOSTATIC COMPRESSION PROCESS CONVERTS POLYAROMATICS INTO STRUCTURAL MATERIAL

INGHAM, J. D. LAWSON, D. D. OSTRUM, G. K. JUN. 1967

JPL-892

Isostatic compression process compacts certain powdered aromatic polymers into homogeneous materials that can be machined to form useful components, such as bearings. It provides for complete removal of air in the interstitial spaces surrounding the granules of the powdered polymer before the powder is subjected to isostatic compression.

B67-10182

STRESS CALCULATOR SPEEDILY CONVERTS STRAIN DATA

CORNETT, D. W. /BOEING CO./ JUN. 1967

M-FS-2021

Stress calculator permits speedy conversion of strain data directly into maximum and minimum stresses and also determines stress direction. The calculator has a movable slide with logarithmic and linear scales, and an information and grid board. Its size is flexible for easy manipulation.

B67-10184

NEW CLASS OF COMPOUNDS HAVE VERY LOW VAPOR PRESSURES

ANGELL, C. A. GRUEN, D. M. JUN. 1967

ARG-115

Magnesium hexahydrate tetrachlorometallates are 50-volume-percent water, have a high melting point and possess a low vapor pressure. These new compounds are relatively noncorrosive, thermally stable, and water soluble but not hygroscopic. They may have potential applications as cooling fluids.

B67-10185

XENON FLUORIDES SHOW POTENTIAL AS FLUORINATING AGENTS

CHERNICK, C. L. SHIEH, T. C. YANG, N. C. JUN. 1967

ARG-113

Xenon fluorides permit the controlled addition of fluorine across an olefinic double bond. They provide a series of fluorinating agents that permit ready separation from the product at a high

purity. The reactions may be carried out in the vapor phase.

and can introduce multiple ignitions in a hydrogen gas stream.

B67-10186

ALPHA PARTICLE BACKSCATTERING MEASUREMENTS  
USED FOR CHEMICAL ANALYSIS OF SURFACES  
PATTERSON, J. H. JUN. 1967

ARG-116

Alpha particle backscattering performs a chemical analysis of surfaces. The apparatus uses a curium source and a semiconductor detector to determine the energy spectrum of the particles. This in turn determines the chemical composition of the surface after calibration to known samples.

B67-10187

OXIDE FILM ON METAL SUBSTRATE REDUCED TO  
FORM METAL-OXIDE-METAL LAYER STRUCTURE  
YOUNGDAHL, C. A. JUN. 1967

ARG-48

Electrically conductive layer of zirconium on a zirconium-oxide film residing on a zirconium substrate is formed by reducing the oxide in a sodium-calcium solution. The reduced metal remains on the oxide surface as an adherent layer and seems to form a barrier that inhibits further reaction.

B67-10189

IRON SERVES AS DIFFUSION BARRIER IN  
THERMALLY REGENERATIVE GALVANIC CELL  
CROUTHAMEL, C. E. JUN. 1967

ARG-29

Pure iron or iron-coated diaphragm provides a hydrogen diffusion electrode for a thermally regenerative galvanic cell. It allows the gas to diffuse through its interatomic spaces and resists the corrosive action of the cell environment.

B67-10191

SOLUBILITY DATA ARE COMPILED FOR METALS IN  
LIQUID ZINC

DILLON, I. G. JOHNSON, I. JUN. 1967 SEE ALSO  
ANL-7083

ARG-149

Available data is compiled on the solubilities of various metals in liquid zinc. The temperature dependence of the solubility data is expressed using the empirical straight line relationship existing between the logarithm of the solubility and the reciprocal of the absolute temperature.

B67-10194

SEPARATION TECHNIQUE PROVIDES RAPID  
QUANTITATIVE DETERMINATION OF CESIUM-137  
IN IRRADIATED NUCLEAR FUEL

ELLENBURG, E. J. MC COWN, J. J. /WESTINGHOUSE  
ASTRONUCL. LAB./ JUN. 1967

NUC-10047

Potassium cobalt ferrocyanide is used to determine cesium-137 activity in irradiated fuel samples. It preferentially removes cesium from an acid solution of the fuel material. The residue is filtered and analyzed with a gamma spectrometer.

B67-10197

NEW CLASS OF THERMOSETTING PLASTICS HAS  
IMPROVED STRENGTH, THERMAL AND CHEMICAL  
STABILITY

BURNS, E. A. DUBROW, B. LUBOWITZ, H. R. /TRW  
SYSTEMS/ JUN. 1967

LEWIS-10108

New class of thermosetting plastics has high hydrocarbon content, high stiffness, thermal stability, humidity resistance, and workability in the precured state. It is designated cyclized polydiene urethane, and is applicable as matrices to prepare chemically stable ablative materials for rocket nose cones of nozzles.

B67-10208

STUDY MADE OF RANEY NICKEL TECHNOLOGY  
LEE, W. B. /MARQUADT CORP./ JUN. 1967

M-FS-2054

Raney nickel study indicates that its improved storage life is due to gaseous hydrogen and that the mechanism of its ignitions is catalytic and due to chemisorbed hydrogen atoms. It shows that reacted Raney nickel powder can be reactivated

B67-10209

POROUS MANDRELS PROVIDE UNIFORM  
DEFORMATION IN HYDROSTATIC POWDER  
METALLURGY

GRIPSHOVER, P. J. HANES, H. D. /BATTELLE MEM.  
INST./ JUN. 1967

M-FS-1972

Porous copper mandrels prevent uneven deformation of beryllium machining blanks. The beryllium powder is arranged around these mandrels and hot isostatically pressed to form the blanks. The mandrels are then removed by leaching.

B67-10227

PHOTOSENSITIVE FILLER MINIMIZES INTERNAL  
STRESSES IN EPOXY RESINS

DILLON, J. N. /IBM/ JUL. 1967

M-FS-1880

Photosensitive filler is added to curable epoxy resins to minimize stress from internal shrinkage during curing or polymerization. Cinnamic acid resins and cinnamal ketones may be added in the amount of 1 to 3 per cent by weight of the resin mixture.

B67-10228

SUBSTITUTING GOLD FOR SILVER IMPROVES  
ELECTRICAL CONNECTIONS

LOYD, J. R. PICKARD, R. F. /ASTRO-SPACE LABS./  
JUL. 1967

M-FS-2390

In attaching external leads to thin film sensors of platinum ribbon, liquid gold is applied to each end of the ribbon and the leads are soldered to the cured gold. The cured and soldered liquid gold shows no tendency to migrate and retains initial resistance characteristics when exposed to elevated temperatures.

B67-10232

WELDING, BONDING, AND SEALING OF REFRACTORY  
METALS BY VAPOR DEPOSITION

INNOVATOR NOT GIVEN /ELECTRO-OPTICAL SYSTEMS/  
JUL. 1967

LEWIS-123

Plating process welds, bonds, and seals refractory metals without weakening or changing the structure of the base metals. A metal halide compound in the vapor phase is decomposed to deposit filler metal on the base metal. The resulting bond is a true metal-to-metal bond.

B67-10236

URANIUM ISOTOPES QUANTITATIVELY DETERMINED  
BY MODIFIED METHOD OF ATOMIC ABSORPTION  
SPECTROPHOTOMETRY

LEE, G. H. JUL. 1967

ARG-210

Hollow-cathode discharge tubes determine the quantities of uranium isotopes in a sample by using atomic absorption spectrophotometry. Dissociation of the uranium atoms allows a large number of ground state atoms to be produced, absorbing the incident radiation that is different for the two major isotopes.

B67-10243

ANALYTICAL TECHNIQUE CHARACTERIZES ALL  
TRACE CONTAMINANTS IN WATER

FOSTER, J. N. LYSYJ, I. NELSON, K. H. /N. AM.  
AVIATION/ JUL. 1967

MSC-11032

Properly programmed combination of advanced chemical and physical analytical techniques characterize critically all trace contaminants in both the potable and waste water from the Apollo Command Module. This methodology can also be applied to the investigation of the source of water pollution.

B67-10265

ALUMINUM-TITANIUM HYDRIDE-BORON CARBIDE  
COMPOSITE PROVIDES LIGHTWEIGHT NEUTRON  
SHIELD MATERIAL

POINDESTER, A. M. /WESTINGHOUSE ASTRONUCL. LAB./  
AUG. 1967

NUC-10069

Inexpensive lightweight neutron shield material has high strength and ductility and withstands high internal heat generation rates without excessive thermal stress. This composite material combines structural and thermal properties of aluminum, neutron moderating properties of titanium hydride, and neutron absorbing characteristics of boron carbide.

B67-10266

SIMPLIFIED METHOD MEASURES CHANGES IN TENSILE YIELD STRENGTH USING LEAST NUMBER OF SPECIMENS

DIXON, C. E. /AEROJET-GEN. CORP./ AUG. 1967

NUC-10075

Simplified method determines yield strength due to heat treat, irradiation or mechanical treatment. Each specimen in a group of specimens is tested for yield stress point, subjected to heat treat or irradiation, and retested for new yield stress point which is a measure of change in material.

B67-10282

MATERIALS DATA HANDBOOK, INCONEL ALLOY 718  
SESSLER, J. WEISS, V. /SYRACUSE UNIV. RES.  
INST./ AUG. 1967

M-FS-2348

Materials data handbook on Inconel alloy 718 includes data on the properties of the alloy at cryogenic, ambient, and elevated temperatures and other pertinent engineering information required for the design and fabrication of components and equipment utilizing this alloy.

B67-10286

LIQUID CRYSTALS DETECT VOIDS IN FIBERGLASS

LAMINATES

HOLLAR, W. T. /GEN. DYN./CONVAIR/ AUG. 1967

LEWIS-10104

Liquid crystal solution nondestructively detects voids or poor bond lines in fiberglass laminates. A thin coating of the solution is applied by spray or brush to the test article surface, and, when heated, indicates the exact location of defects by differences in color.

B67-10290

TRACE HYDRAZINES IN AQUEOUS SOLUTIONS

ACCURATELY DETERMINED BY GAS CHROMATOGRAPHY

WELZ, E. A., JR. /N. AM. AVIATION/ AUG. 1967

SEE ALSO NASA B66-10586

MSC-11222

Trace amounts of hydrazines in aqueous solutions can be determined by using polyethyleneimine /PEI/ in conjunction with the gas chromatographic column. The PEI specifically retains water without altering the separability or elution order of the hydrazine and associated constituents.

B67-10299

LIQUID OXYGEN DUCTING CLEANED BY FALLING

FILM METHOD

PAUL, H. I. /BOEING CO./ AUG. 1967

M-FS-11816

Principle of a vertical falling film is used to clean contaminated large diameter and length liquid oxygen /LOX/ cylindrical ducting. The cleaning cycle is performed by flowing trichloroethylene in a falling film down a vertically mounted duct for approximately one hour.

B67-10301

MATERIALS DATA HANDBOOK, ALUMINUM ALLOY

7075

SESSLER, J. WEISS, V. /SYRACUSE UNIV. RES.

INST./ AUG. 1967

M-FS-2349

Materials data handbook on aluminum alloy 7075 includes data on the properties of the alloy at cryogenic, ambient, and elevated temperatures, and other pertinent engineering information required for the design and fabrication of components and equipment utilizing this alloy.

B67-10302

IMPROVED COMPRESSION MOLDING PROCESS

HEIER, W. C. JUL. 1967

LANGLEY-10027

Modified compression molding process produces plastic molding compounds that are strong, homogeneous, free of residual stresses, and have improved ablative characteristics. The conventional method is modified by applying a vacuum to the mold during the molding cycle, using a volatile sink, and exercising precise control of the mold closure limits.

B67-10312

NEW ELECTRON MICROSCOPE EMPLOYS NEW VIDEO DISPLAY TECHNIQUE

BROOKSHIER, W. K. GILROY, J. AUG. 1967

ARG-158

Video display system for a scanning electron microscope provides slow scanning rates, a self-generated color gradient technique, and allows leisurely viewing of several hours. It also enables the viewing of areas where selected energy regions contribute relatively few electrons, and the changing of specimen position and magnification without adjustments.

B67-10315

TRITIATED ALUMINA SERVES AS REAGENT FOR SELF-LABELING ANALYSIS

ERENRICH, E. H. KLEIN, P. D. SEP. 1967

ARG-209

Tritiated alumina, prepared by exchange of the surface hydroxyl groups with tritiated water, is a suitable reagent for exchange-labeling of specific compounds in low concentrations prior to chromatographic analysis. In a chromatographic column, it detects and measures submicrogram quantities of material.

B67-10320

EVAPORANT FEED DEVICE FACILITATES FLASH

VAPOR DEPOSITION PROCESS IN VACUUM

HERMANN, W. A. STIRN, R. J. SEP. 1967

NPD-10232

Mechanism using a helix sequentially feeds prescribed amounts of metal charges into an evaporation boat used for flash vapor deposition of the evaporants onto a substrate in a vacuum chamber. The helix is advanced by external manual controls extending through sealed feed-through devices into the chamber wall.

B67-10322

CHEMICAL MILLING SOLUTION REVEALS STRESS

CORROSION CRACKS IN TITANIUM ALLOY

BRASKI, D. N. SEP. 1967

LANGLEY-10077

Solution of hydrogen fluoride, hydrogen peroxide, and water reveals hot salt stress corrosion cracks in various titanium alloys. After the surface is rinsed in water and dried, swabbed with the solution, be observed by the naked eye or at low magnification.

B67-10324

THERMODYNAMIC PROPERTIES OF SOLID PALLADIUM-

SILVER ALLOYS AND OTHER ALLOYS ARE

INVESTIGATED BY TORSION-EFFUSION TECHNIQUE

MYLES, K. M. SEP. 1967 SEE ALSO ANL-6657

ARG-277

Vapor pressure data obtained by the torsion-effusion method provides the thermodynamic properties of several transition-metal alloy systems. The vapor pressure of silver over solid silver and over palladium-silver alloys was measured and the results were more accurate than those found previously by other techniques.

B67-10340

HIGH-STRENGTH TUNGSTEN ALLOY WITH IMPROVED

DUCTILITY

KLOPP, W. D. RAFFO, P. L. RUBENSTEIN, L. S.

WITZKE, W. R. AUG. 1967

LEWIS-10257

Alloy combines superior strength at elevated temperatures with improved ductility at lower temperatures relative to unalloyed tungsten. Composed of tungsten, rhenium, hafnium, and carbon, the alloy is prepared by consumable electrode vacuum arc-melting and can be fabricated into rod, plate, and sheet.



B67-10346

THERMODYNAMIC PROPERTIES OF SATURATED LIQUID  
PARAHYDROGEN CHARTED FOR IMPORTANT  
TEMPERATURE RANGEMC CARTY, R. D. Roder, H. M. /NATL. BUR. OF  
STD./ SEP. 1967  
NUC-10018

Six entropy diagrams for parahydrogen in or near the saturated liquid state cover the temperature range from 29.16 degrees to 42.48 degrees R with pressures to 100 psia and mixtures of the liquid and vapor phases to 0.003 quality. The diagrams are printed in color, are 19 by 30 inches in size, and are suitable for wall mounting.

B67-10349

EXCELLENT SPRING PROPERTIES DEVELOPED IN TWO  
NICKEL ALLOYS FOR USE AT CRYOGENIC  
TEMPERATURESDESSAU, P. P. REHN, I. M. /AEROJET-GEN. CORP./  
SEP. 1967  
NUC-10084

Cold working and aging prepares nickel alloys for coiling into springs with properties acceptable in a cryogenic environment.

B67-10350

SOFT METAL PLATING ENABLES HARD METAL SEAL  
TO OPERATE SUCCESSFULLY IN LOW TEMPERATURE,  
HIGH PRESSURE ENVIRONMENTLAMVERMEYER, D. J. /AEROJET-GEN. CORP./ SEP.  
1967  
NUC-10083

Soft metal plating of hard metal lip seal enables successful operation of seal in a cryogenic fluid line under high pressure. The seal is coated with a thin film of 24 carat gold on the lip area to provide antigall and seal properties.

B67-10351

METAL FLAME SPRAY COATING PROTECTS ELECTRICAL  
CABLES IN EXTREME ENVIRONMENTBRADY, R. D. /METCO, INC./ FOX, H. A. /AEROJET-GEN.  
CORP./ OCT. 1967  
NUC-10077

Metal flame spray coating prevents emf measurement error in sheathed instrumentation cables which are externally attached to cylinders which were cooled on the inside, but exposed to gamma radiation on the outside. The coating provides a thermoelectrode path for radiation induced high temperatures within the cables.

B67-10354

CUT-THROUGH TESTER ACCURATELY MEASURES  
INSULATION FAILURE RATESBAKER, E. U. /DOUGLAS AIRCRAFT/ OCT. 1967  
M-FS-12506

Cut-through tester electronically measures the rate of failure of various wire and cable insulating materials both as to time and the amount of applied pressure. The force/weight/acting on the penetrator can be applied through a near infinite range.

B67-10365

MAGNESIUM-LITHIUM ALLOYS DEVELOPED FOR LOW  
TEMPERATURE USEDUNKERLEY, F. J. LEAVENWORTH, H. W., JR. /AM.  
MACHINE AND FOUNDRY CO./ OCT. 1967 SEE ALSO  
NASA-SP-5068  
M-FS-1541

Three new magnesium-lithium alloys have been developed for application at cryogenic temperatures. These lightweight alloys have approximately doubled the tensile and yield strengths at room temperature of previously described magnesium-lithium alloys.

B67-10366

STUDY MADE OF DIELECTRIC PROPERTIES OF  
PROMISING MATERIALS FOR CRYOGENIC  
CAPACITORSMATHES, K. N. MINNICH, S. H. /GE/ OCT. 1967  
M-FS-13620

Experimental investigations were conducted to determine dielectric properties of promising materials for cryogenic capacitors to be used in energy storage and pulse applications. The three

classes of materials investigated were - /1/ inorganic bonded ferroelectric materials, /2/ anodic coatings on metal foils, and /3/ polar low temperature liquids.

B67-10374

HANDBOOKS DESCRIBE EDDY CURRENT TECHNIQUES  
USED IN NONDESTRUCTIVE TESTING OF METAL  
PARTS AND COMPONENTSINNOVATOR NOT GIVEN /GEN. DYN./CONVAIR/ OCT.  
1967  
M-FS-13172

Handbooks describe eddy current techniques used in nondestructive testing of metal parts and components.

B67-10375

ANALYSIS OF STABILITY-CRITICAL ORTHOTROPIC  
CYLINDERS SUBJECTED TO AXIAL COMPRESSIONFINLEY, R. L. LIU, L. S. YANG, P. B. /BOEING  
CO./ OCT. 1967  
M-FS-12869

Analytical procedure for determining critical buckling loads of orthotropic cylinders subjected to axial compression loading has been defined. Three modes of instability have been considered - local instability caused by panel and interframe buckling, and local instability caused by yielding and crippling in areas of stress concentration.

B67-10381

## MACHINING HEAVY PLASTIC SECTIONS

STALKUP, O. M. /N. AM. AVIATION/ OCT. 1967  
M-FS-12720

Machining technique produces consistently satisfactory plane-parallel optical surfaces for pressure windows, made of Plexiglass, required to support a photographic study of liquid rocket combustion processes. The surfaces are machined and polished to the required tolerances and show no degradation from stress relaxation over periods as long as 6 months.

B67-10383

POLARIZED LIGHT REVEALS STRESS IN MACHINED  
LAMINATED PLASTICSFRANKOWSKI, J. /GEN. DYN./CONVAIR/ OCT. 1967  
LEWIS-10018

Polarized light applied to drilled laminated plastic components exposes to the human eye the locked-in stresses that will result in fractures and delaminations when the soldering procedure takes place. This technique detects stresses early in the production cycle before appreciable man-hours are invested in an item destined for rejection.

B67-10392

STUDY MADE OF DUCTILITY LIMITATIONS OF  
ALUMINUM-SILICON ALLOYSBAILEY, W. A. FREDERICK, S. F. /DOUGLAS AIRCRAFT  
CO./ OCT. 1967  
M-FS-12524

Study of the relation between microstructure and mechanical properties of aluminum-silicon alloys determine the cause of the variations in properties resulting from differences in solidification rate. It was found that variations in strength are a consequence of variations in ductility and that ductility is inversely proportional to the dendrite cell size.

B67-10397

EXPERIMENTS SHED NEW LIGHT ON NICKEL-  
FLUORINE REACTIONSFISCHER, J. GUNTHER, W. JARRY, R. L. OCT. 1967  
SEE ALSO ANL-6684  
ARG-10008

Isotopic tracer experiments and scale-impingement experiments show fluorine to be the migrating species through the nickel fluoride scale formed during the fluorination of nickel. This is in contrast to nickel oxide scales, where nickel is the migrating species.

B67-10409

## SCRIBABLE COATING FOR PLASTIC FILMS

CLARK, R. T. /N. AM. AVIATION/ OCT. 1967  
MSC-11194

Scribble, opaque coating for transparent plastic film tape is not affected by aging, vacuum, and moderate temperature extremes. It consists of titanium dioxide, a water-compatible acrylic polymer emulsion, and a detergent. The coating mixture is readily dispersed in water before it is dried.

B67-10417  
TECHNIQUE FOR MEASURING MAGNETIC TAPE  
INTERLAYER ADHESION  
CLEMENT, W. G. OCT. 1967  
NPO-10011

Technique measures interlayer adhesion in spacecraft data storage tape to avoid blocking. An unwind force is exerted on the spool, and the displacement before breakaway of the weighted outer layer is used to calculate the peel-off force necessary. This technique also can have terrestrial applications.

B67-10421  
SODIUM PERXENATE PERMITS RAPID OXIDATION  
OF MANGANESE FOR EASY SPECTROPHOTOMETRIC  
DETERMINATION  
BANE, R. W. OCT. 1967  
ARG-262

Sodium perxenate oxidizes manganese to permanganate almost instantaneously in dilute acid solution and without a catalyst. A solution is prepared by dissolving 200 mg of sodium perxenate in distilled water and diluting to 100 ml.

B67-10429  
ADHESIVES FOR LAMINATING POLYIMIDE  
INSULATED FLAT CONDUCTOR CABLE  
MONTERMOSO, J. C. SAXTON, T. R. TAYLOR, R. L.  
/QUANTUM, INC./ NOV. 1967  
M-FS-12066

Polymer adhesive laminates polyimide-film flat conductor cable. It is obtained by reacting an appropriate diamine with a dianhydride. The adhesive has also been used in the lamination of copper to copper for the preparation of multilayer circuit boards.

B67-10432  
VIBRATION DAMPING COMPOSITION HAS FLUSH-  
AWAY FEATURE  
FELLIN, J. F. /N. AM. AVIATION/ NOV. 1967  
M-FS-597

Vibration damping compound nullifies resonant frequencies in structures that support critical components undergoing vibration testing. The main feature of this damping composition is the ability to remove it with a flush of plain tap water.

B67-10436  
FUEL CELL LIFE IMPROVED BY METALLIC SINTER  
ACTIVATION AFTER ELECTRODE ASSEMBLY  
WELDING  
TAYLOR, W. A. /PRATT AND WHITNEY/ NOV. 1967  
MSC-10965

Technique improves the service life of fuel cell electrodes. The welding is done before the metallic sinter is activated by depositing finely divided metal within the sinter structure from a solution with corrosion inhibiting ions. The activator solution flows through the porous sinter while attached to the backup plate.

B67-10437  
STUDY MADE OF PNEUMATIC HIGH PRESSURE PIPING  
MATERIALS /10,000 PSI/  
LOEB, M. B. SMITH, J. C. /BOEING CO./ NOV. 1967  
KSC-10133

Five types of steel were evaluated for use in high pressure pneumatic piping systems in accordance with the following criteria - impact strength, tensile and yield strengths, elongation and reduction in area, field weldability, and cost. One type, AISI 4615, was selected as most advantageous for extensive use in future flight vehicles.

B67-10439  
STUDY MADE OF LARGE AMPLITUDE FUEL SLOSHING  
DI MAGGIO, D. D. SALZMAN, R. N. /N. AM.

AVIATION/ NOV. 1967  
M-FS-12381

Study of resonant oscillations of an ideal fluid in a cylindrical tank is used to obtain a better understanding of fuel sloshing in large liquid booster. More realistic structural design criteria may be formulated when the dynamic response of the liquid in a cylindrical tank can be predicted analytically.

B67-10440  
FLUID PROPERTIES HANDBOOK  
GERSHMAN, R. SHERMAN, A. /DOUGLAS AIRCRAFT CO./  
NOV. 1967  
M-FS-13462

A single source compilation handbook, has been made of the most accurate available physical property data pertaining to helium, hydrogen, oxygen, and nitrogen.

B67-10441  
NEWLY DEVELOPED FOAM CERAMIC BODY SHOWS  
PROMISE AS THERMAL INSULATION MATERIAL  
AT 3000 DEG F  
BLOCKER, E. W. PAUL, R. D. /UNITED AIRCRAFT  
CORP./ NOV. 1967  
M-FS-11968

Optimized zirconia foam ceramic body shows promise for use as a thermal insulation material. The insulating media displays low density and thermal conductivity, good thermal shock resistance, high melting point, and mechanical strength.

B67-10442  
CORROSION OF ALUMINUM ALLOYS BY CHLORINATED  
HYDROCARBON/METHANOL MIXTURES  
DE FOREST, W. S. /N. AM. AVIATION/ NOV. 1967  
MSC-11365

Laboratory investigations show that water-free mixtures of Freon MF /trichlorofluoromethane/ and methanol vigorously attack aluminum alloys which contain significant amounts of copper. Freon MF alone did not attack the aluminum alloys at room temperature, pure methanol had only a slight corrosive effect on the alloy.

B67-10451  
STUDY MADE OF PROCEDURES FOR EXTERNALLY  
LOADING AND CORROSION TESTING STRESS  
CORROSION SPECIMENS  
HUMPHRIES, T. S. NOV. 1967 SEE ALSO  
NASA-TM-X-53483  
M-FS-12064

Study was initiated to determine methods or test specimens for evaluating stress corrosion cracking characteristics of common structural materials. It was found that the methods of externally loading and corrosion testing were reliable in yielding reproducible results for stress corrosion evaluation.

B67-10454  
WARPAGE ELIMINATED IN COPPER-CLAD  
MICROWAVE CIRCUIT LAMINATES  
BOONE, W. L., JR. /IBM/ NOV. 1967  
M-FS-13892

Cryogenic treatment of laminated copper-clad microwave circuit boards eliminates stresses that cause warpage when a circuit is etched on one side of the board. After etching, the stresses may be eliminated to reduce warpage.

B67-10455  
A METHOD OF DETERMINING COMBUSTION GAS  
FLOW  
BONTEMPL, P. J. /N. AM. AVIATION/ JAN. 1968  
M-FS-13757

Zirconium oxide coating enables the determination of hot gas flow patterns on liquid rocket injector face and baffle surfaces to indicate modifications that will increase performance and improve combustion stability. The coating withstands combustion temperatures and due to the coarse surface and coloring of the coating, shows the hot gas patterns.

B67-10463  
ACID SPRAY TECHNIQUE MILLS ALUMINUM ALLOY  
MATERIALS WITHOUT IMMERSION

DUFOUR, G. /LOCKHEED MISSILES AND SPACE CO./  
NOV. 1967  
M-FS-12500

Acid spray machining technique chemically mills aluminum alloy panels without immersing them in an etchant. The spray does not require artificial heating to initiate the etching process.

B67-10484  
METALLOGRAPHIC SAMPLES MOUNTED WITH ROOM-TEMPERATURE, CURABLE, POLYESTER CASTING RESINS

HUGHES, J. KRUGER, O. SCHMITZ, F. DEC. 1967  
SEE ALSO ANL-6712  
ARG-10025

Study of epoxies and polyesters determines which type of resin would satisfy the desirable prerequisites of a metallographic mount. Investigated were PolyLite 8063, PolyLite 8173, PE-169, and PE-228. The results were compared to the standard thermosetting mounting material, Bakelite, and found to be favorable.

B67-10491  
MATERIAL FATIGUE DATA OBTAINED BY CARD-PROGRAMMED HYDRAULIC LOADING SYSTEM  
DAVIS, W. T. DEC. 1967  
LANGLEY-10042

Fatigue tests using load distributions from actual loading histories encountered in flight are programmed on punched electronic accounting machine cards. With this hydraulic loading system, airframe designers can apply up to 55 load levels to a test specimen.

B67-10501  
NEUTRON IRRADIATION AM241 EFFECTIVELY PRODUCES CURIUM  
ANDERSON, R. W. MILSTEAD, J. STEWART, D. C. DEC. 1967 SEE ALSO ANL-6932 ANL-6933  
ARG-10030

Computer study was made on the production of multicurie amounts of highly alpha-active curium 242 from americium 241 irradiation. The information available includes curium 242 yields, curium composition, irradiation data, and production techniques and safeguards.

B67-10502  
REACTION OF STEAM WITH MOLYBDENUM IS STUDIED  
KILPATRICK, M. LOTT, S. DEC. 1967 SEE ALSO ANL-6257  
ARG-295

Comprehensive report studies the reaction of flowing steam with refractory metals /in particular molybdenum/, in the temperature range of 1100 degrees C. The reaction products are hydrogen gas and molybdenum oxide vapor.

B67-10527  
QUANTUM MECHANICAL CALCULATIONS OF REACTIVE SCATTERING CROSS SECTIONS IN BIMOLECULAR ENCOUNTERS  
PIRKLE, J. C., JR. /GEORGIA INST. OF TECH./ DEC. 1967  
M-FS-13594

Study applies the nonequilibrium collision theory of reaction rates to the estimation of rate constants for simple reactions. The complications in the quantum mechanical description of chemical reactions and the care needed in approximating the exact wave function for the collision are shown.

B67-10532  
COPPER AND NICKEL ADHERENTLY ELECTROPLATED ON TITANIUM ALLOY  
BROWN, E. E. /BOEING CO./ DEC. 1967  
M-FS-13952

Anodic treatment of titanium alloy enables electroplating of tightly adherent coatings of copper and nickel on the alloy. The alloy is treated in a solution of hydrofluoric and acetic acids, followed by the electroplating process.

B67-10533  
STUDY OF STRESS CORROSION IN ALUMINUM ALLOYS

BRUMMER, S. B. /TYCO LABS./ DEC. 1967  
M-FS-13906

Mechanism of the stress corrosion cracking of high-strength aluminum alloys was investigated using electrochemical, mechanical, and electron microscopic techniques. The feasibility of detecting stress corrosion damage in fabricated aluminum alloy parts by nondestructive testing was investigated using ultrasonic surface waves and eddy currents.

B67-10551  
GAS PRESSURE IN SEALED ELECTROCHEMICAL CELLS MEASURED EXTERNALLY  
SHERFEY, J. M. DEC. 1967  
GSFC-10004

Piezoresistive transducer measures gas pressure inside sealed secondary electrochemical cells without breaking the seal. This method is based on the observed fact that the force exerted by the cell faces on the clamp tightening them against the transducer is a function of the gas pressure inside the cell.

B67-10570  
RADIANT HEAT SOURCE, VACUUM BAG, PROVIDE PORTABLE BONDING OVEN  
NICHOLLS, A. H. /N. AM. AVIATION/ DEC. 1967  
MSC-11342

Portable bonding oven is formed to any desired size or configuration to attach doublers and brackets to the surfaces of large structures. A radiant heat source is used in combination with a heat resistant transport vacuum bag and a black heat absorbing cloth.

B67-10573  
SPECTROPHOTOMETRIC TECHNIQUE QUANTITATIVELY DETERMINES NAMBT INHIBITOR IN ETHYLENE GLYCOL-WATER SOLUTIONS  
GARRARD, G. G. /N. AM. AVIATION/ DEC. 1967  
MSC-11496

Spectrophotometric method, using a ratio-recording ultraviolet-absorption spectrophotometer, permits analysis of NaMBT in ethylene glycol-water solutions with high accuracy. It reduces analysis time, requires smaller samples, and is able to detect extremely small concentrations of mercaptobenzothiazole.

B67-10577  
PURE XENON HEXAFLUORIDE PREPARED FOR THERMAL PROPERTIES STUDIES  
MALM, J. G. OSBORNE, D. W. SCHREINER, F. DEC. 1967  
ARG-10056

Preparation of a xenon hexafluoride and sodium fluoride salt yields a sample of the highest possible purity for use in thermal measurements. The desired hexafluoride can be easily freed from the common contaminants, xenon tetrafluoride, xenon difluoride, and xenon oxide tetrafluoride, because none of these compounds react with sodium fluoride.

B67-10578  
STUDY OF CORROSION OF 1100 ALUMINUM  
DRALEY, J. E. LOESS, R. E. MORI, S. DEC. 1967  
ARG-10045

Corrosion of 1100 aluminum in oxygen-saturated water at 70 degrees C under experimental conditions was studied, emphasizing effects of exposure interruption, the number of specimens, and the refreshment rate. A logarithmic equation was derived to express the corrosion rate.

B67-10579  
MAGNESIUM-ZINC REDUCTION IS EFFECTIVE IN PREPARATION OF METALS  
KNIGHTON, J. B. STEUNENBERG, R. K. DEC. 1967  
ARG-10050

Uranium, thorium, and plutonium are effectively prepared by magnesium-zinc reduction, using uranium oxides, thorium dioxide, and plutonium dioxide as starting materials. This technique is also useful in performing reduction of metals such as zirconium and titanium.

B67-10580

SIMPLE COLORIMETRIC METHOD DETERMINES

URANIUM IN TISSUE

DORAN, D. /ST. PROCOPIUS COLL./ FRIGERIO, N. A.

DEC. 1967 SEE ALSO ANL-7136

ARG-10039

Simple colorimetric micromethod determines concentrations of uranium in tissue. The method involves dry ashing organic extraction, and colorimetric determination of uranyl ferrocyanide. This uranium determination technique could be used in agricultural research, tracer studies, testing of food products, or medical research.

B67-10582

STUDY MADE OF RESISTANCE OF STAINLESS STEELS TO ZINC-VAPOR CORROSION

BENNETT, G. A. BURRIS, L., JR. NELSON, P. A.

DEC. 1967

ARG-10055

Study of the corrosion resistance of several stainless steels to zinc vapor revealed that some stainless steels could be employed for use in zinc processing equipment housings or vapor lines.

B67-10583

STUDY OF CREVICE-GALVANIC CORROSION OF ALUMINUM

DRALEY, J. E. LOESS, R. E. MORI, S. DEC. 1967

SEE ALSO ANL-6236

ARG-10013

Corrosion effects of aluminum-copper and aluminum-nickel couples in oxygenated distilled water, and aluminum alloys in oxygenated copper sulfate solution were studied. One of each of the couples had a water tight seal, and showed no substantial corrosion, and of the unsealed couples, only the aluminum-copper developed corrosion.

B67-10584

FOGGING TECHNIQUE USED TO COAT MAGNESIUM WITH PLASTIC

MROZ, T. S. DEC. 1967

LEWIS-10316

Cleaning process and a fogging technique facilitate the application of a plastic coating to magnesium plates. The cleaning process removes general organic and inorganic surface impurities, oils and greases, and oxides and carbonates from the magnesium surfaces. The fogging technique produces a thin-filmlike coating in a clean room atmosphere.

B67-10586

DEVICE MEASURES STATIC FRICTION OF MAGNETIC TAPE

DEC. 1967 SEE ALSO NASA-TN-D-3399

GSFC-10360

Device measures the coefficient of static friction of magnetic tape over a range of temperatures and relative humidities. It uses a strain gauge to measure the force of friction between a reference surface and the tape drawn at a constant velocity of approximately 0.0001 inch per second relative to the reference surface.

B67-10589

EXPLOSIVE-TRAIN INITIATED THROUGH SOLID BULKHEAD BY PRESSURE CARTRIDGE

WILKOWSKI, J. C. /N. AM. AVIATION/ DEC. 1967

MSC-11395

Explosive-train initiated pressure cartridge transmits a shock wave igniting a main charge of explosive through a solid bulkhead without destroying or damaging the seal or the bulkhead. The main charge could be an explosive, a pyrotechnic, or a propellant.

B67-10592

MATHEMATICAL RELATION PREDICTS ACHIEVABLE DENSITIES OF COMPACTED PARTICLES

AYER, J. E. SOPPET, F. E. DEC. 1967

ARG-10082

Series of mathematical relationships predicts 1/ compact densities of spherical shapes in a cylinder as a function of particle dimension, and 2/ compact density of angular shapes as a function of particle shape and absolute size.

B67-10593

SOLVENT PERMITS SOLID CURING AGENTS TO BE USED AT ROOM TEMPERATURES

ST. CYR, M. C. /DOUGLAS AIRCRAFT CO./ DEC. 1967

M-FS-13434

Solvent system dissolves the solid curing agents used with polyurethane resins in adhesive systems. The system developed yields bond strengths comparable to 100 percent solid formulations. The optimum solvent chosen was a 55.5 percent solution in anhydrous tetrahydrofuran.

B67-10596

EPOXY RESINS PRODUCE IMPROVED PLASTIC SCINTILLATORS

MARKLEY, F. W. DEC. 1967

ARG-241

Plastic scintillator produced by the substitution of epoxy resins for the commonly used polystyrene, is easy to cast, stable at room temperature, and has the desirable properties of a thermoset or cross-linked system. Such scintillators can be immersed directly in strong solvents, an advantage in many chemical and biological experiments.

B67-10599

BACTERIOSTATIC CONFORMAL COATING FOR ELECTRONIC COMPONENTS

BLAND, C. LE DOUX, F. N. JAN. 1968

GSFC-10007

Coating for electronic components used in space applications has bacteriostatic qualities capable of hindering bacterial reproduction, both vegetative and sporulative viable microorganisms. It exhibits high electrical resistivity, a low outgassing rate, and is capable of restraining electronic components when subjected to mechanical vibrations.

B67-10600

DYNAMIC CAPTIVE PLASTIC SEAL

DRYER, E. O. /N. AM. AVIATION/ DEC. 1967

M-FS-12988

Fluoroplastic material held captive between valve sealing surfaces of 16 to 125 rms microinches provides zero leakage to a high-pressure line at high cryogenic temperatures, when the plastic material is subjected to sufficient stress. This sealing technique makes unnecessary the use of superfinished valve sealing surfaces.

B67-10608

A CERAMIC COMPOSITE THERMAL INSULATION

DEC. 1967 SEE ALSO NASA-TM-X-53646

M-FS-13991

Ceramic composite thermal insulation comprised of alumina-silica fibers, pigmentary potassium titanate, and asbestos fibers, bonded with a colloidal silica sol has improved insulating capabilities to both radiant and convective heat. Gelation of the colloidal silica sol prevents binder migration.

B67-10627

THORIATED TUNGSTEN TUBE PROVIDES IMPROVED HIGH TEMPERATURE THERMOCOUPLE SHEATH

ZELLNER, G. J. /WESTINGHOUSE ASTRONUCL. LAB./

DEC. 1967

NUC-10145

Thermocouple tubing of thoriated tungsten with a very fine grain structure produces a small-diameter sheath capable of operating up to 5000 degrees R in a hydrogen and graphite environment. This tubing remains ductile and resists both grain growth and carbiding even after prolonged exposure to temperature.

B67-10634

PHOTOVOLTAIC EFFECT IN ORGANIC POLYMER-IODINE COMPLEX

HERMANN, A. M. REMBAUM, A. DEC. 1967 SEE ALSO

B66-10682 AND B67-10132

NPO-10373

Certain charge transfer complexes formed from organic polymers and iodine generate appreciable voltages at relatively low impedances upon exposure to light. These films show promise in applications requiring chemically and electrically

stable films as detectors of optical radiation and as energy converters in photovoltaic cells.

B67-10641  
COMPILATION OF DETECTION SENSITIVITIES IN  
THERMAL-NEUTRON ACTIVATION  
WAHLGREN, M. A. WING, J. DEC. 1967 SEE ALSO  
ANL-6953  
ARG-10068

Detection sensitivities of the chemical elements following thermal-neutron activation have been compiled from the available experimental cross sections and nuclear properties and presented in a concise and usable form. The report also includes the equations and nuclear parameters used in the calculations.

B67-10645  
EDDY CURRENT PROBE MEASURES SIZE OF CRACKS  
IN NONMETALLIC MATERIALS  
MUSSEY, C. W. /BOEING CO./ JAN. 1968  
M-FS-14059

Nondestructive method uses powdered iron and eddy current probe to measure the depth/width ratio of cracks in electrically nonconductive materials. The eddy current probe measures the mass of metal in the crack after it has been filled with the powdered iron.

B67-10647  
SYNTHESIS OF PURE AROMATIC GLYCIDYL ESTERS  
FOR USE AS ADHESIVES  
INNOVATOR NOT GIVEN /BORDEN CHEM. CO./ JAN. 1968  
M-FS-12705

Laboratory study was conducted to synthesize pure glycidyl esters of aromatic acids and to convert the resultant epoxy esters to polymers for use as adhesives over a range of temperatures down to minus 423 degrees F.

B67-10650  
BUCKLING STRENGTH OF FILAMENT-WOUND  
CYLINDERS UNDER AXIAL COMPRESSION IS  
INVESTIGATED  
DEC. 1967 SEE ALSO NASA-CR-266  
HQ-10032

Analytical study was made of the effects of axial compression on buckling strength of filament-wound cylinders having diameter-to-wall thickness ratios of 167 to 643. Analytical predictions for buckling loads were obtained by using linear anisotropic shell theory.

B67-10660  
STUDY MADE OF MECHANICS OF DEFORMATION AND  
FRACTURE OF FIBROUS COMPOSITES  
ROSEN, B. W. /GE/ DEC. 1967  
HQ-10035

Report summarizes the findings of studies made of the influence of both fiber and matrix characteristics upon the mechanics of deformation and fracture of fibrous composites. The major portion of the report is devoted to a study of the mechanics of tensile failure of a fibrous composite.

## 04 LIFE SCIENCES

B63-10003  
NEW LOW LEVEL AC AMPLIFIER PROVIDES ADJUSTABLE  
NOISE CANCELLATION AND AUTOMATIC TEMPERATURE  
COMPENSATION  
SMITH, J. R., JR. MAR. 1964  
ARC-2

A circuit utilizing a transistorized differential amplifier is developed for biomedical use. This low voltage operating circuit provides adjustable cancellation at the input for unbalanced noise signals, and automatic temperature compensation is accomplished by a single active element across the input-output ends.

B64-10025  
IMPROVED ELECTRODE GIVES HIGH-QUALITY  
BIOLOGICAL RECORDINGS  
DAY, J. L. LIPPITT, M. W. MAY 1964

MSC-17

To obtain high quality waveforms from a subject engaged in physical activity, an improved electrode assembly has been devised. This consists of a cup containing an electrically conductive paste and a silver electrode. The paste maintains contact between the skin and the plate.

B64-10108  
DEVICE INDUCES LUNGS TO MAINTAIN KNOWN  
CONSTANT PRESSURE  
LIPPITT, M. W. REED, J. H. JUL. 1964  
MSC-50

This device requires the use of thoracic muscles to maintain prescribed air pressure in the lungs for brief periods. It consists of a clear plastic hollow cylinder fitted with a mouthpiece, a spring-loaded piston, and a small vent for escaping air when exhalation into the mouthpiece displaces the piston.

B64-10146  
TECHNIQUE SIMULATES EFFECT OF REDUCED GRAVITY  
HEWES, D. E. SPADY, A. A. JR. JUN. 1964  
LANGLEY-44

To simulate the effects of lunar gravity, an arrangement of near-vertical cables has been devised. These suspend the test subject perpendicular to an inclined walkway to give the effect of reduced gravitational pull.

B65-10332  
TEST MONKEYS ANESTHETIZED BY ROUTINE PROCEDURE  
INNOVATOR NOT GIVEN /SPACE/DEFENSE CORP./ NOV. 1965  
HQ-18

Test monkeys are safely anesthetized for five minutes by confining them for less than six minutes in enclosures containing a controlled volume of ether. Thus the monkeys can be properly and safely positioned on test couches and fitted with electrodes or other devices prior to physiological tests.

B66-10049  
IMPROVED ELECTRODE PASTE PROVIDES RELIABLE  
MEASUREMENT OF GALVANIC SKIN RESPONSE  
DAY, J. L. FEB. 1966 SEE ALSO B64-10025 AND  
B65-10015  
MSC-146

High-conductivity electrode paste is used in obtaining accurate skin resistance or skin potential measurements. The paste is isotonic to perspiration, is nonirritating and nonsensitizing, and has an extended shelf life.

B66-10117  
MICROORGANISMS DETECTED BY ENZYME-CATALYZED  
REACTION  
VANGO, S. P. WEETALL, H. H. WELIKY, N. MAR. 1966  
JPL-782

Enzymes detect the presence of microorganisms in soils. The enzyme lysozyme is used to release the enzyme catalase from the microorganisms in a soil sample. The catalase catalyzes the decomposition of added hydrogen peroxide to produce oxygen which is detected manometrically. The partial pressure of the oxygen serves as an index of the sample's bacteria content.

B66-10118  
INTEGRAL SKIN ELECTRODE FOR  
ELECTROCARDIOGRAPHY IS EXPENDABLE  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1966  
MSC-299

Inexpensive, expendable skin electrode for use in electrocardiography combines an electrical contact, conductive paste, and a skin-attachment adhesive. Application of the electrode requires only degreasing of the skin area.

B66-10154  
PHONOCARDIOGRAPH SYSTEM MONITORS HEART SOUNDS  
INNOVATOR NOT GIVEN /BECKMAN INSTR., INC./ APR. 1966  
MSC-185

Phonocardiograph system monitors the mechanical

activity of the heart in extreme environments. It uses a piezoelectric-crystal microphone with an integral preamplifier, and a signal conditioner having special frequency characteristics. The output signals can be recorded on tape, presented aurally, or transmitted telemetrically to a remote station.

**B66-10184**  
**SELF-INFLATING LIFEVEST STORES IN SMALL PACKAGE**  
 RADNOFSKY, M. I. MAY 1966  
 MSC-5A

Emergency lifevest is inflated with carbon dioxide from a self-contained cartridge in 10 seconds. When deflated, it fits into a package occupying less than 20 cubic inches and weighing less than one pound.

**B66-10252**  
**SEMICONDUCTOR FORMS BIOMEDICAL RADIATION PROBE**  
 BURNS, F. P. FRIEDERICKS, J. E. /SOLID STATE RADIATION, INC./ JUN. 1966  
 MSC-320

Semiconductor radiation dosimeter in the form of a slender probe is easily inserted into body tissue. The probe has a signal-to-noise ratio that is acceptable to recording equipment and provides realistic measurements of the spatial and energy distributions of radiant electrons and protons.

**B66-10314**  
**PHONOCARDIOGRAPH MICROPHONE IS RUGGED AND MOISTUREPROOF**  
 YOUNG, W. J. JUL. 1966  
 MSC-212

Microphone used as a phonocardiograph transducer monitors small amplitude audio signals in the presence of large shock loads and high humidity. It contains a lead zirconate-lead titanate piezoelectric plate encapsulated in a flexible polyurethane resin. The resin is contained in a sealed nylon case having a diameter of less than one inch.

**B66-10406**  
**PLANT RESPIROMETER ENABLES HIGH RESOLUTION OF OXYGEN CONSUMPTION RATES**  
 FOSTER, D. L. /SPACE DEFENSE CORP./ SEP. 1966  
 HQ-47

Plant respirometer permits high resolution of relatively small changes in the rate of oxygen consumed by plant organisms undergoing oxidative metabolism in a nonphotosynthetic state. The two stage supply and monitoring system operates by a differential pressure transducer and provides a calibrated output by digital or analog signals.

**B66-10468**  
**RADON GAS, USEFUL FOR MEDICAL PURPOSES, SAFELY FIXED IN QUARTZ**  
 FIELDS, P. R. MOSHE, H. Z. STEIN, L. NOV. 1966  
 ARG-2

Radon gas is enclosed in quartz or glass ampules by subjecting the gas sealed at a low pressure in the ampules to an ionization process. This process is useful for preparing fixed radon sources for radiological treatment of malignancies, without the danger of releasing radioactive gases.

**B66-10515**  
**APPARATUS ENABLES AUTOMATIC MICROANALYSIS OF BODY FLUIDS**  
 SOFFEN, G. A. STUART, J. L. NOV. 1966  
 JPL-962

Apparatus will automatically and quantitatively determine body fluid constituents which are amenable to analysis by fluorometry or colorimetry. The results of tests are displayed as percentages of full scale deflection on a strip-chart recorder. The apparatus can also be adapted for microanalysis of various other fluids.

**B66-10647**  
**MODIFIED ALGESIMETER PROVIDES ACCURATE DEPTH MEASUREMENTS**  
 TURNER, D. P. /N. AM. AVIATION/ DEC. 1966  
 MSC-616

Algesimeter which incorporates a standard sensory needle with a sensitive micrometer, measures needle point depth penetration in pain tolerance research. This algesimeter provides an inexpensive, precise instrument with assured validity of recordings in those biomedical areas with a requirement for repeated pain detection or ascertaining pain sensitivity.

**B66-10649**  
**SPRAY-ON ELECTRODES ENABLE EKG MONITORING OF PHYSICALLY ACTIVE SUBJECTS**  
 DEC. 1966 SEE ALSO NASA-TN-D-3414  
 FRC-36

Easily applied EKG electrodes monitor the heart signals of human subjects engaged in various physical exercises. The electrodes are formed from an air drying, electrically conductive cement mixture that can be applied to the skin by means of a modified commercially available spray gun.

**B67-10005**  
**DIGITAL COMPUTER PROCESSING OF X-RAY PHOTOS**  
 NATHAN, R. SELZER, R. H. JAN. 1967  
 JPL-792

Digital computers correct various distortions in medical and biological photographs. One of the principal methods of computer enhancement involves the use of a two-dimensional digital filter to modify the frequency spectrum of the picture. Another computer processing method is image subtraction.

**B67-10056**  
**ADJUSTABLE HINGE PERMITS MOVEMENT OF KNEE IN PLASTER CAST**  
 MALEY, W. E. MAR. 1967  
 M-FS-1756

Metal knee hinge with an adjustable sleeve worn on the outside of a leg cast facilitates movement of the knee joint. This helps eliminate stiffness of the knee and eliminates bulkiness and adjustment difficulty.

**B67-10114**  
**INTEGRATED MOBILITY MEASUREMENT AND NOTATION SYSTEM**  
 ROEBUCK, J. A., JR. /N. AM. AVIATION/ MAY 1967  
 MSC-726

System for description of movements and positions facilitates design of space suits with more mobility. This measurement and notation system gives concise and unequivocal descriptions, compatible with engineering analysis and applicable to specific needs.

**B67-10129**  
**ION EXCHANGE DETERMINES IODINE-131 CONCENTRATION IN AQUEOUS SAMPLES**  
 FAIRMAN, W. D. SEDLET, J. MAY 1967  
 ARG-208

Inorganic radioiodide in aqueous media is analyzed by separating the radioactive iodine-131 as the iodide ion on a silver chloride column. The activity in the final precipitate may be determined by beta or gamma counting.

**B67-10188**  
**URANYL PHTHALOCYANINES SHOW PROMISE IN THE TREATMENT OF BRAIN TUMORS**  
 FRIGERIO, N. A. JUN. 1967 SEE ALSO ANL-6910  
 ARG-100

Processes synthesize sulfonated and nonsulfonated uranyl phthalocyanines for application in neutron therapy of brain tumors. Tests indicate that the compounds are advantageous over the previously used boron and lithium compounds.

**B67-10207**  
**SELF-SEALING CLOSURE ENABLES ACCESS TO SEVERAL FLUID CONTAINERS**  
 WHEELER, S. B. JUN. 1967  
 NPO-10123

Self-sealing closure enables small amounts of specific biochemical solutions to be withdrawn from or added to containers in inaccessible or small spaces. It uses a self-sealing septum of a silicone elastomer through which a hypodermic needle can be inserted.

B67-10245

AUTOMATED URINALYSIS TECHNIQUE DETERMINES  
CONCENTRATION OF CREATINE AND CREATININE BY  
COLORIMETRY

RHO, J. H. JUL. 1967  
NPO-10149

Continuous urinalysis technique is useful in the study of muscle wastage in primates. Creatinine concentration in urine is determined in an aliquot mixture by a color reaction. Creatine is determined in a second aliquot by converting it to creatinine and measuring the difference in color intensity between the two aliquots.

B67-10252

BLOOD OXYGEN SATURATION DETERMINED BY  
TRANSMISSION SPECTROPHOTOMETRY OF  
HEMOLYZED BLOOD SAMPLES

MALIK, W. M. /INST. OF MED. SCIENCES/ AUG. 1967  
MSC-11018

Use of the Lambert-Bear Transmission Law determines blood oxygen saturation of hemolyzed blood samples. This simplified method is based on the difference in optical absorption properties of hemoglobin and oxyhemoglobin.

B67-10304

CYTOLOGY IS ADVANCED BY STUDYING EFFECTS  
OF DEUTERIUM ENVIRONMENT

BOSE, S. /BOSE RES. INST./ FLAUMENHAFT, E.  
/UNIV. OF AKRON/ CRESPI, H. L. KATZ, J. J.  
AUG. 1967

Research of deuterium effects on biological systems shows deuteration is not incompatible with life. With the successful cultivation of deuterated bacteria, work is now being done on extraction of deuterio-compounds from bacteria.

B67-10305

LIQUID MICRURGY CHAMBER AND MICROSYRINGE  
DESIGNS ALLOW MORE EFFICIENT  
MICROMANIPULATIONS

DANIELS, E. W. AUG. 1967  
ARG-251

More efficient micromanipulations on large amoebae achieved by liquid micrurgy chamber and microsyringe. These innovations move the system closer to the specimen, and flatten the specimen for a clear view of the nuclei, also eliminating spherical aberration and evaporation.

B67-10332

HAND-HELD INSTRUMENT SHOULD RELIEVE  
HEMATOMA PRESSURE

RAGGIO, L. J. ROBERTSON, T. L. SEP. 1967  
MSC-599

Portable instrument relieves hematomas beneath fingernails and toenails without surgery. This device simplifies the operative procedure with an instant variable heating tip, adjustable depth settings and interchangeable tip sizes for cauterizing small areas and relieving pressurized clots.

B67-10395

LARGE VOLUME CONTINUOUS COUNTERFLOW  
DIALYZER HAS HIGH EFFICIENCY

MANDELES, S. WOODS, E. C. /CALIF. UNIV./ OCT. 1967

HQ-10055

Dialyzer separates macromolecules from small molecules in large volumes of solution. It takes advantage of the high area/volume ratio in commercially available 1/4-inch dialysis tubing and maintains a high concentration gradient at the dialyzing surface by counterflow.

B67-10408

IMPROVED SAMPLE CAPSULE FOR DETERMINATION  
OF OXYGEN IN HEMOLYZED BLOOD

MALIK, W. M. /PRESBYTERIAN ME. CENTER/ OCT. 1967  
MSC-11017

Sample capsule for determination of oxygen in hemolyzed blood consists of a measured section of polytetrafluoroethylene tubing equipped at each end with a connector and a stopcock valve. This method eliminates errors from air entrainment or from the use of mercury or syringe lubricant.

B67-10500

EFFECT OF PREPARATION PROCEDURES ON  
INTENSITY OF RADIOAUTOGRAPHIC LABELING IS  
STUDIED

BASERGA, R. KISIELESKI, W. E. DEC. 1967  
ARG-10032

Effects of tissue preparation and extractive procedures on the intensity of radioautographic labeling are presented in terms of mean grain count per cell in cells labeled with tritiated precursors of proteins or nucleic acids. This information would be of interest to medical researchers and cytologists.

B67-10556

CONTINUOUS MICROBIAL CULTURES MAINTAINED  
BY ELECTRONICALLY-CONTROLLED DEVICE

EISLER, W. J., JR. WEBB, R. B. DEC. 1967  
ARG-177

Photocell-controlled instrument maintains microbial culture. It uses commercially available chemostat glassware, provides adequate aeration through bubbling of the culture, maintains the population size and density, continuously records growth rates over small increments of time, and, contains a simple, sterilizable nutrient control mechanism.

B67-10590

ULTRAVIOLET MICROSCOPY AIDS IN CYTOLOGICAL  
AND BIOMEDICAL RESEARCH

SCHLENK, F. SVIHLA, B. DEC. 1967 SEE ALSO  
ANL-6971

ARG-178

Ultraviolet microscopy is used by cytologists and biochemists to study the morphological and physiological changes in the living cell under varied culture conditions. The yeast cell is used because of its content of ultraviolet-absorbing materials and its lack of motility.

B67-10604

STUDY MADE OF RELATIONSHIP BETWEEN GROWTH  
AND METABOLISM

SURREY, K. DEC. 1967  
ARG-10046

Study shows that the growth of X-irradiated sunflower seeds is inversely related to the metabolism of the seeds. The actual magnitudes of the relation between the two differed for various ranges of X-ray exposure. The results of the study suggested that the X-rays affected the embryo.

B67-10663

REVIEW OF BIOLOGICAL MECHANISMS FOR  
APPLICATION TO INSTRUMENT DESIGN

HEALER, J. /ALLIED RES. ASSOCIATES/ DEC. 1967  
HQ-33

Biological sensors are the mechanisms which enable a living organism to monitor its environment. Ways in which the functional mechanism of biosensors can be applied to develop new concepts of instrumentation, enhance and extend the human senses, and improve the sensitivity of existing instrumentation are described in a review of these mechanisms.

## 05 MECHANICAL

B63-10007

HIGH PURITY ELECTROFORMING YIELDS SUPERIOR  
METAL MODELS

HAEFELI, R. M. HOUSTON, J. P. JAN. 1964  
ARC-6

Ultrasonic electroforming has proven successful in making high purity metal models for heat transfer studies. This process provides smooth, pit-free models.

B63-10008

VACUUM FORMING OF THERMOPLASTIC SHEET RESULTS  
IN LOW-COST INVESTMENT CASTING PATTERNS

CLARKE, A. E., JR. MAR. 1964  
ARC-7

Vacuum forming of a sheet of thermoplastic

material around a mandrel conforming to the shape of the finished object provides a pattern for an investment mold. The thickness of the metal part is determined by the thickness of the plastic pattern.

**B63-10009**  
CHAIN FRICTION SYSTEM GIVES POSITIVE, REVERSIBLE DRIVE

DAVIDSEN, J. S. APR. 1964  
ARC-8

By cementing a strip of an elastomer to the smooth metal rim of the pulley and neoprene covered idlers providing suitable tension to the chain around the pulley, a positive reversible drive is accomplished more quietly and with less vibration.

**B63-10023**  
V-SLOTTED SCREW HEAD AND MATCHING DRIVING TOOL FACILITATE INSERTION AND REMOVAL OF SCREW FASTENERS

HANDLEY, M. G. JAN. 1964  
FRC-16

A V-slotted designed screw and a screwdriver with a V-shaped tang facilitate driving the screw into difficult locations and minimize axial forces thus avoiding damage to the screw.

**B63-10123**  
ELASTIC ORIFICE AUTOMATICALLY REGULATES GAS BEARINGS

BATSCH, F. LAUB, J. L. JUN. 1964  
JPL-135

An elastic, pressure-sensitive orifice is used to automatically regulate the rate of gas flow into bearings under varying loads. Formed of a molded elastomer, tests show these orifices increase the stability of gas bearings.

**B63-10139**  
METHOD OF WELDING JOINT IN CLOSED VESSEL IMPROVES QUALITY OF SEAM

FREEMAN, R. LEVOE, C. MAY 1964  
JPL-170

To facilitate welding of closed vessels, a metal backup strip is used at the junction inside the vessel. After welding from the outside, this strip is dissolved by a chemically reactive solvent poured through a filler hole into the vessel.

**B63-10141**  
VENTED PISTON SEAL PREVENTS FLUID LEAKAGE BETWEEN TWO CHAMBERS

MAC GLASHAN, W. F. MORRISON, R. DEC. 1964  
JPL-179

To prevent fluid leakage around piston seals separating two fluids under differential pressure, a venting system has been devised. Two methods may be used for venting seals through internal passages to an external low-pressure area, O-ring or split-ring seals.

**B63-10143**  
COINCIDENT SWITCH CLOSING REDUCES ERROR IN MOTOR-DRIVEN TIMER

RICH, S. DEC. 1964  
JPL-182

To cut the lag-lead in motor-driven timing devices, the timing circuit has been extended to include a second switch. This is actuated in time with the first but driven directly at a speed  $x$  times faster than the first.

**B63-10170**  
HIGH-PRESSURE REGULATING SYSTEM PREVENTS PRESSURE SURGES

KELLER, O. F. MAC GLASHAN, W. F. JUN. 1964 /SEE U.S. PATENT NO. 3,105,515/  
JPL-231

Gas flow is controlled by means of a pressure regulating system which prevents pressure surges. A high-pressure fluid source, a spring-loaded fluid-damped regulator valve, an accumulator, a conventional normally closed command valve, and a control valve are the main components.

**B63-10198**  
DEVICE TRANSMITS ROTARY MOTION THROUGH

HERMETICALLY SEALED WALL  
PORTER, R. N. APR. 1964  
JPL-303

A wobble plate, metal bellows, and two shafts, assembled in a four-section housing, make it possible to transmit rotary motion through a hermetically sealed wall. In operation a rotational torque is developed by the wobble plate.

**B63-10200**  
APPARATUS OF SMALL SIZE CAN BE EXTENDED INTO LONG, RIGID BOOM

MILLER, J. V. MAY 1964  
JPL-305

Three metal sheets, having prenotched edges, are interlocked as they are unrolled from three feed rollers, which form a triangle. The apparatus is relatively small, and the sheets can be erected into a rigid triangular boom of considerable length.

**B63-10226**  
SELF SEALING DISCONNECT FOR TUBING FORMS METAL SEAL AFTER BREAKAWAY

GERNANDT, H. H. JAN. 1964  
JPL-354

Disconnect fittings form a positive metal seal when the fill tube pulls against a metal sleeve when disconnected by force. A specially designed sleeve surrounds the fill tube. O-rings in the shoulder of the sleeve and near the outer end of the fill tube seal against leakage.

**B63-10228**  
PACKLESS VALVE WITH ALL-METAL SEAL HANDLES WIDE TEMPERATURE, PRESSURE RANGE

MAC GLASHAN, W. F. MAR. 1964  
JPL-361

A durable line valve utilizes stacked metal disks to seal off an inlet port. No packing or shaft sealing is needed, and the valve operates satisfactorily over a wide temperature and pressure range.

**B63-10236**  
LIGHTWEIGHT UNIVERSAL JOINT TRANSMITS BOTH TORQUE AND THRUST

BAMFORD, R. M. JAN. 1964  
JPL-375

A lightweight universal joint uses a thin steel flexure plate to transmit torque and a steel rod to transmit thrust. Both the plate and rod are independently mounted and can act individually.

**B63-10237**  
SUPERCOLD TECHNIQUE DUPLICATES MAGNETIC FIELD IN SECOND SUPERCONDUCTOR

HILDEBRANDT, A. F. NOV. 1964  
JPL-376

A superconductor cylinder, charged with a high magnetic field, can be used to create a similar field in a larger cylinder. The uncharged cylinder is precooled, lowered into a helium dewar system, and fitted around the cylinder with the magnetic field. Magnetic flux lines pass through the two cylinders.

**B63-10240**  
SLEEVE AND CUTTER SIMPLIFY DISCONNECTING WELDED JOINT IN TUBING

PERKINS, G. S. APR. 1964  
JPL-384

To test equipment, welded tubing joints may have to be disconnected and rewelded. To eliminate rewelding, a nonstandard welding sleeve permits the tubing to be welded and then disconnected by a specially designed sleeve cutter. Use of this tool assures that only the sleeve is cut.

**B63-10241**  
VEITCH DIAGRAM PLOTTER SIMPLIFIES BOOLEAN FUNCTIONS

RUBIN, D. K. APR. 1964  
JPL-385

This device for simplifying the plotting of a Veitch diagram consists of several overlays for blocking out the unwanted squares. This method of plotting the various input combinations to a



computer is used in conjunction with the boolean functions.

B63-10247

NEW PACKAGE FOR BELLEVILLE SPRING PERMITS RATE CHANGE, EASY DISASSEMBLY  
MAC GLASHAN, W. F. MAR. 1964

JPL-392

A spring package, with grooves to hold the spring washers at the inner and outer edges, reduces hysteresis to a minimum. Three-segment retainers permit easy disassembly so that the spring rate can be changed.

B63-10251

HELICAL TUBE SEPARATES NITROGEN GAS FROM LIQUID NITROGEN

STEPHENS, J. B. JUN. 1964

JPL-398

To prevent a boiloff problem, liquid nitrogen flowing from a storage tank to a container, is separated into liquid and gaseous components. This is accomplished by centrifugal and venting action, using a section of perforated helical aluminum tubing.

B63-10289

FRICTIONAL WEDGE SHOCK MOUNT IS INEXPENSIVE, HAS GOOD DAMPING CHARACTERISTICS

TENER, W. M. MAY 1964

JPL-IT-1001

A wedge-shaped shock mount uses rubber for energy absorption, and the frictional characteristics of ordinary brake material for damping.

B63-10291

SPECIAL PLIERS CONNECT HOSE CONTAINING LIQUID UNDER PRESSURE

BLAYDES, R. A. MAR. 1964

JPL-IT-1003

For speed and safety in handling disconnect fittings on a hose carrying liquid under pressure, special pliers have been constructed. A gear and rack mechanism is combined with two or more wide-opening U-shaped jaws which are placed over the quick-disconnect fittings.

B63-10292

HEAVY-DUTY STAPLE REMOVER OPERATED BY HAND

MORRISON, T. RENNER, R. MAR. 1964

JPL-IT-1004

To remove staples from thick reports, a rooter, bending hook and post are incorporated into a heavy duty hand tool. This makes possible one-step extraction of long staples.

B63-10304

BREAK-UP OF METAL TUBE MAKES ONE-TIME SHOCK ABSORBER, BARS REBOUND

HATHAWAY, M. MC GEHEE, J. R. ZAVADA, E. FEB. 1964 /SEE NASA-TN-D-1477/

LANGLEY-1A

A frangible metal tube has the capability to dissipate the energy generated when a vehicle lands with excessive velocity. The tube is so placed that, at impact, it is forced against a die and, as it fragments, energy is absorbed.

B63-10340

CRYOPUMPING OF HYDROGEN IN VACUUM CHAMBERS IS AIDED BY CATALYTIC OXIDATION OF HYDROGEN

CHILDS, J. H. GROBMAN, J. RAYLE, W. JUN. 1964 /SEE NASA-TN-D-863/

LEWIS-15

Vacuum test facilities are required for high speed cryopumping of gaseous hydrogen at low pressures. One method involves the catalytic oxidation of hydrogen and condensation of the resulting water on a liquid nitrogen-cooled surface.

B63-10341

DESIGN OF VALVE PERMITS SEALING EVEN IF THE STEM IS MISALIGNED

SCHMIDT, H. W. JAN. 1964

LEWIS-38

A conical-walled valve plug is designed to seal against a recessed spherical valve seat. This insures proper sealing during numerous seating cycles even though the valve stem is misaligned or

forced out of its proper axis.

B63-10354

RAPID BILLET LOADER AIDS EXTRUSION OF REFRACTORY METALS

DOLINSHEK, A. F. HERMAN, L. E. APR. 1964

LEWIS-50

A combination gravity and manually powered rapid billet loader reduces the time required for transferring hot metal billets from a heating furnace to an extrusion press. Positioned between the furnace and extrusion press, this loader is a simple slide-delivery device.

B63-10367

CONNECTOR FOR VACUUM-JACKETED LINES CUTS TUBING SYSTEM COST

CALVERT, H. F. MAY 1964

LEWIS-66

A low-cost fitting, fabricated from standard connectors, is used for disconnecting flow lines in cryogenic systems. Utilizing vacuum-jacketed lines made from two sizes of tubing welded at the ends, the connectors are stronger and setup time is reduced.

B63-10368

COMPOSITE, VACUUM-JACKETED TUBING REPLACES BELLOWS IN CRYOGENIC SYSTEMS

CALVERT, H. F. JUN. 1964

LEWIS-67

For reliability control of high pressure cryogenic systems, one or more 90 degree elbow expansion devices are substituted for the metal bellows normally used. The device consists of a conducting tube inside a support tube, with the space between the tubes evacuated for insulation.

B63-10376

NOVEL CLAMPS ALIGN LARGE ROCKET CASES, ELIMINATE BACK-UP BARS

FRANKLIN, W. J. MARTIN, N. C. JAN. 1964

M-FS-1

Welding clamps, placed inside and outside a rocket case, hold it in proper alignment during tungsten inert gas welding. These metal blocks, connected by a stainless steel band, eliminate the need for backup bars.

B63-10384

VACUUM-TYPE BACKUP BAR SPEEDS WELD REPAIRS

CARMODY, R. J. AUG. 1964

M-FS-12

A backup bar designed to use both vacuum and air pressure provides a method of sealing the weld root of a faulty section of seam weld. With slight redesign, the bar can be made sufficiently flexible to fit any large cylindrical surface.

B63-10385

FLEXIBLE HONEYCOMB STRUCTURE CAN BEND TO FIT COMPOUND CURVES

CARMODY, R. J. APR. 1964

M-FS-13

For flexibility in forming a curved surface, a honeycomb configuration using multiple pleats has proved superior to the usual core structures. The partial pleats formed in individual cell walls permit movements to and from the central axis without tearing.

B63-10387

PORTABLE FLOORING PROTECTS FINISHED SURFACES, IS EASILY MOVED

CARMODY, R. J. MAR. 1964

M-FS-15

To protect curved, finished surface and provide support for workmen, portable flooring has been made from rigid plastic foam blocks, faced with aluminum strips. Held together by nylon webbing, the flooring can be rolled up for easy carrying.

B63-10420

SIMPLE MECHANISM COMBINES POSITIVE LOCKING AND QUICK-RELEASE FEATURES

CLAYTON, L. B. /HUGHES AIRCRAFT CO./ FEB. 1964

WOO-4

For secure locking and quick release of two objects, this device uses a spring-loaded slotted

bolt, locked in position by two retainer arms. When these retainer arms are freed from contact, the bolt is ejected and the objects released.

**B63-10431**  
HIGH-TEMPERATURE, HIGH-PRESSURE SPHERICAL SEGMENT VALVE PROVIDES QUICK OPENING  
GIOVANNETTI, A. HIMMELRIGHT, R. MEYER, K.  
NITTA, H. APR. 1964  
ARC-13

A hollow spherical segment valve with an eccentric permits non-rubbing closure and provides a means for gas-cooling the seal. The design allows quick opening at high temperatures and discharge pressures.

**B63-10435**  
PORTABLE DISPLAY PANELING HAS WIDE USE, EASY TAKE DOWN AND ASSEMBLY  
DEVOTO, H. J., JR. MAR. 1964  
ARC-17

Design for a modular display panel is based on a cross-shaped corner connector and wooden lattice bars. The bars are fitted into the arms of the metal connector and a pocket slot holds a modular-size panel.

**B63-10442**  
KINETIC-ENERGY ABSORBER EMPLOYS FRICTIONAL FORCE BETWEEN MATING CYLINDERS  
CONRAD, E. W. MAY 1964  
LEWIS-75

A kinetic energy absorbing device uses a series of coaxial, mating cylindrical surfaces. These surfaces have high frictional resistance to relative motion when axial impact forces are applied. The device is designed for safe deceleration of vehicles impacting on landing surfaces.

**B63-10489**  
FINE-PARTICLE FILTER PREVENTS DAMAGE TO VACUUM PUMPS  
HARLAMERT, P., JR. APR. 1964  
LEWIS-106

A filter system for mechanical pumps is designed with a baffle assembly that rotates in a circulating oil bath which traps destructive particles. This prevents severe damage to the pump and is serviceable for long periods before it requires cleaning.

**B63-10497**  
INTEGRAL COOLANT CHANNELS SIMPLY MADE BY MELT-OUT METHOD  
ESCHER, W. J. D. JUN. 1964  
M-FS-91

A melt-out method of constructing strong, pressure-tight fluid coolant channels for chambers is accomplished by cementing pins to the surface and by depositing a melt-out material on the surface followed by two layers of epoxy-resin impregnated glass fibers. The structure is heated to melt out the low-melting alloy.

**B63-10502**  
FLUID-PRESSURE METER CAN BE CALIBRATED WITHOUT REMOVAL FROM FLOW LINE  
MELTON, D. E. MAR. 1964  
M-FS-98

The construction of a fluid pressure meter with two inlet ports, flexible diaphragms and a pressure-responsive transducer is described. One port can be connected to the line and the other to a source of standard pressures for calibration.

**B63-10517**  
MINIATURE OXYGEN-HYDROGEN CUTTING TORCH CONSTRUCTED FROM HYPODERMIC NEEDLE  
SHLICHTA, P. APR. 1964  
JPL-545

A miniature cutting torch consisting of a main body member, upon which the hydrogen and oxygen containers are mounted, valves for controlling gas flow, and a hypodermic needle that acts as a mixing tube and flame tip is constructed.

**B63-10519**  
TOOL FACILITATES SEALING OF METAL FILL TUBES

COOLEY, H. H., JR. /UNITED AIRCRAFT CORP./ JUL. 1964  
MSC-24

A hand tool is designed for sealing metal fill tubes containing corrosive or inflammable liquids without the use of heat or open flame. The tool aligns the fill tube into which a tapered sealing pin is dropped and driven below the neck of tube.

**B63-10526**  
BUILT-IN TEMPLATES SPEED UP PROCESS FOR MAKING ACCURATE MODELS  
FEB. 1964  
LANGLEY-23

From accurate scale drawings of a model, photographic negatives of the cross sections are printed on thin sheets of aluminum. These cross-section images are cut out and mounted, and mahogany blocks placed between them. The wood can be worked down using the aluminum as a built-in template.

**B63-10530**  
NEW ANEMOMETER HAS FAST RESPONSE, MEASURES DYNAMIC PRESSURE DIRECTLY  
LYNCH, J. W. REED, W. H., III OCT. 1964  
LANGLEY-28

A simple anemometer having a fast response to high frequency wind fluctuations by direct measurement of two drag-force components in orthogonal planes is described. It may be used to determine wind profiles to extensive heights and would be helpful in takeoff and landing of light planes.

**B63-10547**  
ELLIPSOIDAL OPTICAL REFLECTORS REPRODUCED BY ELECTROFORMING  
HUNGERFORD, W. J. LARMER, J. W. LEVINSON, M. OCT. 1964  
GSFC-92

An accurately dimensioned convex ellipsoidal surface, which will become a master after polishing, is fabricated from 316L stainless steel. When polishing of the master is completed, it is suspended in a modified watt bath for electroforming of nickel reflectors.

**B63-10556**  
LATHE CONVERTED FOR GRINDING ASPHERIC SURFACES  
LARMER, J. W. LEVINSON, M. MC CRAW, D. PESSAGNO, E. H. TAUB, F. J. JUL. 1964  
GSFC-115

A standard overarm tracing lathe converted by the addition of an independently driven diamond grinding wheel is used for grinding aspheric surfaces. The motion of the wheel is controlled by the lathe air tracer following the template which produces the desired aspheric profile.

**B63-10558**  
NEW METHOD FORMS BOND LINE FREE OF VOIDS  
KING, C. B. OCT. 1964  
LANGLEY-20

A new bonding method using vacuum, pressure and heat, which produces a bond line free of voids, is described. This method is very successful in bonding ablation shields to a magnesium structural component in simulated reentry tests involving great heat and air turbulence.

**B63-10560**  
CAMERA SHUTTER IS ACTUATED BY ELECTRIC SIGNAL  
NEFF, J. E. NOV. 1964  
ARC-20

A rotary solenoid energized by an electric signal opens a camera shutter and when the solenoid is de-energized a spring closes it. By the use of a microswitch, the shutter may be opened and closed in one continuous, rapid operation when the solenoid is actuated.

**B63-10564**  
A TECHNIQUE FOR MAKING ANIMAL RESTRAINTS  
CLARKE, A. E., JR. REITMAN, J. SEP. 1964  
ARC-25

A contoured shell for restraining animals is made by thermoforming plastic over the anesthetized, frozen specimen. It may be vented, or pieces may be cut out to facilitate working in localized

areas.

B63-10568  
PLASTIC MOLDS REDUCE COST OF ENCAPSULATING  
ELECTRIC CABLE CONNECTORS  
KNOTT, D. NOV. 1964  
M-FS-69

Resin casting of the aluminum master pattern forms a plastic mold for encapsulating a cable connector. An elastomer is injected into the mold and cured. The mold is disassembled leaving an elastomeric encapsulation around the connector.

B63-10571  
SELF-BALANCING BEAM PERMITS SAFE, EASY LOAD  
HANDLING UNDER OVERHANG  
EDWARDS, O. H. MAR. 1964  
M-FS-84

The use of a self-balancing I-beam with a counterweight and motor simplifies moving heavy loads that are inaccessible for cranes. The beam cannot be overloaded, as the counterweight will not balance the load, and thus acts as an automatic safety device.

B63-10590  
STAINLESS-STEEL ELBOWS FORMED BY SPIN FORGING  
INNOVATOR NOT GIVEN /CHANCE-VOUGHT CORP./ DEC.  
1964  
M-FS-122

Large seamless austenitic stainless steel elbows are fabricated by spin forging /rotary shear forming/. A specially designed spin forging tool for mounting on a hydrospro machine has been built for this purpose.

B64-10001  
NEW INFLATABLE LIFERAFT IS NONTIPPABLE  
RADNOFSKY, M. I. SHEWMAKE, G. A. MAR. 1964 /SEE  
NASA-TN-D-1083/  
MSC-4A

A one-seamed lightweight life raft has three underwater ballast buckets as stabilizers. Nontippable, it can be compactly packaged and inflated with carbon dioxide.

B64-10006  
SPEED-SENSING DEVICE AIDS CRANE OPERATORS  
OCT. 1964  
WS-4

So that crane operators can judge payload movements accurately, a friction-driven multilobed cam device energizes a buzzer and indicator lamp in the crane cab. The signal frequency of this speed sensor has a sensitivity to hoist movement of 1/8 inch.

B64-10011  
METAL STRIP FORMS 21 FOOT BOOM, ROLLS UP FOR  
COMPACT STORAGE  
INNOVATOR NOT GIVEN /CANADIAN COMMERCIAL CORP./  
MAY 1964  
GSFC-151

An extensible boom, carrying three separate electric conductor tapes, can be rolled into a compact storage drum. The tape is curved in cross section so that the boom automatically forms a tube as it is extended.

B64-10014  
GUIDE FOR EXTRUSION DIES ELIMINATES  
STRAIGHTENING OPERATION  
GYORGAK, C. A. HOOVER, R. J. NOV. 1964  
LEWIS-152

To prevent distortion of extruded metal, a guidance assembly is aligned with the die. As the metal emerges from the extrusion dies, it passes directly into the receiver and straightening tube system, and the completed extrusion is withdrawn.

B64-10015  
COMFORTABLE, LIGHTWEIGHT SAFETY HELMET HOLDS  
RADIO TRANSMITTER, RECEIVER  
ATLAS, N. D. /N. AM. AVIATION/ MAY 1964  
MSC-53

For two-way radio communication where safety gear is required, a lightweight helmet with few protrusions has been designed. The electronics components and power supply are mounted between

the inner and outer shells, and resilient padding is used for the lining.

B64-10021  
PRESSURE TRANSDUCER 3/8-INCH IN SIZE CAN BE  
FAIRED INTO SURFACE  
SCHAFER, R. J. /N. AM. AVIATION/ MAY 1964  
WOO-065

To measure fluid pressure with minimum disturbance to fluid flow, a miniature pressure transducer can be imbedded and faired into the test surface. Incorporated in the design are piezoresistive elements, mounted on a diaphragm, which transform pressure strains into an electrical signal.

B64-10028  
QUICK-ACTING CLUTCH DISENGAGES IDLE DRIVE  
MOTOR  
STARK, K. W. AUG. 1964  
GSFC-143

Positive-drive, no drag, over-running clutch is developed to conserve power of idle motor in a low-power system using multiple drive motors. This device is useful where a number of shaft speeds are required with frequent shifting.

B64-10031  
MULTIPLE PORT PRESSURE SCANNER VALVE FEATURES  
GREATER ACCURACY, QUICKER DATA  
VINCENT, E. R. SEP. 1964  
JPL-555

A fast, accurate, multipressure measuring system, which employs a multiple port pressure scanning valve that connects a pressure transducer to many pressures, is described.

B64-10050  
MODIFIED GAS BEARING IS ADJUSTABLE TO OPTIMUM  
STIFFNESS RATIO  
EVANS, J. L. AUG. 1964  
M-FS-145

Inexpensive and rapid-adjustments of the radial-to-axial stiffness ratio of a spherical gas bearing are achieved by a series of gas passages in the equatorial plane of the sphere which feed into orifices that can be readily changed in size.

B64-10058  
INSULATED WELD TOOLING PERMITS UNIFORM, HIGH-  
QUALITY WELD  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ AUG. 1964  
MSC-42

The application of a ceramic material coating to all surfaces contacting parts to be welded permits greater weld strength than the conventional weld tooling method.

B64-10066  
ENCAPSULATION PROCESS STERILIZES AND PRESERVES  
SURGICAL INSTRUMENTS  
MONTGOMERY, L. C. MORELLI, F. A. JUL. 1964  
JPL-484

Ethylene oxide is blended with an organic polymer to form a sterile material for encapsulating surgical instruments. The material does not bond to metal and can be easily removed when the instruments are needed.

B64-10069  
METAL-BENDING BRAKE FACILITATES LIGHTWEIGHT,  
CLOSE-TOLERANCE FABRICATION  
ERCOLINE, A. L. WILTON, K. B. OCT. 1964  
ARC-29

A lightweight, metal bending brake ensures very accurate bends. Features of the brake that adapt it for making complex reverse bends to close tolerances are a pronounced relief or cutaway of the underside of the bodyplate combined with modification in the leaf design and its suspension.

B64-10084  
MOLDED ELASTOMER PROVIDES COMPACT FERRITE-CORE  
HOLDER, SIMPLIFIES ASSEMBLY  
HAYDEN, R. R. NOV. 1964  
JPL-584

A ferrite-core holder, fabricated by casting an elastomer in a simple mold, simplifies the assembly of modular matrix units for computers.

Use of the device permits the core leads to be multiply threaded and soldered to terminals, without requiring intermediate terminals.

**B64-10119**  
BUCKLE JOINS WEB STRAPS QUICKLY, ADJUSTS EASILY  
WILKINSON, J. E. /CHANCE VUGHT CORP./ JUN. 1964  
LANGLEY-21

To join web straps used to hoist heavy loads, a novel buckle permits two straps to be quickly joined and held by the combined forces of strap load tension and friction.

**B64-10121**  
ELECTRONIC ASSEMBLY RACK PANELS SNAP ON AND OFF  
BAILEY, J. W. JUN. 1964  
GSFC-59

Snap fasteners on each side of an electronic assembly rack blank panel give quick access to the interior. Guide pins extending from the inside face easily slip into standard screw holes on the frame and provide additional support.

**B64-10124**  
ATTACHMENT CONVERTS MICROSCOPE TO POINT SOURCE AUTOCOLLIMATOR  
SHLICHTA, P. J. JUL. 1964  
JPL-499

A low-power microscope or telescope provides a simple means of autocollimation. This is done by fitting the instrument with a light source to permit alignment from a reflecting surface normal to the optic axis of the instrument.

**B64-10130**  
BEARING TRANSMITS ROTARY AND AXIAL MOTION  
DOW, N. F. PETERS, R. W. SEP. 1964  
LANGLEY-27

A low friction, two-component bearing comprised of a pair of ball-bearing races for transmitting rotary motion and an inner series of ball bearing assemblies for transmitting axial motion is described and should be useful in mechanisms such as stress-strain testing machines.

**B64-10141**  
PNEUMATIC POWER IS TRANSMITTED THROUGH AIR BEARING  
JOHNSON, H. I. WOBIG, D. A. JUL. 1964  
MSC-8

A more efficient method for supplying high pressure air to an air bearing and pneumatic equipment mounted on it has been developed. The system uses a conventional air bearing and an air-supported sphere with a central passage. High pressure air is channeled through it into the pneumatic equipment on the sphere.

**B64-10145**  
FLEXIBLE FASTENER ALLOWS THERMAL EXPANSION  
CRUMPLER, W. B. JUN. 1964  
LANGLEY-40

A flexible fastener permits thermal expansion of model skin sections which are rigidly attached to supporting structures in wind tunnel tests. The device uses a modified ball joint contact between the fastener and a skin section.

**B64-10164**  
UPSETTING BUTT EDGE INCREASES WELD-JOINT STRENGTH  
VESCO, D. OCT. 1964  
M-FS-175

Mechanical upsetting /a mode of cold forging/ of butt edges to be welded is accomplished by the use of hydraulic rams and pressure rollers. The mechanical upsetting increases the thickness of the material in the heat-affected zone and compensates for the lower specific strength per unit thickness common to this area.

**B64-10170**  
BALL BEARING USED IN DESIGN OF RUGGED FLOW-METER  
MINKIN, H. L. JAN. 1965  
LEWIS-159

A volumetric flowmeter which has a small magnet

imbedded in the outer perimeter of the turbine wheel or in the bearing permits measurement of liquid flow rates in the presence of wide ranges and violent surges.

**B64-10178**  
MACHINE TESTS CREASE DURABILITY OF SHEET MATERIALS  
JONES, L. K. STANFORD, H. B. NOV. 1964  
JPL-604

To test the crease resistance of sheet materials, the mid-section is folded over crease-control blades. One end is clamped to a motor-driven eccentric, the other to a spring, and durability is measured by the cycles required to produce failure.

**B64-10185**  
THREADING HOOK FACILITATES SAFE RECOVERY OF HEAVY LOADS  
ARTHUR, J. S. WILLIAMS, D. C. OCT. 1964  
MSC-46

A C-shaped threading hook and shuttle mounted on a spring-loaded driving rod located inside the long-handled pole are developed for recovering massive loads afloat in the sea.

**B64-10188**  
BLADE VALVE ISOLATES COMPARTMENT IN PIPE, OPENS TO ALLOW FREE FLOW  
IMUS, R. NOV. 1964  
JPL-585

Two thin blades are incorporated into a valve which, when closed, form a sealed compartment in the shock-tube portion of a pipeline. When forced open by an actuator, gas flows through the system.

**B64-10211**  
MICROMACHINING PRODUCES OPTICAL APERTURES TO MICRON DIMENSIONS  
WALCH, A. J. OCT. 1964  
GSFC-206

A micron dimensioned rectangular optical aperture is formed under a high-powered toolmaker's microscope by laying two knife-edged blocks over the miniature knife-edged hole in the base.

**B64-10223**  
TWO-PART VALVE ACTS AS QUICK COUPLING  
MAC GLASHAN, W. F., JR. NOV. 1964  
JPL-478

A two-part valve simplifies the problem of filling large tanks from smaller ones. One part acts as a check valve and remains integral to the recipient system, while the other part is integral to the donor system.

**B64-10249**  
INSTRUMENT ADJUSTMENT KNOB LOCKS TO PREVENT ACCIDENTAL MALADJUSTMENT  
INNOVATOR NOT GIVEN /LEAR SIEGLER CORP./ NOV. 1964  
M-FS-190

A device, incorporating a collar with a hexagonal opening which fits snugly over a hexagonal nut used to engage instrument panel components, keeps the adjustment knob locked. A quick release mechanism frees the knob for rotational adjustment.

**B64-10272**  
VISCIOUS-PENDULUM DAMPER SUPPRESSES STRUCTURAL VIBRATIONS  
REED, W. H., III NOV. 1964  
LANGLEY-45

The viscous pendulum damper consists of a cylinder containing round trays on which round lead slugs rest. When assembled, the container is filled with a viscous liquid and attached, with axis vertical, to the structure. The device permits varying the damping of structural vibrations.

**B64-10274**  
VEHICLE WALKS ON VARIED TERRAIN, CAN ASSIST HANDICAPPED PERSONS  
NOV. 1964  
WOO-005

A battery-powered motorized vehicle with three pairs of legs connected to push rods and a series

of linkages is constructed for traversing varied terrains. Two cams connected to the drive mechanism control the motion of the legs. The basic design may be adapted for use with motorized wheelchairs.

B64-10277  
APPARATUS ALTERS POSITION OF OBJECTS TO FACILITATE DEMAGNETIZATION  
RINARD, G. WATSON, J. D. NOV. 1964  
GSFC-234

An apparatus consisting of pulleys, a drive shaft and an inner compartment, in which components to be demagnetized are mounted, is constructed. Due to the speed ratio of the three frames, every point on a component in the inner compartment is cycled through an optimum locus in the demagnetization field.

B64-10278  
SENSITIVE LOW-PRESSURE RELIEF VALVE HAS POSITIVE SEATING AGAINST LEAKAGE  
INNOVATOR NOT GIVEN /N. AM. AVIATION / NOV. 1964  
WDO-041

A pilot-operated relief valve which provides positive seating against leakage in cryogenic systems is described. The principal advantage is that the pilot poppet is unaffected by variations in control pressures in the pilot cavity, and results in a more accurate sensing of inlet pressure conditions.

B64-10284  
APPARATUS MEASURES VERY SMALL THRUSTS  
INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ NOV. 1964  
WDO-048

Measurement of very small thrusts of an ion engine are made by mounting the engine on a platform supported by leaf springs which are loaded to have a zero spring constant. Measuring apparatus includes an inductive sensor, servo amplifier, and a counterthrust feedback system.

B64-10306  
COMPRESSED GAS SYSTEM OPERATES SEMITRAILER BRAKES DURING WINCHING OPERATION  
TUPPER, W. E. DEC. 1964  
JPL-0036

To move van-type semi-trailers into and out of confined spaces, an auxiliary braking system is mounted on a standard dolly converter. Compressed nitrogen is used to actuate the brakes which are used in conjunction with a power winch.

B64-10327  
CONNECTOR SEALS FLUID LINES AT CRYOGENIC TEMPERATURES AND HIGH VACUUMS  
KITTS, W. T. PLATT, P. K. JAN. 1965  
GSFC-253

A connector that will serve as a seal for fluids at cryogenic temperatures and in high vacuums was constructed by installing a metal disk between two sets of mating serrations to form two sealing surfaces. Compression on both sealing surfaces is ensured by spring action of the disk.

B64-10348  
SAFETY RESTRAINER PREVENTS WHIPPING OF RUPTURED HIGH-PRESSURE HOSE  
THOMPSON, W. E. DEC. 1964  
LEWIS-99

The braid at each end of a standard electric cable puller is modified to reinforce high pressure, flexible, fluid transfer hoses. This safety device acts as a restraint if the line ruptures.

B64-10406  
POLYCHART CONTOUR PLOTTER ENABLES DATA EXTRAPOLATION FROM MULTIPLE PLOTTING CHARTS  
SWINDALL, P. M. WISE, T. E. JUL. 1964  
M-FS-37

A polychart contour plotter is used to reduce the data from all 19 antenna pattern charts to a one-chart form.

B65-10003  
ILLUMINATED DISPLAY PANEL IS EASILY CHANGED

INNOVATOR NOT GIVEN /IBM/ JAN. 1965  
MSC-108

Photographic negative placed between two plastic sheets and back-lighted in selected areas prepares illuminated multicolored display panels. The device is inexpensive, easily changed, and quickly fabricated.

B65-10007  
THERMOCOMPRESSION BONDING PRODUCES EFFICIENT SURFACE-BARRIER DIODE  
INNOVATOR NOT GIVEN /IBM/ JAN. 1965  
JPL-SC-066

Thermocompression bonding of a gold wire to a gallium-arsenide wafer produces a quality surface barrier diode with fast recovery times. The properties of this combination may be useful in semiconductor devices.

B65-10008  
SHOCK ABSORBER PROTECTS MOTIVE COMPONENTS AGAINST OVERLOADS  
INNOVATOR NOT GIVEN /DOUGLAS AIRCRAFT CO./ JAN. 1965  
WDO-092

Shock absorber with an output shaft, hollow gear, and a pair of springs forming a resilient driving connection between shaft and gear, operates when abnormally high torques are applied. This simple durable frictional device is valuable in rotating mechanisms subject to sudden overloads.

B65-10009  
FORMING BLOCKS SPEED PRODUCTION OF STRAIN GAUGE GRIDS  
BONN, J. L. GARDNER, D. E. FEB. 1965  
LEWIS-182

A tool is designed which facilitates the forming of wire grids used in manufacturing strain gauge grids. Flattening the grid wire by a cold working process produces a stabilized grid which can be readily handled for storage or shipment.

B65-10014  
USE OF TEAR RING PERMITS REPAIR OF SEALED MODULE CIRCUITRY  
INNOVATOR NOT GIVEN /IBM/ JAN. 1965  
M-FS-210

Improved packaging technique for modulator electronic circuitry utilizes a tear ring which may be removed for repair and resealed. The tear ring is put over the container and header to which the electronic circuit assembly has been attached.

B65-10017  
EXPLOSIVES ACTUATE NONMAGNETIC INDEXING DEVICE  
BAUERNSCHUB, J. P., JR. JAN. 1965  
GSFC-237

Nonmagnetic explosive-actuated indexing device creates magnetic field that can be tolerated by a sensor.

B65-10019  
WIDE-ANGLE SENSOR MEASURES RADIANT HEAT ENERGY IN CORROSIVE ATMOSPHERES  
INNOVATOR NOT GIVEN /BOEING CO./ JAN. 1965 SEE ALSO B63-10004  
M-FS-228

Ellipsoidal cavity device measures radiant heat energy over wide incident angles in corrosive atmospheres. The instrument consists of a cavity in copper heat sink sealed with sapphire window to protect thermocouple.

B65-10020  
OPTICAL ARRANGEMENT INCREASES USEFUL LIGHT OUTPUT OF SEMICONDUCTOR DIODES  
INNOVATOR NOT GIVEN /IBM/ JAN. 1965 SEE ALSO B64-10297  
JPL-SC-064

Useful light output of semiconductor diodes increased by incorporating the diode in an integral reflector and lens assembly. This reduces normal reflection losses between the diode and the air.

B65-10021  
PICKUP DEVICE READS PRESSURES FROM PORTS IN ROTATING MECHANISMS

JANAS, B. JAN. 1965 SEE ALSO B64-10031  
LEWIS-158

Indexing pickup monitors fluid pressures from ports at various angles on high or low speed rotating mechanisms in operation. By a simple axial movement of a takeoff connector, angle changing takes place. This device can be adapted for electric current monitoring.

B65-10022  
KNOB LINKAGE PERMITS ONE-HAND CONTROL OF SEVERAL OPERATIONS  
CODDING, G. C. LAVENDER, C. E. JAN. 1965  
MSC-30

Electromechanical device with single knob provides one-hand control of numerous electrical or mechanical functions. The principle of this design may have application to remote-control switching devices.

B65-10027  
FLUID-PRESSURE MEASUREMENT APPARATUS USES SHORT-LENGTH MANOMETER TUBES  
SATHER, B. I. MAR. 1965  
LEWIS-28

System of short length U-tube manometers with a proportionally divided reference pressure measures high fluid pressures.

B65-10029  
SEISMIC TRANSDUCER MEASURES SMALL HORIZONTAL DISPLACEMENTS  
GREENWOOD, T. L. MAR. 1965  
M-FS-81

Pendular seismic transducer mounted on base plate measures small horizontal displacements of structures subjected to vibration where no fixed reference point is available. Enclosure of transducer in transparent plastic case prevents air currents from disturbing the pendulum balance.

B65-10031  
SPRING LOADED BEADED CABLE MAKES EFFICIENT WIRE PULLER  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ FEB. 1965  
WOO-108

An efficient wire puller consists of a steel probe with a hole in one end fastened to a steel cable which is strung with metal beads compressed by spring loaded ferrules. This device allows cables to be pulled or forced around bends and elbows in pipes or tubes.

B65-10035  
OCEANBORNE TRANSPONDER PLATFORM HAS GOOD STABILITY  
INNOVATOR NOT GIVEN /IBM/ FEB. 1965  
M-FS-171

Determination of space vehicle range and orbit is aided by a stable subsurface oceanic transponder. This device consists of a buoy held below the surface by a three-point system of anchors and mooring lines with an above surface antenna.

B65-10037  
IMPROVED HOLDER PROTECTS CRYSTAL DURING HIGH ACCELERATION AND IMPACT  
LE VAY, K. H. FEB. 1965  
JPL-463

A plastic holder, which retains a crystal blank with standard silvered contacts sandwiched between two copper contacts, protects the crystal against vibration during high acceleration and impact.

B65-10038  
FASTENER PROVIDES COOLING AND COMPENSATES FOR THERMAL EXPANSION  
INNOVATOR NOT GIVEN /AEROJET-GEN. CORP./ FEB. 1965  
NU-0003

A fastener composed of a concentric bellows welded to two plates forming an annular cavity provides cooling and thermal expansion compensation in a high temperature environment.

B65-10039  
NONRESONANT SUPPORT FACILITATES VIBRATION

TESTING OF STRUCTURES  
INNOVATOR NOT GIVEN /BOEING CO./ FEB. 1965  
M-FS-224

An essentially frictionless four-point support system which utilizes bearings and pistons and allows for determination of vibration frequencies of large structures. Retardation of vertical or horizontal motion is due to the viscous damping by the hydrostatic pressure of the oil or by adjustment of the gas volume in the accumulator.

B65-10040  
VALVE DESIGNED WITH ELASTIC SEAT  
MAC GLASHAN, W. F., JR. FEB. 1965  
JPL-442

Absolute valve closure is accomplished by a machined valve with an axially annular channel which changes the outlet passage into a thin tubular elastic seat member with a retainer backup ring. The elasticity of the seat provides tight conformity to ball irregularity.

B65-10042  
FLEXURE SUPPORT SYSTEM PROTECTS THERMALLY AND DYNAMICALLY LOADED MODELS  
CRUMPLER, W. B. FEB. 1965  
LANGLEY-39

The design of an eight legged flexure support system which permits differential thermal expansion of thin skinned models subjected to high temperatures is done by setting the length-wise axes of the supporting legs approximately normal to the line of absolute motion of the model supported.

B65-10049  
SCREW LOCKING CUPS QUICKLY AND NEATLY CRIMPED  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ FEB. 1965  
NU-0009

A tool consisting of a positioning pin which is engaged in the screw and depressed until the tool body contacts the locking cup permits quick and neat crimping.

B65-10053  
SEAL ALLOWS BLIND ASSEMBLY AND THERMAL EXPANSION OF COMPONENTS  
INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./ FEB. 1965  
NU-0005

The design of a seal consisting of two concentric cylinders with outer and inner threaded elements attached to each side of the system interface withstands large temperature changes and allows for blind assembly.

B65-10060  
NEW ALLOY BRAZES TITANIUM TO STAINLESS STEEL  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1965  
MSC-102

Brazing alloy of palladium, silver and silicon is used in brazing titanium to stainless steel without embrittling metals at the brazed interfaces.

B65-10063  
CERAMIC-COATED BOAT IS CHEMICALLY INERT, PROVIDES GOOD HEAT TRANSFER  
SPITZER, C. R. MAR. 1965  
LANGLEY-90

Refractory metal foil sprayed with ceramic coating serves as evaporating boat for inorganic materials. The high thermal conductivity of this boat makes it useful with ohmic heaters.

B65-10064  
DEVICE MEASURES CURVED SURFACE FINISH ON GEAR TEETH  
INNOVATOR NOT GIVEN /GE/ MAR. 1965  
WOO-112

Measurement of the curved surface finish on gear teeth is made by a device used in conjunction with a conventional profilometer.

B65-10070  
SIMPLE SCALE INTERPOLATOR FACILITATES READING OF GRAPHS

FETTERMAN, D. E., JR. MAR. 1965  
 LANGLEY-88

Simple transparent overlay with interpolation scale facilitates accurate, rapid reading of graph coordinate points. This device can be used for enlarging drawings and locating points on perspective drawings.

B65-10074  
 NITROGEN DIOXIDE PRODUCED BY SELF-SUSTAINED  
 PYROLYSIS OF NITROUS OXIDE  
 SABOL, A. P. MAR. 1965  
 LANGLEY-32

Apparatus is developed for achieving continuous self-sustaining pyrolysis reaction in the production of nitrogen dioxide from nitrous oxide. The process becomes self-sustaining because of the exothermic reaction and the regenerative heating of the gases in the pyrolysis chamber.

B65-10075  
 TENSION IS SERVO CONTROLLED IN FILM ADVANCE  
 SYSTEM  
 INNOVATOR NOT GIVEN /AM. OPT. CO./ MAR. 1965  
 LANGLEY-54

Servocontrol device feeds film into a roller system. Two linear potentiometers connected to spring loaded tension rollers furnish servo input signal. Can be used in any continuous material transport system.

B65-10077  
 NEW COUPLING COMPENSATES FOR SHAFT  
 MISALIGNMENT  
 INNOVATOR NOT GIVEN /WESTINGHOUSE ELEC. CORP./  
 MAR. 1965  
 NU-0013

Coupling of splined shafts with slight misalignment is accomplished by means of a crown spline and sleeve arrangement.

B65-10078  
 FABRICATION METHOD PRODUCES HIGH-GRADE  
 ALUMINA CRUCIBLES  
 PALMOUR, H. MAR. 1965  
 M-FS-216

Alumina-binder mixture, which has been dry pressed in a die using a mating punch, forms crucibles of various configurations and after firing results in a ceramic structure for use in diffusion experiments.

B65-10090  
 COMPACT ASSEMBLY GENERATES PLASTIC FOAM,  
 INFLATES FLOTATION BAG  
 APR. 1965  
 LANGLEY-96

Device for generating plastic foam consists of an elastomeric bag and two containers with liquid resin and a liquid catalyst. When the walls of the containers are ruptured the liquids come into contact producing foam which inflates the elastomeric bag.

B65-10094  
 CUTTER AND STRIPPER REDUCES COAXIAL CABLE  
 CONNECTION TIME  
 THOMPSON, F. E. APR. 1965  
 ARC-40

Consisting of three pivoted members, this hand cutter and stripper positions to cut shielding and insulation at the right distance and depth. Coaxial cable is prepared quickly and accurately for connector attachment.

B65-10098  
 CONTACT STRESSES CALCULATED FOR MINIATURE SLIP  
 RINGS  
 ALBRIGHT, F. G. DOMEREST, K. E. HORTON, J. C.  
 APR. 1965  
 M-FS-280

Using mathematical formulations to plot the graphs of the contact preload versus the Hertzian load, calculations of unit loading of the preloaded brushes on slip rings can be made. This optimizes the design of contact brushes and miniature slip rings.

B65-10099  
 SLIT FEEDS REDUCE UNBALANCED TORQUES IN  
 GAS-LUBRICATED BEARINGS  
 BATSCH, F. F. LAUB, J. H. APR. 1965 SEE ALSO  
 B63-10123 AND B64-10050  
 JPL-264

Gas-lubricated journal bearing with narrow radial slits forming circular gas-feed passages regulates gas flow in precision instruments. Asymmetrical flow pattern and unbalanced torques are prevented.

B65-10101  
 JIG AND FIXTURE AID FABRICATION OF TUNGSTEN  
 RIVETS  
 CHATTIN, J. H. APR. 1965  
 LEWIS-185

Jig and fixture that holds several lengths of tungsten rods produces rivets simply and inexpensively. The apparatus allows sufficient tungsten to be exposed for heating and forging into a rivet head.

B65-10104  
 LEAF-SPRING SUSPENSION PROVIDES ACCURATE  
 PARALLEL DISPLACEMENTS  
 MC CREARY, R. A. APR. 1965  
 JPL-480

Leaf-spring suspension device with the springs symmetrically mounted on suspension frames provides accurate parallel displacements of loads over short linear distances.

B65-10109  
 ROCK BIT REQUIRES NO FLUSHING MEDIUM TO  
 MAINTAIN DRILLING SPEED  
 INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ APR.  
 1965  
 JPL-W00-031

Steel drill bit having terraces of teeth intersected by spiral grooves with teeth permits the boring of small holes through rock with low power. The cuttings are stored in a chamber behind the cutting head. Could be used as sampling device.

B65-10110  
 MAGNETS POSITION X-RAY FILM FOR WELD  
 INSPECTION  
 WAGNER, R. P. APR. 1965  
 M-FS-253

Film-positioning device uses magnets to hold X-ray film for weld inspection in nonferrous structures, such as tanks, where access to interior points is difficult.

B65-10111  
 PROBE TESTS MICROWELD STRENGTH  
 INNOVATOR NOT GIVEN /DOUGLAS AIRCRAFT CO./ APR.  
 1965  
 W00-118

Probe is developed to test strength of soldered, brazed or microwelded joints. It consists of a spring which may be adjusted to the desired test pressure by means of a threaded probe head, and an indicator lamp. Device may be used for electronic equipment testing.

B65-10113  
 SHOCK MOUNT ISOLATES PRESSURE TRANSDUCERS FROM  
 VIBRATION  
 ROGERO, R. S., JR. APR. 1965  
 JPL-631

Pressure transducer is isolated from shock and vibration forces by a pressure-compensated shock mount. Silicone elastomer O-rings within the shock mount serve as shock and vibration-damping pads.

B65-10114  
 AVERAGING PROBE REDUCES STATIC-PRESSURE  
 SENSING ERRORS  
 RITCHIE, V. S. APR. 1965  
 LANGLEY-36

Averaging the high and low pressure admitted to a plenum through circumferentially spaced orifices provides a probe that accurately senses the free-stream static pressure on an aerodynamic surface. This surface does not have a preferred angle of inclination to the direction of the

airstream cross flow.

**B65-10115**  
**INERT GAS SPRAYING DEVICE AIDS IN REPAIR OF**  
**HAZARDOUS SYSTEMS**  
 TELEHA, S. APR. 1965  
 LEWIS-8B

Inert gas spraying device aids in safely making mechanical repairs to a cryogenic fluid system without prior emptying of the system. This method can be applied to any natural or bottled gas system and with modifications to gasoline transports.

**B65-10116**  
**LOW-COST TOOL MINIMIZES DAMAGE TO O-RINGS**  
**DURING INSTALLATION**  
 INNOVATOR NOT GIVEN /N. AM. AVIATION/ APR. 1965  
 MSC-140

Tapered cylindrical tool enables O-ring installation over threaded fasteners without seal damage.

**B65-10121**  
**FLOW CONTROL VALVE IS INDEPENDENT OF PRESSURE**  
**DROP**  
 INNOVATOR NOT GIVEN /THIOLKOL CHEM. CORP./ APR. 1965  
 JPL-WDD-039

Remote control of fluid flow in a low-power system is established by a flow control valve with a flapper and nozzle flow control. Constant rates are maintained despite fluctuating pressure across the valve.

**B65-10126**  
**COLLAPSIBLE TRUSS STRUCTURE IS AUTOMATICALLY**  
**EXPANDABLE**  
 INNOVATOR NOT GIVEN /GE/ MAY 1965  
 GSFC-265

Coil springs wound with maximum initial tension in a three-truss, closed loop structure form a collapsible truss structure. The truss automatically expands and provides excellent rigidity and close dimensional tolerance when expanded.

**B65-10130**  
**COLLAR POSITIONS STRIP STOCK USED TO FORM COIL**  
**ON MANDREL**  
 BLAZE, C. J. MAY 1965  
 JPL-198

Guide collar fastened to a mandrel helps form a coil of strip sheet metal stock. The collar maintains the strip stock in its proper position during winding of each turn of the coil.

**B65-10131**  
**APPARATUS FACILITATES PRESSURE-TESTING OF**  
**METAL TUBING**  
 GYORGAK, C. A. MAY 1965  
 LEWIS-174

Burst-testing of refractory metal tubing is conducted in an apparatus in which tubular specimens are firmly gripped and test pressures and temperatures are applied. Porosity, flaw, and fatigue-stress rupture are also tested.

**B65-10134**  
**HIGH PERMEABILITY SEMICONDUCTORS PERMIT**  
**CLOSE-TOLERANCE SOLDERING**  
 INNOVATOR NOT GIVEN /HUGHES AIRCRAFT CO./ MAY 1965  
 GSFC-319

High permeability semiconductors concentrate magnetic field energy in small areas to allow soldering of small components. This device can be used in microminiature parts in thin-film fabrication.

**B65-10135**  
**COILED SPRING MAKES SELF-LOCKING DEVICE FOR**  
**THREADED FASTENERS**  
 INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAY 1965  
 MSC-149

Coiled spring device provides both easy self-locking and disassembly for screw-threaded fasteners. When the fastener turns in one

direction the spring grips one of the fastener threads and releases when the fastener turns in the opposite direction.

**B65-10141**  
**INTEGRAL RIBS FORMED IN METAL PANELS BY COLD-**  
**PRESS EXTRUSION**  
 BRADIE, P. R. SCHUERER, P. H. MAY 1965  
 M-FS-230

Metal panels with integral ribs are formed by the cold-press extrusion method without material loss. Integral ribs in aluminum-alloy panels are formed by this process.

**B65-10144**  
**LIGHTWEIGHT LOAD SUPPORT SERVES AS VIBRATION**  
**DAMPER**  
 LAYMAN, W. E. MAY 1965  
 JPL-661

Omnidirectional antennas and solar panels can be supported by a thin-walled tubular strut. Silicon grease is used as the vibration-damping medium and a coil spring supports static loads.

**B65-10147**  
**IMPROVED FLUID CONTROL VALVE EXTENDS DIAPHRAGM**  
**LIFE**  
 MAC GLASHAN, W. F. MAY 1965  
 JPL-345

Wear resistance of flexible diaphragms in fluid control valves is increased by incorporating a soft rubber washer at the bottom of the piston, a flexible buffer between the diaphragm and the valve seat, and a fluid feedback arrangement. The stress and wear of components at the valve seat are minimized.

**B65-10148**  
**BIDIRECTIONAL TORQUE FILTER ELIMINATES**  
**BACKLASH**  
 BAKER, R. VEILETTE, L. WILLIAMS, S. MAY 1965  
 GSFC-335

Two elastic springs connecting a hub and two spur gears absorb bidirectional step torque differentials and provide antibacklash characteristics between input and output shafts. This device is used in precise control systems.

**B65-10149**  
**CANTILEVER SPRINGS MAINTAIN TENSION IN**  
**THERMALLY EXPANDED WIRES**  
 TERSELIC, R. A. MAY 1965  
 LEWIS-136

Two deflected cantilever springs strung with wire provide force displacement compensation to maintain tension in the wires as they undergo thermal expansion. This method of maintaining tension in thermally expanded wires is used in electric space heaters and residential heat exchangers.

**B65-10150**  
**METAL BELLOWS CUSTOM-FABRICATED FROM TUBING**  
 MAY. 1965  
 LEWIS-192

Mandrel assembly mounted in a lathe chuck is used with a forming wheel to roll-form bellows from standard sheet metal tubing. Spacers and mandrels of various sizes custom-fabricate bellows of any desired dimensions.

**B65-10153**  
**TITANIUM TREATMENT IMPROVES BRAZED JOINTS**  
 INNOVATOR NOT GIVEN /MIT/ MAY 1965  
 MSC-127

Pretreating metal with a thin coating of pure titanium improves the wettability and flow of brazing alloys. This can be used in the manufacturing of aviation and aerospace components where high strength-to-weight ratio must be achieved.

**B65-10154**  
**SYSTEM MEASURES UNIDIRECTIONAL FORCES,**  
**EXCLUDES EXTRANEOUS FORCES**  
 BEHRENDT, D. R. HEGLAND, D. E. MAY 1965  
 LEWIS-170

System measures unidirectional force without interference from other directional forces. The



measuring apparatus is mounted so that it only moves vertically and is constrained from horizontal and rotational movement. This system can be used to accurately measure small forces in one direction, or as an analytic balance.

**B65-10160**  
**LOW-COST SEAL COMPENSATES FOR SURFACE**  
**IRREGULARITIES**  
 INNOVATOR NOT GIVEN /AEROJET-GEN. CORP./ JUN. 1965  
 NU-0016

Seal assembly consisting of a steel V-ring and a perforated tubular fluorocarbon polymer O-ring provides a barrier to gaseous and liquid hydrogen under high pressure.

**B65-10163**  
**DEVICE DISCONNECTS SEVERAL COUPLINGS**  
**SIMULTANEOUSLY**  
 KORSYTHE, A. K. JUN. 1965  
 JPL-226

Actuator assembly disconnects electric cable and fluid-line coupling from a rocket. The disconnecter incorporates interconnected hydraulic cylinders which effect an equal and simultaneous displacement of pistons upon admission of compressed air through a solenoid control valve.

**B65-10166**  
**SPLICE PLATE DESIGN ASSURES STRUCTURAL**  
**SEPARATION BY MILD EXPLOSIVE**  
 INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1965  
 MSC-137

Splice plate with mechanical joint is separated by expanding gases of a mild detonating fuse. The gas pressures of the low-yield explosive eliminate component fragmentation and achieve excellent control of the separation line.

**B65-10168**  
**LATHE ATTACHMENT USED TO MACHINE ELLIPTICAL**  
**CONES**  
 ALLEN, J. H., SR. WOBIG, D. A. JUN. 1965  
 MSC-100

Close-tolerance elliptical cones are fabricated by cutting-tool guide assembly used with conventional tracer cartridge on turret lathe accurately produced in two machine operations.

**B65-10170**  
**METAL PARTS HYDROSIZED BY EXPLOSIVE FORCE**  
 INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1965  
 M-FS-289

Large metal parts are sized by a charge exploded above a sealed container filled with evacuated die and water. Explosive hydrosizing achieves close dimensional tolerances, eliminates damage to the surface, and allows longer force application and more even pressure distribution.

**B65-10174**  
**PRESSURE TRANSDUCER SYSTEM IS FORCE-BALANCED,**  
**HAS DIGITAL OUTPUT**  
 INNOVATOR NOT GIVEN /GIANNINI CONTROLS CORP./ JUN. 1965  
 M-FS-154

Force-balanced pressure transducer and associated circuitry controls pressure testing of space equipment systems under actual operating conditions. The transducer and circuitry automatically converts the sensed pressure to digital form.

**B65-10176**  
**DEVICE ENABLES MEASUREMENT OF MOMENTS OF**  
**INERTIA ABOUT THREE AXES**  
 CONN, J. JUN. 1965  
 GSFC-49

Device measures moments of inertia of an irregularly shaped mass about three mutually perpendicular axes by the standard pendulum and torque methods. A fixture suspends the test mass at one point and can be adjusted to allow oscillation of the mass.

**B65-10177**  
**EPOXY-RESIN PATTERNS SPEED SHELL-MOLDING OF**  
**ALUMINUM PARTS**  
 INNOVATOR NOT GIVEN /ALABAMA UNIV./ JUN. 1965  
 M-FS-303

Half patterns cast from commercial epoxy resin containing aluminum powder are used for shell-molding of aluminum parts. The half patterns are cast in plastic molds of the original wooden pattern. Ten serviceable sand-resin molds are made from each epoxy pattern.

**B65-10180**  
**NEW NUT AND SLEEVE IMPROVE FLARED CONNECTIONS**  
 GARRARD, J. S. JUN. 1965  
 M-FS-194

Improved nut and sleeve of standard stainless steel flared tube connection allows forces on the mating surfaces to be uniformly applied. This can be applied to pressurized fluid systems such as refrigeration, air conditioning, and hydraulic systems.

**B65-10181**  
**HAND TOOL BENDS COMPONENT LEADS ACCURATELY**  
 INNOVATOR NOT GIVEN /CHRYSLER CORP./ JUN. 1965  
 M-FS-308

Hand-operated die set bends, without damage, electrical component leads to perfectly match holes in printed circuit board. This tool speeds up printed circuit fabrication and reduces the number of component rejections.

**B65-10185**  
**DISPENSING SYSTEM ELIMINATES TORSION IN**  
**DEPLOYED HOSES**  
 INNOVATOR NOT GIVEN /IIT RES. INST./ JUN. 1965  
 MSC-80

Dispensing system uses a rotating drum, transfer arm, and stationary drum to deploy, reel in, and store an attached hose. This system which eliminates torsion and minimizes strain and wear of flexible hoses, is used for handling flexible cables that have one end permanently attached to an outlet or connector.

**B65-10191**  
**EXTENDIBLE COLUMN CAN BE STOWED ON DRUM**  
 HOLTZ, G. M. HOWARD, E. A. JUN. 1965  
 JPL-686

Column formed from a series of segments held together by an internal spring or cable can be coiled on a drum or extended into a rigid structure. This storable coil is useful in boring for soil samples and supporting electrical and optical sensors.

**B65-10192**  
**SPIRAL HEATER COILS HAND-FORMED WITH FIXTURE**  
 CHATTIN, J. H. JUN. 1965  
 LEWIS-208

Bench model jig and fixture used for hand fabricating spiral coils of various lengths from flat strip stock. This tool is used to make springs and coils to custom lengths.

**B65-10198**  
**SELF-ALIGNING FIXTURE USED IN LATHE CHUCK JAW**  
**REFACING**  
 LINN, C. C. JUN. 1965  
 FRC-21

Self-aligning tool positions and rigidly holds lathe chuck jaws for refacing and truing of the clamping surface. The jaws clamp the fixture in the manner of clamping a workpiece. The fixture can be modified to accommodate four-jawed checks.

**B65-10201**  
**ELECTRICAL CABLE CONNECTOR-CLAMP HAS SMOOTH**  
**EXTERIOR SURFACE**  
 INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1965  
 MSC-154

Electrical cable connector-clamp fitted with a collet has a smooth exterior surface that can be easily gripped. The collet clamps a portion of the cable and provides for connecting it to a

standard electrical connector.

**B65-10205**  
**BALL AND SOCKET JOINTS PROVIDE ACCURATE**  
**BIAXIAL GIMBAL**  
 ROUZE, E. R. JUL. 1965  
 JPL-658

Ball-and-socket joints are used to connect two rotating inputs to orthogonally pivoted outputs. This provides an accurate biaxial gimbal which will operate in continuous motion without backlash.

**B65-10207**  
**FLUID CHECK VALVE HAS FAIL-SAFE FEATURE**  
 GAUL, L. C. JUL. 1965  
 JPL-0019

Check valve ensures unidirectional fluid flow and, in case of failure, vents the downstream fluid to the atmosphere and gives a positive indication of malfunction. This dual valve consists of a master check valve and a fail-safe valve.

**B65-10210**  
**FIBERGLASS DIES SPEED FORMING OF LARGE METAL**  
**SHEETS**  
 BROWN, R. L. SCHUERER, P. JUL. 1965  
 M-FS-214

Fiberglass tooling dies accelerate forming of large metal sheets. The dies, fabricated to fit over and fasten to the die bases, are lightweight, quickly replaced and have nongalling surfaces.

**B65-10216**  
**WIRE MESH ISOLATOR PROTECTS SENSITIVE**  
**ELECTRONIC COMPONENTS**  
 KERLEY, J. J., JR. JUL. 1965  
 GSFC-347

Sensitive electronic components are enclosed in wire mesh for protection. The wire mesh isolates the component from shock and vibration. It acts as a heat sink and as a screen against RF interference.

**B65-10219**  
**FLEXIBLE MAGNETIC PLANNING BOARDS ARE EASILY**  
**TRANSPORTED**  
 INNOVATOR NOT GIVEN /GEN. DYN./ASTRONAUTICS/ AUG. 1965  
 M-FS-340

Easily transportable preprinted magnetic planning boards are made by coating thin sheet steel with clear plastic. Flexible magnetic boards used with paper charts are constructed from close mesh steel screen.

**B65-10222**  
**INEXPENSIVE CHECK VALVE IS INSTALLED IN**  
**STANDARD AN FITTINGS**  
 MARTINEZ, J. S. AUG. 1965  
 JPL-2A

Check valve with a cylindrical flanged tube body is used in standard AN fittings. The valve also has an easily removable spring-loaded piston.

**B65-10227**  
**DIAPHRAGM ELIMINATES LEAKAGE IN CRYOGENIC**  
**FLUID DUCT COUPLING**  
 INNOVATOR NOT GIVEN /DOUGLAS AIRCRAFT CO./ AUG. 1965  
 WOO-142

Duct coupling with nickel steel diaphragm of low thermal expansivity is leakproof when used with cryogenic fluids. The diaphragm, located between the two flanges of the coupling, reduces axial shrinkage at the coupling flanges to a minimum.

**B65-10229**  
**SCOOP ATTACHMENT MAKES HELICOPTER RECOVERIES**  
**EASIER AND SAFER**  
 KOONS, W. E. AUG. 1965  
 MSC-130

Helicopter with rigid boom and net attachment performs rescue or recovery operations easily and safely. The attachment in the front of the helicopter scoops objects from difficult and otherwise inaccessible areas and pivots to the side hatch of the aircraft so that no crew member need leave the craft.

**B65-10230**  
**HYDRAULIC DEVICE PROVIDES ACCURATE**  
**DISPLACEMENTS TO MICROINCHES**  
 TSUTSUMI, K. /MIT/ AUG. 1965  
 MSC-112

Hydraulic drive device translates microinch deviation measurements into precise corrective displacements. The unit is driven by a servomotor activated by the output of an attitude sensing device.

**B65-10231**  
**HANDTOOL FACILITATES EXTRACTION OF CIRCUIT**  
**MODULES**  
 LUSBY, T. K., JR. AUG. 1965  
 LANGLEY-38

Compact handtool extracts electronic modules from circuit board socket. It is used on modules that have four small notches in the base of the plastic housing.

**B65-10235**  
**ANGULAR GLASS TUBING DRAWN FROM ROUND TUBING**  
 INNOVATOR NOT GIVEN /DEBELL AND RICHARDSON/ AUG. 1965  
 HQ-20

Round glass tubing softened in a furnace is drawn over a shaped plug or mandrel to form shapes with other than a circular cross section. Irregularly shaped tubing is formed without limitations on tube length or wall thickness.

**B65-10236**  
**BURST DIAPHRAGM PROTECTS VACUUM VESSEL FROM**  
**INTERNAL PRESSURE TRANSIENTS**  
 HOTZ, G. M. HOWARD, E. A. AUG. 1965  
 JPL-687

Supported dual-mode burst diaphragm protects vacuum vessels from transient internal pressures. It forms the interface between the vacuum in the vessel and an external pressure.

**B65-10241**  
**SHOCK ABSORBER OPERATES OVER WIDE RANGE**  
 CREASY, W. K. JONES, J. C. AUG. 1965  
 MSC-168

Piston-type hydraulic shock absorber, with a metered damping system, operates over a wide range of kinetic energy loading rates. It is used for absorbing shock and vibration on mounted machinery and heavy earth-moving equipment.

**B65-10245**  
**CAPTIVE NUT FASTENER SECURELY JOINS BRITTLE**  
**MATERIALS**  
 SACCOGIO, R. M. /WESTINGHOUSE ELEC. CORP./ AUG. 1965  
 NU-0008

Extension tube captive nut with a standard bolt joins assemblies with an inaccessible nut location. This fastener is excellent for joining brittle materials.

**B65-10246**  
**THERMOCOUPLE-TO-INSTRUMENTATION CONNECTOR**  
**FEATURES QUICK ASSEMBLY**  
 HENSHAW, E. /WESTINGHOUSE ELEC. CORP./ AUG. 1965  
 NU-0022

Rigid thermocouple leads are connected to flexible instrumentation leads by a crimping and bridging process. This method eliminates the need for expensive transition sections and can be accomplished in about five minutes.

**B65-10248**  
**SYSTEM TRANSMITS MECHANICAL VIBRATION INTO**  
**HAZARDOUS ENVIRONMENT**  
 ARMSTRONG, D. G. /WESTINGHOUSE ELEC. CO./ GAAL, A. E. AUG. 1965  
 NU-0025

Vibration transducers are tested in a hazardous environment using a single axis transmission system with an electromagnetic shaker table and vibrating wires which drive identical rocker arms, one in the test cell and the other outside. This system can be modified for a multiaxis configuration.

B65-10251  
CONTROL OF COMPONENT DIFFERENTIAL HARDNESS  
INCREASES BEARING LIFE  
ANDERSON, W. J. PARKER, R. J. ZARETSKY, E. V.  
AUG. 1965  
LEWIS-190

Bearing fatigue life is maximized when the bearing ball or roller hardness is between one and two points greater than that of the bearing race as measured on the Rockwell C scale.

B65-10254  
REMOTELY OPERATED CLAMPING TOOL HAS POSITIVE GRIP  
ADUCCI, S. A. /WESTINGHOUSE ELEC. CORP./ SEWALD, A. W. AUG. 1965  
NU-0020

Jaw-type clamping tool inserts or removes objects in a hazardous environment. It has a strong, positive gripping force which is remotely operated by means of a wedge-screw mechanism.

B65-10256  
HOLLOW PLASTIC HOOPS PROTECT THERMOCOUPLE IN STORAGE AND HANDLING  
OSMOND, L. H. /WESTINGHOUSE ELEC. CORP./ AUG. 1965  
NU-0023

Thermocouples are shipped and stored in hollow plastic hoops. The hoop is an inexpensive but efficient method of protection.

B65-10262  
ROTATING HOLDER PERMITS ACCURATE GRINDING OF METALLURGICAL MICROSAMPLES  
CRAMER, D. L. SEP. 1965  
LEWIS-131

Metallurgical microsamples are held in a fixture which rotates the sample across a rotating grinding wheel. The dual rotation results in a level, flat surface on the sample.

B65-10266  
ONE-SHOT VALVE MAY BE REMOTELY ACTUATED  
KAMI, S. /HUGHES AIRCRAFT CO./ SEP. 1965  
WOO-195

One-shot valve, with spring-loaded plunger and sealing diaphragm, incorporates an emergency release actuated by a remote sensor. The plunger is released by the electrical melting of a fuse link and pierces the valve seal. The valve lowers fluid pressure in a container without losing the contained fluid.

B65-10285  
DIFFERENTIAL PRESSURE GAUGE HAS FAST RESPONSE  
WEBER, H. S. /ARMOUR RES. FOUND./ SEP. 1965  
M-FS-358

Differential pressure gauge with semiconductor-type strain gauge elements measures rapidly changing pressure. Output of the strain gauge elements is a dc voltage that is directly proportional to the pressure difference being measured.

B65-10312  
AIR BRAKE-DYNAMOMETER ACCURATELY MEASURES TORQUE  
OCT. 1965  
LEWIS-163

Air brake-dynamometer assembly combines the principles of the air turbine and the air pump to apply braking torque. The assembly absorbs and measures power outputs of rotating machinery over a wide range of shaft speeds. It can also be used as an air turbine.

B65-10319  
REFRACTORY METALS WELDED OR BRAZED WITH TUNGSTEN INERT GAS EQUIPMENT  
WISNER, J. P. OCT. 1965  
LEWIS-219

Appropriate brazing metals and temperatures facilitate the welding or brazing of base metals with tungsten inert gas equipment. The highest quality bond is obtained when TIG welding is performed in an inert atmosphere.

B65-10323  
VOLUMETRIC SYSTEM CALIBRATES METERS FOR LARGE FLOW RATES  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ NOV. 1965  
WOO-130

Volumetric system calibrates meters used for large liquid flow rates. The system employs trip probes and equipment to time the flow of liquid from a tare vessel into a calibrated vessel. This calibration system is used in the petroleum and chemical industries.

B65-10326  
ROUGH SURFACE IMPROVES STABILITY OF AIR-SOUNDING BALLOONS  
SCOGGINS, J. R. NOV. 1965  
M-FS-320

Aerodynamic stability of balloons used for measuring the intensity and direction of atmospheric winds at various elevations is improved by incorporating a rough surface on the balloons. The rough-surfaced balloon is useful for collecting wind profiles and other meteorological data.

B65-10327  
PRESSURE RESPONSIVE SEAL HANDLES STATIC AND DYNAMIC LOADS  
MARSH, H. W. /N. AM. AVIATION/ NOV. 1965  
GSFC-441

Ported ball valves are sealed under both static and dynamic load conditions by a line-pressure responsive double-acting seal. The top of the seal engages the ported ball at the outer circumferential edge of the seal upper end, and the bottom of the seal seats on a flat circular land with a continuous wall.

B65-10338  
INERT-GAS WELDING AND BRAZING ENCLOSURE FABRICATED FROM SHEET PLASTIC  
WISNER, J. P. NOV. 1965  
LEWIS-220

Custom-fabricated plastic bag maintains an inert-gas atmosphere for welding and brazing certain metals. The bag fits over part of the workpieces and the welding and brazing tools. It is also used for metal brazing and fusion plating which require an inert-gas atmosphere.

B65-10339  
DISK CALCULATOR INDICATES LEGIBLE LETTERING SIZE FOR SLIDE PROJECTION  
HULTBERG, R. R. NOV. 1965  
GSFC-409

Hand-operated disk calculator indicates the minimum size of letters and numbers in relation to the width and height of a working drawing. The lettering is legible when a slide of the drawing is projected.

B65-10342  
ELECTROMAGNETIC HAMMER REMOVES WELD DISTORTIONS FROM ALUMINUM TANKS  
SCHWINGHAMER, R. J. NOV. 1965  
M-FS-287

Distortions around weld areas on sheet-aluminum tanks and other structures are removed with a portable electromagnetic hammer. The hammer incorporates a coil that generates a controlled high-energy pulsed magnetic field over localized areas on the metal surface.

B65-10346  
IMPROVED POPPET VALVE PROVIDES POSITIVE DAMAGEPROOF SEAL  
WALLACE, E. D. NOV. 1965  
M-FS-293

Soft-seat poppet valve provides positive closure against fluid without damage to the seating surface on repeated cycling. It incorporates two compressible soft rings and a retaining ring of hard metal. Sealing is effected when the poppet seat is forced into intimate contact with a mating surface on one of the soft rings.

B65-10348  
STANDOFF TOOL SPEEDS PLACEMENT OF FRICTION-FIT ELECTRICAL TERMINALS

MOORE, D. J. SKIFSTROM, W. W. /SPACE TECHNOL. LABS./ NOV. 1965  
WOO-029

Hand operated tool inserts terminals through compartment walls in electronic equipment. The tool is in the configuration of a modified pair of pliers with jaws consisting of a split chuck and anvil.

B65-10351  
HYDRAULIC DRIVE SYSTEM PREVENTS BACKLASH  
ACORD, J. D. NOV. 1965  
JPL-371

Hydraulic drive system uses a second drive motor operating at reduced torque. This exerts a relative braking action which eliminates the normal gear train backlash that is intolerable when driving certain heavy loads.

B65-10358  
FASTENER DISTRIBUTES STRESS EVENLY FROM SANDWICH-PANEL-HUNG ITEMS  
SHAPIRO, J. /N. AM. AVIATION/ NOV. 1965  
MSC-236

Items are attached externally to cellular-core sandwich panels by a fastener anchored in the panel by a constant amount of adhesive. The changes caused to the core cells and skin sheets are minimized.

B65-10360  
PORTABLE TOOL REMOVES BURRS FROM PIPE AND TUBING  
HEADLEY, C. A. PADILLA, V. E. SCHOPPMAN, R. A. /MCDONNELL AIRCRAFT CORP./ NOV. 1965  
MSC-237

Portable tool cleanly removes burrs that remain on tubing when it is cut. It restores the cut end to its original configuration, and carries away all chips and pieces. This tool is used in places of limited access where a larger tool could not be used.

B65-10367  
FLEXIBLE PLASTIC RING ASSEMBLY MAKES DURABLE SHAFT SEAL  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ DEC. 1965  
WOO-227

Stacked flexible rings interleaved with solid metal rings of smaller width provide a durable seal ring for rotating shafts used in vacuum or pressure pumps.

B65-10370  
BRAZING METHOD PRODUCES SOLID-SOLUTION BOND BETWEEN REFRACTORY METALS  
INNOVATOR NOT GIVEN /AVCO CORP./ DEC. 1965  
LEWIS-212

Brazing two refractory metals by diffusion bonding minimizes distortion and avoids excessive grain growth in the metals. This method requires the selection of an interface metal that forms intermediate low-melting eutectics or solid solutions with the metals to be brazed.

B65-10371  
UNIVERSAL BELLWS JOINT RESTRAINT PERMITS ANGULAR AND OFFSET MOVEMENT  
KUHN, R. F., JR. /N. AM. AVIATION/ DEC. 1965  
WOO-102

Universal joint-type restraint that employs ball joints permits maximum angular and lateral offset movement in a bellows joint without danger of rupture or pressure drop in the line. It is used in high pressure and high temperature applications in refineries, steam plants, or stationary power plants.

B65-10375  
PORTABLE TOOL CLEANS PIPES AND TUBING  
HEADLEY, C. A. /MCDONNELL AIRCRAFT CORP./  
HEADLEY, R. JONES, D. D. DEC. 1965  
MSC-238

Portable tool cleans and polishes the external surfaces of tubes and pipes without contaminating the interior areas with loose particles. The tool is driven by an electric drill and is connected to a vacuum source that removes debris resulting from the cleaning and polishing action.

B65-10378  
REINFORCEMENT CORE FACILITATES O-RING INSTALLATION  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ DEC. 1965  
WOO-228

Reinforcement core holds O-ring in place within a structure while adjacent parts are being assembled. The core in the O-ring adds circumferential rigidity to the O-ring material. This inner core does not appreciably affect the sectional elasticity or gland-sealing characteristics of the O-ring.

B65-10383  
THREADED SPLIT RING CONNECTOR SEPARATES STRUCTURAL SECTIONS  
MAYO, J. W. JUL. 1965  
LANGLEY-145

Threaded split ring connector quickly and cleanly separates two structural members by remote control. The connector is retained in an expanded position by spring plates that are deflected and held by an explosive bolt. Ignition of the bolt effects the separation. This conceptual approach lends itself to various configurations and sizes of structures.

B65-10385  
RACK MOUNT DEVICE QUICKLY INSERTS OR EXTRACTS CHASSIS UNITS  
HAERTHER, L. W. ZIMMERMAN, P. A. /COLLINS RADIO CO./ DEC. 1965  
MSC-244

Rack mounted chassis units are quickly inserted or extracted by a device which is driven in either direction by turning a simple hand crank. This device is used in aircraft and water craft.

B65-10386  
DRILL BIT DESIGN ASSURES CLEAN HOLES IN LAMINATED MATERIALS  
TILLOTSON, R. N. /DOUGLAS AIRCRAFT CO./ DEC. 1965  
WOO-098

Drill bit eliminates delamination when drilling laminated material. It cuts or shaves the material as it progresses through it. The bit acts to hold down the material during drilling to prevent tearing or ripping and produces a clean, smooth and defect-free hole. It prevents chipping in stretched plastic windows for high-altitude, high-performance aircraft.

B65-10388  
STRAINER FITS INSIDE FLARED-TUBE FITTINGS  
PARKER, O. J. DEC. 1965  
LANGLEY-180

Cylindrical wire-mesh strainer which fits inside flare-tube fittings is readily installed and easily replaced. It has a collar that seats on the tapered shoulder of the male fitting.

B65-10391  
TUNGSTEN WIRE AND TUBING JOINED BY NICKEL BRAZING  
INNOVATOR NOT GIVEN /AUTO-CONTROLS LABS./ DEC. 1965  
M-FS-394

Thin tungsten wire and tungsten tubing are brazed together using a contacting coil of nickel wire heated to its melting point in an inert-gas atmosphere. This method is also effective for brazing tungsten to tungsten-rhenium parts.

B65-10393  
DIE AND TELESCOPING PUNCH FORM CONVOLUTIONS IN THIN DIAPHRAGM  
INNOVATOR NOT GIVEN /HONEYWELL/ DEC. 1965  
JPL-SC-135

Die and punch set forms convolutions in thin dish metal diaphragm without stretching the metal too thin at sharp curvatures. The die corresponds to the metal shape to be formed, and the punch consists of elements that progressively slide against one another under the restraint of a compressed-air cushion to mate with the die.

B65-10394  
CENTRIFUGAL DEVICE SEPARATES LIQUID FROM GAS

HANDLEWICH, R. M. /UNITED AIRCRAFT CORP./  
STROUP, K. E. DEC. 1965  
MSC-282

Liquid-to-gas ratio is reduced from maximum efficiency of jet engine fuel by a centrifugal separator. The amount of liquid removed from the fuel is controlled by the separator-screen mesh size and its rotational speed.

B65-10401  
PHOTOSENSORS USED TO MAINTAIN WELDING  
ELECTRODE-TO-JOINT ALIGNMENT  
BOWEN, J. B. /N. AM. AVIATION/ DEC. 1965  
MSC-243

Photosensors maintain electrode-to-joint alignment in automatic precision arc welding. They detect the presence and relative position of a joint to be welded and actuate a servomechanism to guide the welding head accordingly thus permitting alignment for more than straight line or true circle joints.

B65-10402  
LIGHTWEIGHT DOOR SEALS CRYOGENIC CONTAINER  
AGAINST DIAPHRAGM TYPE LOADING  
ENGLEHART, R. C., JR. /N. AM. AVIATION/ DEC. 1965  
M-FS-476

Lightweight, removable, sealed joint access door for a spherical or semispherical pressure vessel containing cryogenic materials uses a joint overlock design to take the shear and moment loads. Oversize bolt holes are used so that the attaching bolts are in tension only.

B66-10001  
FORMING TOOL IMPROVES QUALITY OF TUBING FLARES  
INNOVATOR NOT GIVEN /GEN. DYN./ASTRONAUTICS/ JAN. 1966  
WOO-231

Punch and die set improves the quality of tubing flares for use with standard flared-tube fittings in high-pressure systems. It forges a dimensionally accurate flare in the tubing and forces more tubing material into the high-stress areas to improve the strength and tightness of the tubing connection.

B66-10003  
IMPROVED TOOL EASILY REMOVES BRAZED TUBE CONNECTORS  
SCHOPPMAN, R. A. /MCDONNELL AIRCRAFT CORP./ JAN. 1966  
MSC-263

Portable, compact tool quickly and cleanly removes brazed connectors from system tubes. The tool uses an induction coil to melt the braze and a compression spring to automatically separate the connection. An inert gas is force-fed about the heated area to prevent oxidation of the tube.

B66-10007  
FLOATING DEVICE ALIGNS BLIND CONNECTIONS  
RESEL, J. E. /N. AM. AVIATION/ JAN. 1966  
MSC-256

Panel-mounted connectors overcome the misalignment of blind connectors in electronic rack mounted equipment. The connector is free to move in the vertical direction by the action of a parallelogram mount. This freedom of motion maintains the guide pin hole centerline parallel to the guide pin centerline at all times.

B66-10011  
TORQUE WRENCH DESIGNED FOR RESTRICTED AREAS  
FAGERBERG, E. R. /LOCKHEED MISSILES AND SPACE CO./ JAN. 1966  
LEWIS-246

Wrench with twisting handle grip applies torque to a fastener in a restricted area. The wrench handle may be any length without affecting output torque.

B66-10014  
EXPLOSIVE FORCE OF PRIMACORD GRID FORMS LARGE SHEET METAL PARTS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
SEE ALSO NASA SP 5017  
M-FS-316

Primacord which is woven through fish netting in a grid pattern is used for explosive forming of large sheet metal parts. The explosive force generated by the Primacord detonation is uniformly distributed over the entire surface of the sheet metal workpiece.

B66-10018  
COMPACT RETRACTOR PROTECTS CABLING LOOPS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
M-FS-561

Core and swivel retractor mechanism combined with cable stiffeners provides compact, long-wearing protection for cabling loops in cabinet-mounted electronic equipment drawers.

B66-10019  
BUOYANT STOKES LITTER ASSEMBLY USED FOR SEA RESCUE OPERATIONS  
POLLARD, R. A. SHEWMAKE, G. A. JAN. 1966  
MSC-131

Standard Stokes litter is fastened to inflatable flotation units for sea rescue operations. The assembly keeps an injured person immobilized during transportation to a first aid station.

B66-10020  
O-RING TUBE FITTINGS FORM LEAKPROOF SEAL IN HYDRAULIC SYSTEMS  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
M-FS-481

Leakproof fittings for hydraulic systems are designed to be welded to the ends of the tubing to be joined and mated to form a seal with one O-ring at the joint. Since the fittings are coupled at only one joint, they tend to be more reliable than standard fittings coupled at two joints.

B66-10022  
RING VALVE RESPONDS TO DIFFERENTIAL PRESSURE CHANGES  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
WOO-247

Pressure valve has a moving annular ring seal that automatically reacts to differential pressure changes across the seat. This valve has good potential for the petroleum and chemical industries.

B66-10023  
SIMPLE KEY LOCKS TURBINE ROTOR BLADES  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
WOO-103

Symmetrical, cruciform key has end tabs which bend up to lock turbine rotor blades against axial displacement. The key locks without introducing aerodynamic resistance or upsetting rotor balance.

B66-10030  
FRICTION DEVICE DAMPS LINEAR MOTION OF ROTATING SHAFT  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JAN. 1966  
WOO-214

Damping device checks the axial motion of a rotating shaft by exerting a controllable, radial frictional load to the outer race of the ball bearing in which the shaft is mounted. The device can be used as a soft bearing mount to damp resonant frequencies at critical shaft speed.

B66-10032  
SHEET METAL STRIP UNROLLS TO FORM CIRCULAR BOOM  
INNOVATOR NOT GIVEN /MELPAR, INC./ JAN. 1966  
GSFC-423

Preformed metal strip, coiled flat on a storage drum, unrolls to form a cylindrical boom. Tabs and slots on opposite sides of the strip interlock to form a continuous circular cross section. This retractable boom can be used as a spacecraft antenna, gravity gradient, or positioning device.

B66-10035  
RESILIENT CLAMP HOLDS FUEL CELL STACK THROUGH THERMAL CYCLE  
SHINN, B. H. /UNITED AIRCRAFT CORP./ FEB. 1966  
MSC-313

Resilient clamping device holds a stack of fuel

cells during thermal expansion and contraction periods. The clamp has torsion bar action which maintains seal integrity over a wide stress range.

**B66-10040**  
**ASSEMBLY JIG ASSURES RELIABLE SOLAR CELL**  
**MODULES**  
 OFARRELL, H. O. /TRW SPACE TECHNOL. LABS./ FEB. 1966  
 GSFC-455

Assembly jig holds the components for a solar cell module in place as the assembly is soldered and bonded by the even heat of an oven. The jig is designed to the configuration of the planned module. It eliminates uneven thermal conditions caused by hand soldering methods.

**B66-10047**  
**HEATED DIE FACILITATES TUNGSTEN FORMING**  
 CHATTIN, J. H. HAYSTRICK, J. E. LAUGHLIN, J. C. LEIDY, R. A. FEB. 1966  
 LEWIS-25A

Tungsten forming in a press brake employs a bottom die assembly with a heating manifold between two water-cooled die sections. The manifold has hydrogen-oxygen burners spaced along its length for even heat during forming.

**B66-10052**  
**COMBUSTION CHAMBER INLET MANIFOLD SEPARATES**  
**VAPOR FROM LIQUID**  
 BAKER, D. I. /N. AM. AVIATION/ FEB. 1966 SEE  
 ALSO B63-10251  
 M-FS-531

Circular manifold with tangential orifices at the inner circumference provides for the vapor constituent of a vaporized cryogenic propellant to enter a rocket combustion chamber before the liquid constituent. The vapor is separated from the liquid by centrifugal action and precedes it into the chamber through carefully positioned orifices.

**B66-10054**  
**MODIFIED POWER TOOL RAPIDLY DRIVES SERIES**  
**TORQUE BOLTS**  
 INNOVATOR NOT GIVEN /N. AM. AVIATION/ FEB. 1966  
 MSC-221

Feeder attachment, which fits on a standard power driver, drives a series of longitudinally attached torque bolts into place with great speed. It allows loading of a series of bolts and then positions individual bolts in the driving head for assembly. The attachment contains a socket gun which may be modified to accommodate different types and sizes of bolts.

**B66-10055**  
**HYDROGEN-ATMOSPHERE INDUCTION FURNACE HAS**  
**INCREASED TEMPERATURE RANGE**  
 CAVES, R. M. GRESSLIN, C. H. FEB. 1966  
 LEWIS-153

Improved hydrogen-atmosphere induction furnace operates at temperatures up to 5,350 deg. F. The furnace heats up from room temperature to 4,750 deg. F in 30 seconds and cools down to room temperature in 2 minutes.

**B66-10056**  
**BENCH VISE ADAPTER GRIPS TUBING SECURELY AND**  
**SAFELY**  
 HOWLAND, B. T. JONES, A. S., JR. /N. AM. AVIATION/ FEB. 1966  
 MSC-279

Plastic self-compressing adapter with grooves, attached to the jaws of a bench vise, secures thin-wall tubing vertically or horizontally during cutting and flaring operations without marring or damaging it. Magnets incorporated in both sections of the adapter prevent detachment from the jaws when the vise is opened.

**B66-10059**  
**CALIBRATED CLAMP FACILITATES PRESSURE**  
**APPLICATION**  
 INNOVATOR NOT GIVEN /N. AM. AVIATION/ FEB. 1966  
 MSC-298

Spring-loaded clamp applies specific pressure to hold materials together during bonding, welding,

and machining. The clamp has two adjustable legs terminating in suction cups for easy attachment to a surface.

**B66-10061**  
**INSTRUMENT QUICKLY TRANSPOSES GROUND REFERENCE**  
**TARGET TO EYE LEVEL**  
 GREEN, B. E. VAN DEVENTER, E. L. /N. AM. AVIATION/ FEB. 1966  
 MSC-275

Optical alignment of equipment is facilitated by a traverse target with a string suspending a plumb bob to transpose the ground level point to eye-level operation. This instrument appreciably decreases the time required from the present method but achieves the same degree of precision.

**B66-10063**  
**TENSILE-STRENGTH APPARATUS APPLIES HIGH**  
**STRAIN-RATE LOADING WITH MINIMUM SHOCK**  
 COTRILL, H. E., JR. MAC GLASHAN, W. F., JR. FEB. 1966  
 JPL-28 JPL-29

Tensile-strength testing apparatus employs a capillary bundle through which a noncompressible fluid is extruded and a quick-release valve system. This apparatus applies the test loads at relatively constant very high strain rates with minimal shock and vibration to the tensile specimen and apparatus.

**B66-10065**  
**T-HANDLE WRENCH HAS TORQUE-LIMITING ACTION**  
 KEMPLE, S. B. /N. AM. AVIATION/ FEB. 1966  
 MSC-280

T-handle wrench can be preset to release when a certain torque value is exceeded by means of a spring-loaded roller and groove torque-limiting mechanism contained in the handle of the wrench. The wrench is also equipped with a push button in the handle that permits the operator to lock the handle to the spindle shaft, thus eliminating the torque-limiting function.

**B66-10069**  
**RUN-IN WITH CHEMICAL ADDITIVE PROTECTS GEAR**  
**SURFACE**  
 HARTMAN, M. A. /N. AM. AVIATION/ FEB. 1966  
 M-FS-548

Run-in treatment provides a protective coating on turbopump gear surfaces so that they are capable of operation under marginal conditions in mineral oil and diester lubricants. This treatment protects highly loaded gears during relatively short-term operation.

**B66-10071**  
**MECHANISM ISOLATES LOAD WEIGHING CELL DURING**  
**LIFTING OF LOAD**  
 HAIGLER, J. S. /N. AM. AVIATION/ FEB. 1966  
 MSC-297

Load weighing cell used in conjunction with a hoist is isolated during lifting and manipulation of the load. A simple mechanism, attached to a crane hook, provides a screw adjustment for engaging the load cell during weighing of the load and isolating it from lift forces during hoisting of the load.

**B66-10073**  
**CALCULATIONS ENABLE OPTIMUM DESIGN OF**  
**MAGNETIC BRAKE**  
 KOSMAHL, H. G. FEB. 1966  
 LEWIS-251

Mathematical analysis and computations determine optimum magnetic coil configurations for a magnetic brake which controllably decelerates a free falling load to a soft stop. Calculations on unconventionally wound coils determine the required parameters for the desired deceleration with minimum electrical energy supplied to the stationary coil.

**B66-10074**  
**THREADED PILOT INSURES CUTTING TOOL**  
**ALIGNMENT**  
 GOLDMAN, R. /N. AM. AVIATION/ SCHNEIDER, W. E. FEB. 1966  
 M-FS-527

Threaded pilot allows machining of a port component, or boss, after the reciprocating hole has been threaded. It is used to align cutting surfaces with the boss threads, thus insuring precision alignment.

B66-10076  
SHOULDER ADAPTER STEADIES SPOT WELDING GUN  
LOVE, T. H. MAR. 1966  
M-FS-321

Shoulder adapter fits on one end of a hand-held spot welding gun. With the adapter, the operator can hold the gun steadily at uniform pressure to ensure defect-free welds.

B66-10077  
PLUGGED HOLLOW SHAFT MAKES FATIGUE-RESISTANT SHEAR PIN  
HANKINSON, T. W. E. MAR. 1966  
LANGLEY-195

Shear pin coupling with plugged hollow shaft provides required load capacity for shaft protection and has no groove to induce fatigue failure.

B66-10078  
THERMAL MOTOR POSITIONS MAGNETOMETER SENSORS  
KERWIN, W. J. SCOTT, S. G. MAR. 1966  
ARC-51

Reversing, thermal, motor-driven device positions magnetometer sensors for checking zero offset. The device alternately positions two sensors at fixed positions 90 degrees apart. The thermal motor is fabricated completely of nonmagnetic materials.

B66-10080  
NYLON SHOCK ABSORBER PREVENTS INJURY TO PARACHUTE JUMPERS  
MANDEL, J. A. /GOODYEAR AEROSPACE CORP./ MAR. 1966  
MSC-226

Nylon shock absorbers reduce the canopy-opening shock of a parachute to a level that protects the wearer from injury. A shock absorber is mounted on each of the four risers between the shroud lines and the harness. Because of their size and location, they pose no problem in repacking the chute and harness after a jump.

B66-10092  
FINGERTIP CURRENT CONTROL FACILITATES USE OF ARC WELDING GUN  
ROTH, B. /N. AM. AVIATION/ MAR. 1966  
MSC-289

Fingertip-operated trigger accurately controls the current supplied to an arc welding gun. The trigger is mounted directly on the handle of the gun.

B66-10093  
TOOL PROVIDES CONSTANT PURGE DURING TUBE WELDING  
LANG, E. R. /N. AM. AVIATION/ MAR. 1966  
M-FS-547

Tool provides a constant purge of inert gas during in-place welding of tubular components to prevent contamination and oxidation. It also permits self-jigging of the tube and sleeve to be welded.

B66-10100  
QUEUEING REGISTER USES FLUID LOGIC ELEMENTS  
INNOVATOR NOT GIVEN /UNIVAC DIV. OF SPERRY RAND/ MAR. 1966  
M-FS-317

Queueing register /a multistage bit-shifting device/ uses a series of pure fluid elements to perform the required logic operations. The register has several stages of three-state pure fluid elements combined with two-input NOR gates.

B66-10102  
PIPE CUTTING TOOL IS USEFUL IN LIMITED SPACE  
HEADLEY, C. A. /MCDONNELL AIRCRAFT CORP./ JONES, D. D. MAR. 1966  
MSC-36

Portable pipe cutting tool is used in areas of limited space. The pipe is clamped in the tool and then cut by a rotating cutter assembly that is

internally connected to a drive shaft engaged in the chuck of a portable electric drill. The tool is held in a fixed position during the cutting operation.

B66-10107  
MECHANISM CONTINUOUSLY MEASURES STATIC AND DYNAMIC CABLE LOADS  
MAR. 1966  
MSC-217

Pulley mechanism measures the tensile loads on a cable under static and dynamic conditions, without disturbing the continuity of operation of the system. A set of takeoff pulleys are mounted on a pivoted frame that is linked to a strain gage which measures the frame displacement as a function of the static or dynamic tensile load on the cable.

B66-10115  
SOLDERING TOOL HEATS WORKPIECES AND APPLIES SOLDER IN ONE OPERATION  
GUDKESE, V. W. MAY 1966  
LEWIS-247

Fountain-pen type soldering iron heats workpieces and applies solder to joints in densely packed electronics assemblies. The basic soldering tool is used with different-sized orifice tips, eliminating the need for an assortment of conventional soldering guns.

B66-10116  
TELESCOPING OF INSTRUMENTATION TUBING ELIMINATES SWAGING  
MC CLELLAN, E. L. /N. AM. AVIATION/ MAY 1966  
M-FS-546

Short sections of stainless steel tubing of slide-fit sizes fitted together and silver-soldered at the junctions form small-diameter tubing assemblies with accurately stepped-down dimensions. This method of fabrication eliminates the costly swaging operations formerly used.

B66-10123  
HAND DRILL ADAPTER LIMITS HOLES TO DESIRED DEPTH  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1966  
MSC-346

Adjustable adapter fastened to the shank of a drill bit limits the depth of bored holes. The adapter may be made in sizes appropriate for bits of different diameters.

B66-10124  
ECONOMICAL AND MAINTENANCE-FREE GAS SYSTEM OPERATES RAILROAD SWITCHES  
VISSING, G. S. MAR. 1966  
NU-0045

Remote control system that uses bottled nitrogen as a power source operates infrequently used railroad switches. This system is economical and maintenance free.

B66-10125  
ALUMINUM OXIDE FILLER PREVENTS OBSTRUCTIONS IN TUBING DURING WELDING  
OKELLY, K. P. MAR. 1966  
MSC-222

Granular aluminum oxide is used as filler in serpentine tubing while welding the tubing to a flat surface. The filler eliminates obstructions in the tubes formed by molten weld nuggets and is porous enough to allow gases to escape from the welding area.

B66-10132  
EXPANDABLE INSERT SERVES AS SCREW ANCHOR  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAR. 1966  
MSC-301

Expandable self-locking adapter secures components to panels having one accessible side. Mounting holes in the panels may not be threaded to accommodate screws, therefore, the adapter contains a female thread that will mate a mounting screw.

B66-10135  
CHART CASE OPENS TO FORM BRIEFING EASEL

NELSON, R. A. /N. AM. AVIATION/ APR. 1966  
MSC-349

Aluminum carrying case protects charts during transit and opens to form a rigid easel for their presentation. Looseleaf clamps hold the charts in place for both carrying and displaying them.

B66-10136  
CRYOGENIC TRAP VALVE HAS NO MOVING PARTS  
BRANUM, L. W. WELLS, G. /N. AM. AVIATION/ APR. 1966  
M-FS-487

Aluminum-body trap valve with an invar stem keeps cryogenic materials in the liquid state while entering the final component of a system. The valve has no moving parts and is self-actuated and self-monitoring.

B66-10137  
ROTATING MANDREL SPEEDS ASSEMBLY OF PLASTIC INFLATABLES  
MAC FADDEN, J. A. /SCHJELDAHL /G.T./ CO./  
STENLUND, S. J. WENDT, A. J. APR. 1966  
LANGLEY-155

Rotating mandrel permits the accurate cutting, forming, and sealing of plastic gores for assembly of an inflatable surface of revolution. The gores remain on the mandrel until the final seam is reached. Tolerances are tightly controlled by the mandrel configuration.

B66-10145  
PORTABLE POWER TOOL MACHINES WELD JOINTS IN FIELD  
SPIER, R. A. APR. 1966  
M-FS-258

Portable routing machine for cutting precise weld joints required by nonstandard pipe sections used in the field for transfer of cryogenic fluids. This tool is adaptable for various sizes of pipes and has a selection of router bits for different joint configurations.

B66-10146  
EXTENDABLE MAST USED IN ONE SHOT SOIL PENETROMETER  
HOTZ, G. M. HOWARD, G. A. APR. 1966  
JPL-685

Penetrometer to test soil characteristics has a piercing head with soil instrumentation equipment attached to an expandable mast actuated by compressed air. The penetrometer gives continuous measurements as the mast pushes the piercing head through the soil.

B66-10149  
DEPTH INDICATOR AND STOP AID MACHINING TO PRECISE TOLERANCES  
LAVERTY, J. L. /N. AM. AVIATION/ APR. 1966  
M-FS-553

Attachment for machine tools provides a visual indication of the depth of cut and a positive stop to prevent overcutting. This attachment is used with drill presses, vertical milling machines, and jig borers.

B66-10150  
MOUNTING FACILITATES REMOVAL AND INSTALLATION OF FLAME-DETECTOR RODS  
CASTLE, F. /N. AM. AVIATION/ APR. 1966  
M-FS-555

Flame-detector-rod holder is easily removed from the wall of a gas-fired furnace for maintenance or replacement of the detector rod without requiring shutdown of the furnace. The holder consists of an externally threaded outer bushing, a sleeve which is held inside the outer bushing with a set screw, and a detector rod assembly which screws into the sleeve.

B66-10151  
SPLIT GLASS TUBE ASSURES QUALITY IN ELECTRON BEAM BRAZING  
KRESSIN, W. J. /N. AM. AVIATION/ APR. 1966  
M-FS-564

Sealed enclosure of heat-resistant glass tubing and silicone rubber molds provide good visibility for electron beam brazing of metal tubes in an inert gas atmosphere. The glass tubing and

rubber molds, which are bonded together, are easily applied to and removed from the brazing area by operation of a clamp.

B66-10152  
NYLON BIT REMOVES CORK INSULATION WITHOUT DAMAGE TO SUBSTRATE  
CRANDALL, J. C. /N. AM. AVIATION/ APR. 1966  
MSC-381

Nylon router bit in an electric hand-held drill removes small quantities of cork insulation from a metal or fiberglass surface without cutting or scratching the surface.

B66-10155  
SIMPLE DEVICE FACILITATES INERT-GAS WELDING OF TUBES  
CARRITHERS, K. V. /N. AM. AVIATION/ KELLEY, W. B. APR. 1966  
M-FS-558

Metal Y-tube simultaneously directs argon streams over weld areas on both sides of tubes being joined along a line on their outer periphery. The device is advanced along the junction in step with the welding operation.

B66-10167  
DUAL REGULATOR CONTROLS TWO GASES FROM A SINGLE REFERENCE  
JACKSON, K. /GARRETT CORP./ APR. 1966  
MSC-227

Dual-pressure regulator uses single reference for parallel control of two gases. The regulator uses an external fluid pressure to modulate the flow of one gas, and the regulated flow of the first gas to modulate the flow of the second.

B66-10168  
SAFETY SWITCH PERMITS EMERGENCY BRIDGE CRANE SHUTDOWN  
LONG, E. J. R. /N. AM. AVIATION/ APR. 1966  
M-FS-549

Safety switch on a crane control pendant must be held closed to operate the crane. This provides for immediate power cutoff to the crane in an emergency or a pendant circuit failure.

B66-10169  
MODIFIED DRILL PERMITS ONE-STEP DRILLING OPERATION  
LIBERTONE, C. /N. AM. AVIATION/ APR. 1966  
M-FS-559

Drill with modified cutting faces permits one-step drilling operation without chatter upon contact and premature wear. The modification of the drill, which has the same diameter as that of the desired hole, consists of a groove across the bottom of each of the cutting faces of the drill flutes.

B66-10171  
MULTISURFACE FIXTURE PERMITS EASY GRINDING OF TOOL BIT ANGLES  
JONES, C. R. /N. AM. AVIATION/ APR. 1966  
M-FS-586

Multisurface fixture with a tool holder permits accurate grinding and finishing of right and left-hand single point threading tools. All angles are ground by changing the fixture position to rest at various reference angles without removing the tool from the holder.

B66-10172  
FLEXIBLE COILED SPLINE SECURELY JOINS MATING CYLINDERS  
COPPERNOL, R. W. /GEN. DYN./ASTRONAUTICS/ APR. 1966  
WOO-270

Mating cylindrical members are joined by spline to form an integral structure. The spline is made of tightly coiled, high-tensile-strength steel spiral wire that fits a groove between the mating members. It provides a continuous bearing surface for axial thrust between the members.

B66-10174  
EPOXY-COATED CONTAINERS EASILY OPENED BY WIRE BAND  
MC COY, J. W. /N. AM. AVIATION/ APR. 1966



M-FS-592

Epoxy coating reduces punctures, abrasions, and contamination of synthetic cellular containers used for shipping and storing fragile goods and equipment. A wire band is wound around the closure joint, followed by the epoxy coating. The container can then be easily opened by pulling the wire through the epoxy around the joint.

B66-10175

DEVICE SPOT-LAPS SPHERES TO VERY CLOSE

TOLERANCES

AVERY, H. W. /GE/ MAY 1966

JPL-SC-119

Device laps precise amounts of metal from high spots on a spherical body to correct minute surface imperfections. The device generates the lapped surface with reference to an existing true surface on the spherical workpiece. Lapping is performed by applying a rotary and oscillatory motion to the workpiece while the lapping tool is held on the workpiece high spot.

B66-10176

LIFTING CLAMP POSITIVELY GRIPS STRUCTURAL

SHAPES

REINHARDT, E. C. MAY 1966

M-FS-593

Welded steel clamps securely grip structural shapes of various sizes for crane operations. The clamp has adjustable clamping jaws and screw-operated internal V-jaws and provides greater safety than hoisting slings presently used. The structural member can be rotated in any manner, angle, or direction without being released by the clamp.

B66-10188

CONTROL SYSTEM MAINTAINS COMPARTMENT AT

CONSTANT TEMPERATURE

LINDBERG, J. G. /N. AM. AVIATION/ MAY 1966

JPL-SC-145

Gas-filled permeable insulating material maintains an enclosed compartment at a uniform temperature. The material is interposed between the two walls of a double-walled enclosure surrounding the compartment.

B66-10189

PNEUMATIC SHUTOFF AND TIME-DELAY VALVE

OPERATES AT CONTROLLED RATE

HORNING, J. L. TOMLINSON, L. E. /N. AM.

AVIATION/ MAY 1966

M-FS-602

Shutoff and time delay valve, which incorporates a metering spool that moves at constant velocity under pneumatic pressure and spring compression, increases fluid-flow area at a uniform rate. Diaphragm areas, control cavity volume, and bleed-orifice size may be varied to give any desired combination of time delay and spool travel time.

B66-10190

BELLOWS DESIGN FEATURES LOW SPRING RATE AND

LONG LIFE

LUSIC, R. F. /N. AM. AVIATION/ MAY 1966

MSC-521

High pressure bellows has high strength rigid hoops for strength and stability and sheet stock for low spring rate effects. The simplicity of this bellows design facilitates mass production.

B66-10191

TOOL POST MODIFICATION ALLOWS EASY TURRET

LATHE CUTTING-TOOL ALIGNMENT

FOOTS, L. /N. AM. AVIATION/ MAY 1966

M-FS-581

Modified tool holder and tool post permit alignment of turret lathe cutting tools on the center of the spindle. The tool is aligned with the spindle by the holder which is kept in position by a hydraulic lock-in feature of the tool post. The tool post is used on horizontal and vertical turret lathes and other engine lathes.

B66-10195

SEGMENTED BALL VALVE IS EASY TO OPEN AND CLOSE

PRONO, E. SHINAULT, L. H. /N. AM. AVIATION/

SPEISMAN, C. JUN. 1966

WOO-248

Segmented ball valve and flowmeter in the same spherical housing provide a valve that will handle large fluid volume without bulkiness and weight of blade valves or conventional ball valves. The valve is easily opened or closed and the flowmeter remains stationary, so errors are eliminated.

B66-10197

INTERMEDIATE ROTATING RING IMPROVES

RELIABILITY OF DYNAMIC SHAFT SEAL

MESNY, P. R. /N. AM. AVIATION/ MAY 1966

M-FS-575

Intermediate rotating ring improves the reliability of dynamic shaft seals whose rubbing surfaces wear down rapidly at high shaft speeds. The rotating ring is placed between the rotating shaft sealing surfaces and the stationary surface, and driven at one-half the shaft speed.

B66-10201

SELF-CONTAINED CLOTHING SYSTEM PROVIDES

PROTECTION AGAINST HAZARDOUS ENVIRONMENTS

INNOVATOR NOT GIVEN /GARRETT CORP./ MAY 1965

M-FS-536

Self-contained clothing system protects personnel against hazardous environments. The clothing has an environmental control system and a complete protection envelope consisting of an outer garment, inner garment, underwear, boots, gloves, and helmet.

B66-10202

BODY-FITTED HARNESS PROVIDES SAFE AND EASY

COMPONENT HANDLING

MILLER, E. G. ROTHWELL, G. E. /IBM/ MAY 1966

M-FS-533

Body-fitted restraint harness enables workers to safely and conveniently handle critical components during their installation or removal. Since the harness supports the components, the worker is able to maneuver through restricted areas with his hands free. It is easily put on, adjusted, and removed, or comfortably worn without interfering with normal activities.

B66-10204

TORQUE WRENCH ALLOWS READINGS FROM

INACCESSIBLE LOCATIONS

DE BARNARDO, M. /N. AM. AVIATION/ MAY 1966

M-FS-598

Torque wrench with an adjustable drive shaft permits indicator to remain in view when used on sections of equipment with limited access. The shaft is capable of protruding from either side of the wrench head by means of spring loaded balls.

B66-10206

LOW POWER HEATING ELEMENT PROVIDES THERMAL

CONTROL DURING SWAGING OPERATIONS

CROWELL, J. W. /CHRYSLER CORP./ MAY 1966

M-FS-457

Low-power, cylindrical heating element in a swaging anvil assembly heats the material being worked on. The increased ductility of heated material results in crack-free deformation.

B66-10208

TOOL ENABLES PROPER MATING OF ACCELEROMETER

AND CABLE CONNECTOR

STEED, C. N. /N. AM. AVIATION/ MAY 1966

M-FS-611

Tool supports accelerometer in axial alignment with an accelerometer cable connector and permits tightening of the accelerometer to the cable connector with a torque wrench. This is done without damaging the components or permitting them to work loose under sustained, high-level vibrations.

B66-10209

SPECIAL TOOL SEALS CONDUCTORS WITH COMBINATION

OF PLASTIC SLEEVES

YOUNG, S. /N. AM. AVIATION/ MAY 1966

M-FS-579

Special tool seals electrical conductors connecting instrumentation within space vehicle

cryogenic fuel tanks and oxidizer tanks. An inner sleeve of fluorinated ethylene-propylene and an outer sleeve of tetrafluoroethylene enclose a bundle of conductors and are heated with the tool to form a tight seal of the bundle and each individual wire.

**B66-10210**  
ADJUSTABLE CUTTING GUIDE ALIGNS AND POSITIONS  
STACKS OF MATERIAL  
THIEL, A. M. MAY 1966  
MSC-321

Adjustable guide tool aligns and positions stacks of material for cutting at various angles. The device adapts its shape to stacks of any corner angle, adjusts to any cutting angle, and quickly aligns the stacks for repeated cutting. With this device, an operator need not place his hands under the knife during alignment.

**B66-10211**  
PRESSURE SEAL RING MAY BE EFFECTIVE OVER WIDE  
TEMPERATURE RANGE  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ MAY 1966  
M-FS-486

Positive pressure seal rings seal bolted flange joints in pressure vessels containing fluids whose temperatures can vary over a wide range. The seal rings mate with grooves in the flanges and compensate for the excessive thermal expansion or contraction of a gasketed joint.

**B66-10212**  
LIQUID TRAP SEALS THERMOCOUPLE LEADS  
RUPPE, E. P. /N. AM. AVIATION/ MAY 1966  
M-FS-688

Liquid trap seals thermocouple leads coming out of a brazing retort that operates with a controlled atmosphere so that air cannot enter the retort and hydrogen cannot escape. The trap is fastened to a duct welded to the retort. Thermocouple leads are led out through the duct and trap, with the fluid forming a gastight seal between the atmosphere and the retort.

**B66-10213**  
CYLINDRICAL CLAW CLAMP HAS QUICK RELEASE  
FEATURE  
GOODWIN, G. D. /CHRYSLER CORP./ MAY 1966  
M-FS-513

Claw clamp grasps cylindrical shapes by pressing its jaws around the object. The clamp is released by retraction of a release pin which extends beyond the clamp handle on both sides for better purchase.

**B66-10214**  
COLLOIDAL SUSPENSION SIMULATES LINEAR  
DYNAMIC PRESSURE PROFILE  
MC CANN, R. J. /LOCKHEED MISSILES AND SPACE CO./  
JUN. 1966  
WDD-266

Missile nose fairings immersed in colloidal suspension prepared with various specific gravities simulate pressure profiles very similar to those encountered during reentry. Stress and deflection conditions similar to those expected during atmospheric reentry are thus attained in the laboratory.

**B66-10215**  
ELECTRON BEAM WELDING OF COPPER-MONEL  
FACILITATED BY CIRCULAR MAGNETIC SHIELDS  
LAMB, J. N. /N. AM. AVIATION/ MAY 1966  
M-FS-569

High permeability, soft magnetic rings are placed on both sides of electron beam weld seams in copper-Monel circular joint. This eliminates deflection of the electron beam caused by magnetic fields present in the weld area.

**B66-10216**  
SOFT-SEAL VALVE HOLDS HAZARDOUS FLUIDS  
SAFELY  
MAY 1966 SEE ALSO NASA-TN-D-1727  
LEWIS-275

Valve assembly allows transfer of hazardous or reactive fluids such as liquid fluorine without corrosion of valve face and seat material. The

assembly consists of a plug to block bulk flow and a soft-seal outer seat to effect zero-leak stoppage.

**B66-10217**  
FIBERGLASS CONTAINER SHELLS FORM  
CONTAMINATION-FREE STORAGE UNITS  
KRAUS, H. M. /N. AM. AVIATION/ JUN. 1966  
WDD-275

Interchangeable molded fiberglass shells are locked together to form storage units of various depths. These units can hold components weighing 1500 pounds, are easily transportable, and protect contents from contamination.

**B66-10218**  
PRESSURE VESSELS FABRICATED WITH HIGH-STRENGTH  
WIRE AND ELECTROFORMED NICKEL  
ROTH, B. /N. AM. AVIATION/ JUN. 1966  
M-FS-580

Metal pressure vessels of various shapes having high strength-to-weight ratios are fabricated by using known techniques of filament winding and electroforming. This eliminates nonuniform wall thickness and unequal wall strength which resulted from welding formed vessel segments together.

**B66-10219**  
TOOL PERMITS DAMAGE-FREE REMOVAL OF SOLAR CELL  
BECKLEY, J. E., JR. /COMPREHENSIVE DESIGNERS/  
MAY 1966  
GSFC-467

Modified soldering iron extracts a wrap-around solar cell that is attached with solder or adhesive to a substrate without destroying the cell removed or damaging adjacent cells. Heat, vacuum, and compressed air, operated from a special head attached to the soldering iron, loosen, extract, and protect the cell.

**B66-10226**  
A CONCEPTUAL DESIGN FOR SQUEEZE FILM BEARINGS  
INNOVATOR NOT GIVEN /BENDIX CORP./ JUN. 1966  
M-FS-573

Squeeze film bearings which require at least one of two adjacent surfaces to oscillate at high frequency and low amplitude have the oscillating /strain-producing/ member on a double gas film. This means of support allows dynamic changing of the gap between the bearing surfaces without the disadvantages produced when the oscillator is affixed to the bearing base itself.

**B66-10228**  
STUDIES REVEAL EFFECTS OF PIPE BENDS ON FLUID  
FLOW CAVITATION  
STONEMETZ, R. E. MAY 1966  
M-FS-516

Incipient cavitation in liquids flowing in pipes curved in one plane are affected by the pipe bend radii and pipe diameters, but little by pipe bend angles ranging from 60 to 120 degrees. Critical cavitation indices decrease with higher Reynolds number and pressure ratio. Bulk liquid temperature increase lowers the mean critical velocity at which cavitation occurs.

**B66-10229**  
EXPANDABLE RUBBER PLUG SEALS OPENINGS FOR  
PRESSURE TESTING  
MAY 1966  
NU-0048

Plug assembly seals openings in piping systems, vessels, and chambers for low pressure leak testing. The assembly, which consists of a rubber sealing plug and the mechanism for expanding it into a pressure-tight configuration, adequately seals irregular diameters without damage to mating surfaces.

**B66-10233**  
QUICK-CLOSING VALVE IS ACTUATED BY EXPLOSIVE  
DISCHARGE  
MAJESKI, S. J. JUN. 1966  
ARC-55

Remotely controlled plug-type valve shuts off a high-pressure, high-temperature gas flow in a few milliseconds. The valve is actuated by a commercially available electrically initiated

squib of low explosive power. More rapid closure is attainable with squibs containing heavier explosive charges.

B66-10235  
KEY-LOCKED GUARD PREVENTS ACCIDENTAL SWITCH  
ACTUATION  
HAWTHORNE, K. C. /N. AM. AVIATION/ JUN. 1966  
MSC-419

Switch guard, which locks in place on a panel, protects individual switches from accidental activation. The guard consists of a cup to cover the switch lever, a standard screw lock tumbler, and a stud that mates with a threaded adapter in the panel.

B66-10236  
AUTOMATIC REEL CONTROLS FILLER WIRE IN  
WELDING MACHINES  
MILLETT, A. V. /N. AM. AVIATION/ JUN. 1966  
MSC-416

Automatic reel on automatic welding equipment takes up slack in the reel-fed filler wire when welding operation is terminated. The reel maintains constant, adjustable tension on the wire during the welding operation and rewinds the wire from the wire feed unit when the welding is completed.

B66-10237  
ADJUSTABLE KNIFE CUTS HONEYCOMB MATERIAL TO  
SPECIFIED DEPTH  
RAUSCHL, J. A. /N. AM. AVIATION/ JUN. 1966  
MSC-475

Calibrated, adjustable knife cuts aluminum honeycomb or other soft materials to a desired depth. The frame of the device accommodates standard commercial blades. Since the blade is always visible to the operator, the device can be used on any straight or irregular layout line.

B66-10238  
INSERT SLEEVE PREVENTS TUBE SOLDERING  
CONTAMINATION  
STEIN, J. /N. AM. AVIATION/ JUN. 1966  
MSC-552

Teflon sleeve insert prevents contamination of internal tube surfaces by solder compound during soldering operations that connect and seal the tube ends. The sleeve insert is pressed into the mating tube ends with a slight interference fit.

B66-10239  
HAND TOOL PERMITS SHRINK SIZING OF ASSEMBLED  
TUBING  
MILLETT, A. ODOR, M. /N. AM. AVIATION/ JUN. 1966  
MSC-504

Portable tool sizes tubing ends without disassembling the tubing installation. The shrink sizing tool is clamped to the tubing and operated by a ratchet wrench. A gear train forces the tubing end against an appropriate die or mandrel to effect the sizing.

B66-10240  
JIG PROTECTS TRANSISTORS FROM HEAT WHILE  
TINNING LEADS  
PELLETIER, A. J. WILLIS, G. A. /N. AM. AVIATION/  
JUN. 1966  
MSC-515

In tinning transistor leads, an aluminum jig is used to dip the leads into the molten tin. The jig's mass shunts excess heat given off by the molten tin before it reaches and damages the transistor body.

B66-10241  
BRAZING PROCESS USING AL-SI FILLER ALLOY  
RELIABLY BONDS ALUMINUM PARTS  
BEUYUKIAN, C. S. JOHNSON, W. R. /N. AM.  
AVIATION/ JUN. 1966  
MSC-448

Brazing process employs an aluminum-silicon filler alloy for diffusion bonding of aluminum parts in a vacuum or inert gas atmosphere. This process is carried out at temperatures substantially below those required in conventional process and produces bonds of greater strength and

reliability.

B66-10242  
PORTABLE SANDBLASTER CLEANS SMALL AREAS  
SEVERIN, H. J. /N. AM. AVIATION/ JUN. 1966  
MSC-523

Portable sandblasting unit rapidly and effectively cleans localized areas on a metal surface. The unit incorporates a bellows enclosure, masking plate, sand container, and used sand accumulator connected to a vacuum system. The bellows is equipped with an inspection window and light for observation of the sanding operation.

B66-10243  
LATHE CHUCK KEY INCORPORATES SAFETY FEATURE  
CHRISTMAN, G. L. /N. AM. AVIATION/ JUN. 1966  
MSC-506

Lathe chuck key with spring loaded plunger cannot inadvertently be left in the chuck when the lathe is started. The plunger automatically ejects the key from the chuck when hand pressure is released.

B66-10244  
HOLLOW NEEDLE USED TO CUT METAL HONEYCOMB  
STRUCTURES  
GREGG, E. A. /N. AM. AVIATION/ JUN. 1966  
MSC-486

Hollow needle tool cuts metal honeycomb structures without damaging adjacent material. The hollow needle combines an electrostatic discharge and a stream of oxygen at a common point to effect rapid, accurate metal cutting. The tool design can be varied to use the hollow needle principle for cutting a variety of shapes.

B66-10246  
MODIFIED SOLDERING IRON SPEEDS CUTTING OF  
SYNTHETIC MATERIALS  
SCHAFFER, W. G., JR. /N. AM. AVIATION/ JUN. 1966  
M-FC 725

Modified soldering iron cuts large lots of synthetic materials economically without leaving frayed or jagged edges. The soldering iron is modified by machining an axial slot in its heating element tip and mounting a cutting disk in it. An alternate design has an axially threaded bore in the tip to permit the use of various shapes of cutting blades.

B66-10247  
PRESSURE-WELDED FLANGE ASSEMBLY PROVIDES  
LEAKTIGHT SEAL AT REDUCED BOLT LOADS  
MARTENSON, A. J. /GE/ JUN. 1966  
M-FS-640

Vibration resistant flange-connector assembly provides a leaktight seal under reduced bolt loads. The assembly consists of ductile metal plates that are pressure welded between dies mounted in recessed flanges.

B66-10248  
ELECTRICAL UPSETTING OF METAL SHEET FORMS WELD  
EDGE  
SCHERBA, E. S. /N. AM. AVIATION/ JUN. 1966  
M-FS-720

Electric gathering of sheet stock edges forms metal sheets in the shape of gore sections with heavier edge areas that can be welded without loss of strength. The edges are gathered by progressive resistance heating and upsetting, and are formed automatically. This process avoids disturbance of the metal's internal structure.

B66-10249  
FLUID DAMPING REDUCES BELLOWS SEAL FATIGUE  
FAILURES  
INNOVATOR NOT GIVEN /N. AM. AVIATION/ JUN. 1966  
M-FS-565

Service life of a bellows-type seal in the presence of mechanical vibration is increased by a system of interconnected bellows with intervening cavities filled with a fluid which damps the amplitude of periodic deflection of the sealing bellows. Different damping fluids are used according to environmental conditions.

B66-10250  
DIFFUSION BONDING MAKES STRONG SEAL AT FLANGED

## CONNECTOR

GITZENDANNER, L. G. LANIEWSKI, J. P. RATHBUN, F. O., JR. /GE/ JUN. 1966  
M-FS-637

Copper strip seals a high pressure fluid system connector so that it is insensitive to relaxation of the bolt loads. The copper strip is diffusion bonded to the surfaces of the connector flange by application of high pressure and temperature.

B66-10253

TOOL SEPARATES SLEEVE-TYPE UNIONS WITHOUT HEAT  
MILLET, A. U. /N. AM. AVIATION/ JUN. 1966  
MSC-497

Tool that uses conventional milling and cutting techniques separates sleeve type tubing unions and tubes without using heat. A selection of holders, associated bits, and cutting wheels permits preparation of varied diameter unions.

B66-10254

MILL PROFILER MACHINES SOFT MATERIALS  
ACCURATELY

RAUSCHL, J. A. /N. AM. AVIATION/ JUN. 1966  
M-FS-692

Mill profiler machines bevels, slots, and grooves in soft materials, such as styrofoam phenolic-filled cores, to any desired thickness. A single operator can accurately control cutting depths in contour or straight line work.

B66-10255

FLOW RING VALVE IS SIMPLE, QUICK-ACTING

LINDFORS, J. A. /N. AM. AVIATION/ JUN. 1966  
M-FS-752

Two porting rings, one within the other, control gas or liquid flow by using seal buttons as the sliding valve closers. Multiporting within the ring allows close control of the flow by the slight rotation of the outer porting ring.

B66-10258

CRITICAL PARTS ARE STORED AND SHIPPED IN  
ENVIRONMENTALLY CONTROLLED REUSABLE CONTAINER  
KUMMERFELD, K. R. /N. AM. AVIATION/ JUN. 1966  
M-FS-703

Environmentally controlled, hermetically sealed, reusable metal cabinet with storage drawers is used to ship and store sensitive electronic, pneumatic, or hydraulic parts or medical supplies under extreme weather or handling conditions. This container is compatible with on-site and transportation handling facilities.

B66-10262

ALUMINUM/STEEL WIRE COMPOSITE PLATES EXHIBIT  
HIGH TENSILE STRENGTH  
INNOVATOR NOT GIVEN /HARVEY ALUMINUM CO./ JUN. 1966

M-FS-401

Composite plate of fine steel wires imbedded in an aluminum alloy matrix results in a lightweight material with high tensile strength. Plates have been prepared having the strength of titanium with only 85 percent of its density.

B66-10265

COMPACT ACTUATOR CONVERTS ROTARY TO LINEAR  
MOTION

FORD, A. G. JUN. 1966  
JPL-786

Compact motor mounted on a stationary base converts rotary to linear motion. The motor rotates a gear train assembly so that the end of an arm attached to the assembly moves in a linear path.

B66-10266

SEAL SURFACES PROTECTED DURING ASSEMBLY

RICHARDSON, G. L. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0067

Protection device for sealed surfaces is placed over the polished surface entrance of trapped bosses and removed when the seal fitting has been engaged with the boss threads. This technique applies to various seal types used in close fitting, spring-loaded, threaded fittings.

B66-10267

RADIAL COOLANT CHANNELS FABRICATED BY  
SIMPLIFIED METHOD

FREEMAN, A. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0070

Radial coolant channels for distributing a coolant over the inner wall of a circular section are fabricated by cold-rolling indentations on the inside circumference of the base section and covering the indentations with a rolled flange.

B66-10269

DIFFERENTIAL EXPANSION PROVIDES PRESSURE FOR  
DIFFUSION BONDING OF LARGE DIAMETER RINGS

INNOVATOR NOT GIVEN /BOEING CO./ JUN. 1966  
M-FS-588

External pressure band is used to bond aluminum alloy collars to large diameter, stainless steel rings. The band contracts while cooling and exerts pressure on the joint between the silver-plated surfaces of the ring and collar which expand toward the band. This diffusion bonding by differential expansion minimizes aluminum deformation.

B66-10275

FASTENER PROVIDES FOR BOLT MISALIGNMENT AND  
QUICK RELEASE OF FLANGE

ENGLAND, C. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0074

Fastener enables two large flanges to be bolted together without close alignment between the bolt and bolt-hole diameters, and provides for a quick release of one of the flanges under emergency conditions. It contains a nut that is retained by a square head in a recess in one side of the removable flange and by a collar and snap ring on the other side of the flange.

B66-10276

REMOTELY CONTROLLED SYSTEM COUPLES AND  
DECOUPLES LARGE DIAMETER PIPES

GRIFFIN, P. A. /AEROJET-GEN. CORP./ JUN. 1966  
NU-0062

Remote control, air-motor driven, chain-drive system engages and disengages a flange coupling from large-diameter, high pressure fluid lines.

B66-10277

DEVICE FACILITATES CENTERING OF WORKPIECES IN  
LATHE CHUCK

PRATER, L. /N. AM. AVIATION/ JUN. 1966  
M-FS-685

Spring-loaded device used in conjunction with a standard dial indicator facilitates centering a workpiece in an independent four-jaw lathe chuck.

B66-10278

O-RINGS WITH MYLAR BACK-UP PROVIDE HIGH-  
PRESSURE CRYOGENIC SEAL

FUNK, G. M. /N. AM. AVIATION/ JUN. 1966  
M-FS-603

Mylar lip type back-up ring installed in combination with three rubber O-rings seal the junctions between a tube stub and an adapter during high pressure gas flow at cryogenic to room temperatures. Mylar seals should not be used with oxygen under pressure or in the liquid state.

B66-10279

MAGNETIC LATCHES PROVIDE POSITIVE  
OVERPRESSURE CONTROL

LOY, J. L. /WESTINGHOUSE ASTRONUCL. LAB./ JUN. 1966  
NU-0057

Louvers are used for overpressure safety venting in rooms or chambers where explosion hazards exist. The louvers have individually hinged closures that are held in locked position by commercially available magnets that quickly release them in an overpressure condition.

B66-10283

FIXED VACUUM PLATE CLAMPS STYROFOAM FOR  
MACHINING

RAUSCHL, J. A. /N. AM. AVIATION/ JUN. 1966  
M-FS-683 M-FS-726

Aluminum plate holds styrofoam securely in place for machining operations. The styrofoam is

clamped to rubber or cork pads on the plate surface by vacuum. Foam rubber tape provides the vacuum seal.

B66-10284  
EXTENSOMETER AUTOMATICALLY MEASURES  
ELONGATION IN ELASTOMERS  
HOOPER, C. D. JUN. 1966  
M-FS-517

Extensometer, with a calibrated shaft, measures the elongation of elastomers and automatically records this distance on a chart. It is adaptable to almost any tensile testing machine and is fabricated at a relatively low cost.

B66-10285  
HIGH PRESSURE TUBE COUPLING REQUIRES NO  
THREADS OR FLARES  
STEIN, J. A. /N. AM. AVIATION/ JUN. 1966  
MSC-600

High pressure tube coupling connects to any straight, unthreaded, and unflared tubing end without deforming or damaging the tubing. The coupling grips the tube wall tightly between an external compression sleeve and an internal hollow mandrel. It is adaptable to standard screw fittings for test stand attachment.

B66-10294  
PNEUMATIC SEPARATOR GIVES QUICK RELEASE TO  
HEAVY LOADS  
BUCHANAN, D. C. DAVIS, E. J. PHILLIPS, J. D.  
JUL. 1966  
KSC-66-10

Pneumatic separator, using applied pressure, quickly releases restraining devices securing heavy loads. With minor modifications this separator can be used as a coupling device.

B66-10297  
DIAPHRAGM SPRING GIVES CLUTCH OVER-CENTER  
TOGGLE EFFECT  
ROSENBERG, H. W. /GE/ AUG. 1966  
GSFC-499

Diaphragm spring clutch mechanism is used in testing the relative merits of eddy-current and hysteresis dampers. The dampers are alternately coupled to a single damping boom shaft. The floating clutch mechanism enables the inoperative damper to remain completely isolated from the damping boom shaft during test of the other damper.

B66-10301  
TOOL PRE-TENSIONS COVERS PRIOR TO LACING  
FORMAN, M. A. VOGEL, R. C. /N. AM. AVIATION/  
JUL. 1966  
MSC-631

In securing a bulky object in a storage compartment, a cinching or tightening tool is used to draw two opposing cover halves together at a predetermined tension to permit quick lacing to retain the stored object. This tool is also useful in fabrication industries to draw components together during assembly or treating.

B66-10302  
SIMPLE SCALE INTERPOLATOR FACILITATES READING  
OF GRAPHS  
FAZIO, A. HENRY, B. HOOD, D. JUL. 1966  
LEWIS-92 LEWIS-93

Set of cards with scale divisions and a scale finder permits accurate reading of the coordinates of points on linear or logarithmic graphs plotted on rectangular grids. The set contains 34 different scales for linear plotting and 28 single cycle scales for log plots.

B66-10303  
BYPASS ROD TRANSFERS HEAT DEVELOPED IN  
THERMIONIC DIODE  
LAZARIDIS, L. J. /THERMO ELECTRON ENG. CORP./  
JUL. 1966  
JPL-SC-136

In a thermionic diode, a cesium tube joining the emitter-collector area and the cesium reservoir is fitted with a copper bypass rod held in place by two standoff brackets. The rod transfers heat from the emitter-collector to the reservoir

without going through the ceramic seal structure which surrounds the cesium tube and cannot sustain large temperature gradients.

B66-10304  
FLEXIBLE FASTENER EFFECTS AIRTIGHT MATERIAL  
CLOSURE  
NAY, D. L. JUL. 1966  
JPL-684

Flexible tube inserted into a 3/4-round strip receptacle inflates to form an airtight material fastener. Inflation is done with a carbon dioxide and deflation by a manually operated release valve. Device has potential use in space suits, underwater suits, and other protective clothing.

B66-10310  
MODIFIED HYDRAULIC BRAKING SYSTEM LIMITS  
ANGULAR DECELERATION TO SAFE VALUES  
BRIGGS, R. S. COUNCIL, M. GREEN, P. M. /COLLINS  
RADIO CO./ JUL. 1966  
GSFC-476

Conventional spring-actuated, hydraulically released, fail-safe disk braking system is modified to control the angular deceleration of a massive antenna. The hydraulic system provides an immediate preset pressure to the spring-loaded brake shoes and holds it at this value to decelerate the antenna at the desired rate.

B66-10311  
UNION WOULD FACILITATE JOINING OF TUBING,  
MINIMIZE BRAZE CONTAMINATION  
TERRIL, A. E. /N. AM. AVIATION/ JUL. 1966  
MSC-777

Union assembly provides a fluidtight joint between two lengths of tubing and minimizes introduction of braze contaminants into the tubing. The union contains two brazing preforms separated by a metal ring that serves as a dam for the molten brazing alloy.

B66-10317  
FLEXIBLE ARMS PROVIDE CONSTANT FORCE FOR  
PRESSURE SWITCH CALIBRATION  
CAIN, D. E. KUNZ, R. W. /GE/ JUL. 1966  
HQ-38

In-place calibration of a pressure switch is provided by a system of radially oriented flexing arms which, when rotated at a known velocity, convert the centrifugal force of the arms to a linear force along the shaft. The linear force, when applied to a pressure switch diaphragm, can then be calculated.

B66-10318  
TORUS ELEMENTS USED IN EFFECTIVE SHOCK  
ABSORBER  
CUNNINGHAM, P. PLATUS, D. L. /AEROSPACE RES.  
ASSOC./ JUL. 1966  
WDD-114

Energy absorbing device forces torus elements to revolve annularly between two concentric tubes when a load is applied to one tube. Interference forces can be varied by using focus elements of different thicknesses. The device operates repeatedly in compression or tension, and under problems of large onset rate tolerance or structural overload.

B66-10319  
FIBER LENGTH AND ORIENTATION PREVENT MIGRATION  
IN FLUID FILTERS  
REIMAN, P. A. /ARTHUR D. LITTLE/ JUL. 1966  
M-FS-541

Stainless steel fiber web filter resists fiber migration which causes contamination of filtered fluids. This filter is capable of holding five times more particulate matter before arbitrary cutoff pressure drop and shows excellent retention in fuel flow at high rates.

B66-10321  
SWIVELING LATHE JAW CONCEPT FOR HOLDING  
IRREGULAR PIECES  
DAVID, J. /N. AM. AVIATION/ JUL. 1966  
M-FS-783

Clamp holds irregularly shaped pieces in lathe

chuck without damage and eliminates excessive time in selecting optimum mounting. Interchangeable jaws ride in standard jaw slots but swivel so that the jaw face bears evenly against the workpiece regardless of contour. The jaws can be used on both engine and turret lathes.

**B66-10323**  
SPECIAL MANDREL PERMITS UNIFORM WELDING OF  
OUT-OF-ROUND TUBING  
DOR, M. E. /FUEG, L. B. WHIFFEN, E. L. /N. AM.  
AVIATION/ JUL. 1966  
M-FS-706

Segmented, expandable mandrel provides uniform weld bead chilling in machine welding of circumferential seams on out-of-round tubes. Radial expansion of a rubber actuator forces the individual mandrel segments into intimate contact with the inner walls of mating tubes. Various sizes of tubing may be welded by using different mandrels and actuators.

**B66-10326**  
EXTERNAL LINKAGE TIE PERMITS REDUCTION IN  
DUCTING SYSTEM FLANGE THICKNESS  
PFLEGER, R. O. /N. AM. AVIATION/ JUL. 1966  
M-FS-823

External linkage tie reduces flange thickness and increases seal efficiency in high pressure ducting and piping systems. The linkage transmits the pressure separating load to the tube wall behind the flange allowing the flange to support only the seal.

**B66-10328**  
CORK IS USED TO MAKE TOOLING PATTERNS AND  
MOLDS  
HOFFMAN, F. J. /N. AM. AVIATION/ JUL. 1966  
MSC-425

Sheet and waste cork are cemented together to provide a tooling pattern or mold. The cork form withstands moderately high temperatures under vacuum or pressure with minimum expansion, shrinkage, or distortion.

**B66-10329**  
INSPECTION OF FINE WIRES SIMPLIFIED BY  
CAPILLARY TUBE WIRE HOLDER  
RAPHAEL, H. A. /N. AM. AVIATION/ JUL. 1966  
MSC-588

Capillary tube wire holder provides a mount for fine wires for photomicrographs. The holder is mounted in a stainless steel tube and cast in a transparent casting material. It protects and permits easy location of the wire.

**B66-10330**  
ADAPTER ASSEMBLY PREVENTS DAMAGE TO TUBING  
DURING HIGH PRESSURE TESTS  
STINETT, L. L. /N. AM. AVIATION/ JUL. 1966  
MSC-563

Portable adapter assembly prevents damage to tubing and injury to personnel when pressurizing a system or during high pressure tests. The assembly is capable of withstanding high pressure. It is securely attached to the tubing stub end and may be removed without brazing, cutting or cleaning the tube.

**B66-10332**  
BELLOWS JOINT ABSORBS TORSIONAL DEFLECTIONS IN  
DUCT SYSTEM  
DANIELS, C. M. /N. AM. AVIATION/ JUL. 1966  
M-FS-882

Long, thin-walled bellows compressed into a short length absorbs the same amount of torsional deflection as the same tube in full length condition and saves in cost, complexity and space. This bellows has lower torsional spring rate to absorb the bulk of the duct assembly tortional deflections, leaving the other bellows free to absorb axial and angular deflections.

**B66-10333**  
VIBRATOR IMPROVES SPARK EROSION CUTTING  
PROCESS  
THRALL, L. R. /AEROJET-GEN. CORP./ JUL. 1966  
NU-0071

Variable frequency mechanical vibrator improves

spark erosion cutting process. The vibration of the cutting tip permits continual flushing away of residue around the cut area with nondestructive electric transformer oil during the cutting process.

**B66-10334**  
STRIPPABLE GRID FACILITATES REMOVAL OF  
GRID-SURFACED CONICAL WORKPIECE FROM DIE  
RUPPE, E. P. /N. AM. AVIATION/ JUL. 1966  
M-FS-716

Female die facilitates the removal of a sheet metal structure from a die used for explosive forming of the metal. The female die consists of a smooth conical frustum made of fiberglass with a cured epoxy-resin surface on which a molded grid pattern made of a polyurethane resin is overlaid.

**B66-10335**  
SHOCK-OPERATED VALVE WOULD AUTOMATICALLY  
PROTECT FLUID SYSTEMS  
BRANUM, L. W. WELLS, G. H. /N. AM. AVIATION/  
JUL. 1966  
M-FS-801

Glandless valve shuts down high-pressure fluid systems when severe shock from an explosion or earthquake occurs. The valve uses a pendulum to support the valve closure plug in the open position. When jarred, the valve body is moved relative to the pendulum and the plug support is displaced, allowing the plug to seat and be held by spring pressure.

**B66-10336**  
CONCEALED HINGE PERMITS FLUSH MOUNTING OF  
DOORS AND HATCHES  
HOLMAN, E. V. /N. AM. AVIATION/ JUL. 1966  
MSC-623

Hinge assembly permits flush mounting of doors and hatches of considerable thickness so that the axis of instant rotation, produced by the hinge, lies outside the panel surface and beyond the perimeter adjacent to the hinge. In operation, motion of the assembly is initially parallel, changing to angular after clearing the panel perimeter.

**B66-10337**  
SEMI-AUTOMATIC DEVICE TESTS COMPONENTS WITH  
BIAXIAL LEADS  
MARSHALL, T. C. /N. AM. AVIATION/ AUG. 1966 SEE  
ALSO B65-10243  
MSC-516

Semiautomatic device with a four-terminal network tests quantities of components having biaxial leads. The four-terminal network permits the testing of components in different environments. This device is easily modified for completely automatic operation.

**B66-10338**  
LATCHING MECHANISM OPERATES IN LIMITED ACCESS  
AREA  
HOLMAN, E. V. /N. AM. AVIATION/ JUL. 1966  
MSC-230

Latching mechanism that is securely locked by the movement of the operating handle in one direction, is used in limited access areas. This mechanism is operated by a force applied to the handle at small angles.

**B66-10339**  
SIMULATOR EFFECTS PARTIAL GRAVITY CONDITIONS  
JOHNSON, H. I. TRADER, A. G. JUL. 1966  
MSC-152

Adjustable apparatus which simulates partial to zero gravity partially supports the weight of convalescing patients in rehabilitation exercises. This device is an ideal tool for physical therapy.

**B66-10342**  
GAS DIFFUSER FACILITATES WITHDRAWAL OF  
CRYOGENIC LIQUIDS FROM TANKS  
DUNN, J. D. /N. AM. AVIATION/ JUL. 1966  
M-FS-915

Compact, cylindrical gas diffuser with radial exhaust slots and internal axial flow channels maintains the necessary pressure for the desired withdrawal rate of cryogenic liquids from tanks.

The diffuser minimizes pressure loss which results from condensation of nitrogen gas in the liquid and prevents direct impingement of gas jets on liquid surface to reduce turbulence.

B66-10343

CONCEPT FOR PASSIVE SYSTEM TO CONTROL GAS FLOW INDEPENDENTLY OF TEMPERATURE

CHAVEZ, E. S. MILLEMAN, S. E. RICKEMAN, E. C. /N. AM. AVIATION/ JUL. 1966

M-FS-982

Volumetric flow rate of gas is maintained at a constant value independent of temperature by passing the gas through a parallel or series combination of turbulent flow and laminar flow resistors. By proper combination of resistors, the flow rate may be automatically made to vary as an increasing or decreasing function of temperature.

B66-10345

FRICTION LOADING DEVICE ENABLES ACCURATE TESTING OF BRITTLE MATERIALS

HENGSTENBERG, T. F. ZIBRITOSKY, G. /WESTINGHOUSE ASTRONUCL. LAB./ JUL. 1966

NU-0051

Friction loading device gives axial symmetry to test specimen of brittle materials during tensile testing. This axial alignment prevents bending stresses which hinder measurement of tensile strength.

B66-10346

TOOL FORMS RIGHT ANGLES IN COMPONENT LEADS

GLENN, C. G. JUL. 1966

M-FS-722

Hand tool forms right angles in electronic component leads so they fit the spaced holes of a printed circuit board. This tool firmly holds the leads at points near the component ends to prevent damage and provide accuracy.

B66-10352

BRAZING PROCESS PROVIDES HIGH-STRENGTH BOND BETWEEN ALUMINUM AND STAINLESS STEEL

HUSCHKE, E. G., JR. NORD, D. B. /N. AM. AVIATION/ AUG. 1966

M-FS-803

Brazing process uses vapor-deposited titanium and an aluminum-zirconium-silicon alloy to prevent formation of brittle intermetallic compounds in stainless steel and aluminum bonding. Joints formed by this process maintain their high strength, corrosion resistance, and hermetic sealing properties.

B66-10354

WELDS CHILLED BY LIQUID COOLANT MANIFOLD

ODOR, M. E. WHIFFEN, E. E. /N. AM. AVIATION/ AUG. 1966

M-FS-679 M-FS-680

Liquid coolant chill tool provides uniform cooling to materials adjacent to weld areas on long or contoured butt welds. This tool incorporates a manifold that clamps to the weld joint by vacuum and circulates liquid in direct contact with adjacent material.

B66-10357

SUPPRESSOR PLATE ELIMINATES UNDESIRABLE ARCING DURING ELECTRON BEAM WELDING

HANCHEY, K. K. KUBIK, J. MAHON, J. C. /HAYES INTERN. CORP./ AUG. 1966

M-FS-1126

Suppressor grid eliminates undesirable arcing during electron beam welding in one of two ways. A grid at ground potential collects secondary emission of ions and electrons produced by the beam as it strikes the workpiece, or a negatively energized grid repels the plasma arc back to the workpiece. This eliminates ground screens used to cover view ports.

B66-10360

ALUMINUM CORE STRUCTURES BRAZED WITHOUT USE OF FLUX

INNOVATOR NOT GIVEN /AERONCA MFG. CORP./ AUG. 1966

M-FS-659

Aluminum alloy face sheets are brazed to aluminum alloy honeycomb cores without using corrosive flux by means of one or three methods. The completed brazed structure has the high-strength characteristics of heat treated aluminum alloys.

B66-10364

VERSATILE MACHINE MILLS, SAWS LIGHT MATERIALS

RAUSCHL, J. A. /N. AM. AVIATION/ AUG. 1966

M-FS-827

Versatile milling/sawing machine performs angle cuts, flat and profile milling, machining of grooves and slots, and edge trimming of phenolic panels. The machine is mounted on rails above a table equipped with vacuum capability for holding workpieces.

B66-10365

DIAPHRAGM VALVE FOR CORROSIVE AND HIGH TEMPERATURE FLUID FLOW CONTROL HAS UNIQUE FEATURES

EBIHARA, B. T. VARY, A. AUG. 1966

LEWIS-304

Monometallic diaphragm valve is used for corrosive and high temperature fluid flow control. The body, diaphragm, and plug of the valve are welded together to form an integral leakproof unit for containing the fluid as it passes through the valve from inlet to outlet.

B66-10366

HOLLOW SPHERICAL ROTORS FABRICATED BY ELECTROPLATING

AVERY, H. W. CONROY, T. F. /GE/ AUG. 1966

JPL-SC-117

Equatorial bands are fabricated to provide a locating fit for the hemispheres of hollow spherical rotors which are then jointed by electroplating. Several nonmagnetic materials may be used to form the joint, such as aluminum, copper, iron, gold, platinum, and zinc.

B66-10367

DOT PATTERNS PROVIDE REPRODUCIBLE FLAW AREAS FOR STUDY OF ADHESIVE BONDS

FRANK, L. SCHMITZ, G. /GEN. AM. TRANSPORTATION CORP./ AUG. 1966

M-FS-862

Photographic production of a small-dot pattern of known geometry on the surface of a substrate for controlled area degradation enables a study of adhesive bond strengths. These dot patterns may also be applied to force-limiting devices which must depend on the adhesive bonding strength between mating surfaces.

B66-10369

AUTOMATIC PROTECTIVE VENT HAS FAIL-SAFE FEATURE

DAMERON, C. E. AUG. 1966

LANGLEY-218

Delayed vent valve system in a mechanical backing pump in a vacuum system allows the pneumatic foreline valve to seal before the pump vent opens. The system is designed to be fail-safe and operate even though there is loss of electrical power.

B66-10370

PORTABLE LIGHTWEIGHT CELL PROVIDES CONTROLLED ENVIRONMENT

SHELTON, S. TARR, J. /N. AM. AVIATION/ AUG. 1966

MSC-648

Inflatable, lightweight cell provides a separate, secondary environment for a spacesuited man in case of spacesuit damage or malfunction. The cell has a pressure-sealing zipper and is equipped to maintain a livable atmosphere.

B66-10371

BRAZING RETORT MANIFOLD DESIGN CONCEPT MAY MINIMIZE AIR CONTAMINATION AND ENHANCE UNIFORM GAS FLOW

RUPPE, E. P. /N. AM. AVIATION/ AUG. 1966

M-FS-707

Brazing retort manifold minimizes air contamination, prevents gas entrapment during purging, and provides uniform gas flow into the

retort bell. The manifold is easily cleaned and turbulence within the bell is minimized because all manifold construction lies outside the main enclosure.

B66-10375

IMPACT- AND PUNCTURE-RESISTANT MATERIAL  
PROTECTS PARTS FROM DAMAGE

SHERIFF, D. D. /N. AM. AVIATION/ AUG. 1966  
MSC-747

Uniform sized, laminated panels protect delicate parts and equipment from damage during storage and transportation. The panels consist of sheets of steel foil bonded between sheets of elastic foam. They are lightweight, impact- and puncture-resistant, and, when formed into an enclosure, provide a barrier against moisture and thermal shock.

B66-10378

NONHAZARDOUS ACID ETCHES WELD SAMPLES

ALLEN, B. C. /N. AM. AVIATION/ AUG. 1966  
M-FS-975

Nonhazardous citric acid solution used with 24-volt dc power supply etches weld samples. This etching method is limited to 300 stainless steel and a small range of other high temperature alloys.

B66-10381

GAS-INJECTION VALVE OPERATES AT HIGH SPEED

HOH, F. C. LOWDER, R. S. /ADVANCED KINETICS,  
INC./ AUG. 1966  
HQ-49

Fast acting gas valve is used for injecting a short pulse of gas into a vacuum chamber during plasma acceleration experiments. It contains a lightweight closure disk that is forced away from the valve seat when an electromagnetic coil is momentarily energized and immediately rebounds from a stop back onto the seat.

B66-10383

GEAR DRIVE AUTOMATICALLY INDEXES ROTARY TABLE

JOHNS, M. F. /N. AM. AVIATION/ AUG. 1966  
M-FS-753

Combination indexer and drive unit drills equally spaced circular hole patterns on rotary tables. It automatically rotates the table a distance exactly equal to one hole spacing for each revolution of a special idler gear.

B66-10384

UNIVERSAL TRANSLOADER MOVES DELICATE EQUIPMENT  
WITHOUT STRESS

BARBOUR, J. R. KESSLER, P. N. /N. AM. AVIATION/  
AUG. 1966  
MSC-654

Transloader moves delicate or heavy items over irregular surfaces without transmitting stress to the load. The loader is supported on three pivot points which produce a wrap-free base. The base is supported by an articulated four-wheel frame.

B66-10385

INFLATABLE O-RING SEAL WOULD EASE CLOSING OF  
HATCH COVER PLATE

NEARY, K. J. /N. AM. AVIATION/ AUG. 1966  
MSC-740

Inflatable O-ring seal provides positive sealing means that does not require the manual exertion of a large compressive force during opening or closing of a rotary-type hatch cover plate. The O-ring is deflated during opening and closing, and inflated after closure by a gas pressure source.

B66-10390

ONE-PIECE TRANSPARENT SHELL IMPROVES DESIGN OF  
HELMET ASSEMBLY

JONES, R. L. OKANE, J. H. AUG. 1966  
MSC-187

One-piece transparent helmet shell made of polycarbonate is equipped with a helmet protection pad, a visor assembly, a communications skull cap, and an emergency oxygen supply. This design offers improvements over previous designs in weight, visual field, comfort and protection.

B66-10399

EXPANDABLE TAKEUP REEL FACILITATES PAPER TAPE  
REMOVAL

WESTERMAN, H. E. /DOUGLAS AIRCRAFT CO./ SEP.  
1966  
WOO-271

Takeup reel receives continuous paper tapes from data recording machines. The roller is recessed to have four longitudinal members about its periphery which can be extended or retracted to change the overall diameter of the assembly to allow easy removal of the tapes.

B66-10402

ROTARY VALVE CONTROLS MULTIPLE HYDRAULIC  
LEVELING CYLINDERS

INNOVATOR NOT GIVEN /BOEING CO./ SEP. 1966  
M-FS-361

Single rotary valve controls a circular bank of hydraulic leveling cylinders that must maintain large loads within plus or minus three arc minutes of the true vertical. Since the position of the valve spool determines the flow rate of each bank of cylinders and hence cylinder position, different flow rates may be obtained by changing the spool shape.

B66-10403

SPECIAL TOOL KIT AIDS HEAVILY GARMENTED  
WORKERS

HOLMES, A. E. /MARTIN CO./ SEP. 1966  
MSC-163

Triangular aluminum tool kit, filled with polyurethane is constructed to receive various tools and hold them in a snug but quick-release fit as an aid to heavily gloved workers. The kit is designed to allow mounting within easily accessible reach and to provide protection of the tools during storage.

B66-10405

DESIGN RELIABILITY GOAL DEVELOPED FROM SMALL  
SAMPLE

BURROWS, D. L. HEATHCOCK, R. SEP. 1966  
M-FS-403

Sampling distributions, constructed by Monte Carlo simulation are used in hardware development to establish a design reliability goal, to place a confidence coefficient on reliability estimates, and to determine whether sample stress/strength data demonstrate a specified reliability at a specified confidence level.

B66-10408

CLOSED LOOP OPERATION ELIMINATES NEED FOR  
AUXILIARY GAS IN HIGH PRESSURE PUMPING  
STATION

LANDY, D. G. /N. AM. AVIATION/ SEP. 1966  
M-FS-893

Closed loop system for a liquid nitrogen high pressure pump feeds back gaseous nitrogen generated by heat leak into the reservoir to maintain the pressure in the storage tank. This safer, more efficient system eliminates the need for auxiliary gas to maintain the tank pressure and can be used on relatively high cryogenic pumping systems.

B66-10410

ALIGNMENT TOOL FACILITATES PIN PLACEMENT ON  
IRREGULAR HORIZONTAL SURFACES

BOYLE, J. V. SEP. 1966  
LANGLEY-219

Alignment tool facilitates spotting and cementing plastic pins on the true vertical to irregular concave and convex surfaces. The tool consists of a wood tripod with individually adjustable legs, a wood block with a hole for placing the pins and two spirit levels at a 90 degree angle for easy alignment.

B66-10411

HEAVY DUTY PRECISION LEVELING JACKS EXPEDITE  
SETUP TIME ON HORIZONTAL BORING MILL

DELLENBAUGH, W. JONES, C. /N. AM. AVIATION/  
SEP. 1966  
M-FS-1084

Leveling jack is a precise alignment tool which expedites the setup of components or assemblies up



to 2500 pounds on horizontal boring mills. This tool eliminates the necessity of wedges and blocks to shim the components to proper position.

**B66-10415**  
ELECTROPLATING ELIMINATES GAS LEAKAGE IN  
BRAZED AREAS  
LEIGH, J. D. /N. AM. AVIATION/ SEP. 1966  
M-FS-923

Electroplating method seals brazed or welded joints against gas leakage under high pressure. Any conventional electroplating process with many different metal anodes can be used, as well as the build up of layers of different metals to any required thickness.

**B66-10416**  
MATCHING FLOW CHARACTERISTICS OF STANDARD  
SHUTOFF VALVES ELIMINATES NEED FOR CUSTOM  
FABRICATED VALVES  
BEVAN, A. F. /N. AM. AVIATION/ SEP. 1966  
M-FS-1069

Standard high pressure valves are used in low pressure fluid system testing when a substantial system pressure increase is required. The flow-vs-valve stroke is matched with that of the valves being replaced. Some correction to the plug contour may be necessary.

**B66-10417**  
MODIFIED PLIERS FACILITATE COUPLING OF  
BAYONET-TYPE CONNECTORS  
HARRIS, F. /N. AM. AVIATION/ SEP. 1966  
M-FS-1344

Modified single-tube hole punch or grommet-setting pliers couples or uncouples spring-loaded bayonet-type connectors quickly and easily. The anvil and tube or punch of the single-tube hole punch or pliers are removed and an open-end slot is machined in the tip of the jaws.

**B66-10418**  
BEARING PULLER FACILITATES REMOVAL AND  
REPLACEMENT OF BEARING ASSEMBLIES  
SCHAUS, R. B. /N. AM. AVIATION/ SEP. 1966  
M-FS-1538

Bearing puller removes ball bearing assemblies, which carry the rotor, from turbine type flowmeters. It matches the bearing configuration to facilitate removal of the bearing assemblies from the support members.

**B66-10422**  
LARGE DIAMETER METAL RING SEAL PREVENTS GAS  
LEAKAGE AT 5000 PSI  
MIDDELKOOP, J. H. /N. AM. AVIATION/ SEP. 1966  
M-FS-1064

Large metal ring seal prevents gas leakage in hydrogen, helium, or nitrogen storage bottles at pressures up to 5,000 psi. The grooved ring seal which contains elastomer O-rings is installed between the mating faces of the access cover and the storage bottle.

**B66-10424**  
LABYRINTH-TYPE VALVE SEAT INCREASES VALVE  
LIFE BY DECREASING FLUID VELOCITY  
HICKS, J. E. /N. AM. AVIATION/ SEP. 1966  
M-FS-1051

Labyrinth-type valve seat and a moving piston with V-notch openings reduce the fluid velocity and thus, the erosion rate of regulator valves.

**B66-10425**  
INTERIOR SERVICING PLATFORM SIMPLIFIES  
MAINTENANCE OF STORAGE TANKS  
RANGER, C. S. /N. AM. AVIATION/ OCT. 1966  
M-FS-1300

Folded work platform simplifies the servicing of the interiors of storage tanks and vessels with limited access openings. The extendable platform which can be lowered through the limited access openings is mounted on a segmented shaft which is externally supported.

**B66-10428**  
FLEXIBLE DRIVE ALLOWS BLIND MACHINING AND  
WELDING IN HARD-TO-REACH AREAS  
HARVEY, D. E. ROHRBERG, R. G. /N. AM. AVIATION/

OCT. 1966  
MSC-524

Flexible power and control unit performs welding and machining operations in confined areas. A machine/weld head is connected to the unit by a flexible transmission shaft, and a locking-indexing collar is incorporated onto the head to allow it to be placed and held in position.

**B66-10434**  
ROTATING MAGNETIC POLES USED TO PUMP MERCURY  
EBIHARA, B. T. LOWDERMILK, W. H. VARY, A. OCT.  
1966 SEE ALSO NASA-TN-D-2965  
LEWIS-276

Rotating magnetic pump with redesigned pump cell is used for pumping mercury. The modified pump has better electrical continuity, more efficient heat removal, and good wetting characteristics in the mercury flow channel.

**B66-10443**  
NEW BACKUP-BAR GROOVE CONFIGURATION IMPROVES  
HELIARC WELDING OF 2014-T6 ALUMINUM  
BLACK, F. J. /N. AM. AVIATION/ OCT. 1966  
MSC-806

Backup chill bars with new grooved dimensions improve welding of 2014-T6 aluminum. This groove geometry affords optimum chilling characteristics, reduces shrinkage and the weld bead is narrower and consistently free from impurities or voids.

**B66-10446**  
SEAL-OFF ASSEMBLY PERMITS RAPID EVACUATION  
OF AIR FROM CONTAINERS  
DEMERS, R. R. /RCA/ OCT. 1966  
GSFC-513

Seal-off assembly which permits rapid container evacuation using large diameter tubing has a vacuum valve that permits sealing plate transfer from the vacuum valve stem to the container after evacuation. The sealing plate can be reused repeatedly. This device can repump in case of a small leak without exposing the container to the atmosphere.

**B66-10450**  
METAL TUBE CAN BE FOLDED FOR COMPACT  
STOWAGE, IS SELF-ERECTING  
OCT. 1966 SEE ALSO NASA-TM-X-1187  
LEWIS-288

Metal tube configuration reduces the section modulus to that of a thin plate, thus permitting the section to be bent into a coil for stowage in limited space without destructive yielding of the material. It is readily released to serve as a rigid fluid transportation conduit or structural member.

**B66-10455**  
MYLAR FILM ELIMINATES SILK SCREENING OF  
EQUIPMENT PANELS  
CONGER, D. R. /N. AM. AVIATION/ OCT. 1966  
MSC-798

Equipment panel designs and nomenclature are photographed on clear Mylar film to permit fast and inexpensive panel redesigns and revisions and to eliminate the silk screen process. The film is coated with an adhesive and impressed on the panel. For revisions, the film is easily peeled off and replaced.

**B66-10457**  
LOGIC SYSTEM AIDS IN EVALUATION OF PROJECT  
READINESS  
MARIS, S. J. OBRIEN, T. J. /N. AM. AVIATION/  
OCT. 1966  
MSC-753

Measurement Operational Readiness Requirements /MORR/ assignments logic is used for determining the readiness of a complex project to go forward as planned. The system uses logic network which assigns qualities to all important criteria in a project and establishes a logical sequence of measurements to determine what the conditions are.

**B66-10459**  
IMPROVED METHOD FACILITATES DEBULKING AND  
CURING OF PHENOLIC IMPREGNATED ASBESTOS

GAINES, P. /N. AM. AVIATION/ OCT. 1966  
MSC-949

Workpieces covered with phenolic impregnated asbestos tape and then wrapped with a specified thickness of nylon yarn under pressure, are debulked and cured in a standard oven. This method of debulking and curing is used in the fabrication of ablative chambers for the Gemini and Apollo attitude control engines.

B66-10460  
CHART SYSTEM SIMPLIFIES IDENTIFICATION OF COMPLEX DESIGN ASSEMBLIES  
MORIN, H. P. /N. AM. AVIATION/ OCT. 1966  
MSC-752

Identification breakdown chart that lists the component parts required for any specific end item is used to identify rapidly and accurately, from numerous drawings, all the component parts of a complex design assembly. Cylindrical and complex configurations are depicted as continuous flat surfaces for ready identification.

B66-10463  
MICROMINIATURE THERMOCOUPLE MONITORS OWN INSTALLATION  
GARRETT, A. J. SELLERS, J. P., JR. /N. AM. AVIATION/ OCT. 1966  
M-FS-1111

Microminiature thermocouple makes precision gas sidewall temperature readings inside large thrust chambers. It is installed by a technique whereby the sensor monitors its own installation to insure against thermal damage to the thermocouple and ensure minimum disturbance to chamber surfaces.

B66-10464  
LARGE SEALS FABRICATED FROM SMALL SEGMENTS REDUCE PROCUREMENT LEAD TIME  
DANIELS, C. M. HANES, V. D. /N. AM. AVIATION/ OCT. 1966  
M-FS-1117

Large diameter seals are fabricated from narrow strip stock welded in segments to form a complete ring. This technique could be used to reduce the cost of critical, large diameter seals in the heating and ventilating industry, petrochemical industry, and marine fabrication industry.

B66-10470  
INDICATOR SYSTEM PROVIDES COMPLETE DATA OF ENGINE CYLINDER PRESSURE VARIATION  
MC JONES, R. W. MORGAN, N. E. /VICKERS, INC./ DEC. 1966  
LEWIS-291

Varying reference pressure used together with a balanced pressure pickup /a diaphragm switch/ to switch the electric output of the pressure transducer in a reference pressure line obtains precise engine cylinder pressure data from a high speed internal combustion engine.

B66-10471  
COPPER-ACRYLIC ENAMEL SERVES AS LUBRICANT FOR COLD DRAWING OF REFRACTORY METALS  
BEANE, C. KARASEK, F. NOV. 1966  
ARG-54

Acrylic enamel spray containing metallic copper pigment lubricates refractory metal tubing during cold drawing operations so that the tubing surface remains free from scratches and nicks and does not seize in the die. Zirconium alloys, zirconium, tantalum alloys, niobium alloys, and titanium alloys have been drawn using this lubricant.

B66-10472  
RUBBER AND ALUMINA GASKETS RETAIN VACUUM SEAL IN HIGH TEMPERATURE EMF CELL  
HESSON, J. C. NOV. 1966  
ARG-17

Silicone rubber gasket and an alumina gasket retain a vacuum inside a high temperature EMF cell in which higher and lower density liquid metal electrodes are separated by an intermediate density fused salt electrolyte. This innovation is in use on a sodium bismuth regenerable EMF cell in which the fused salts and metals are at about 500 deg to 600 deg C.

B66-10473  
MINIATURE VALVE ACCURATELY CONTROLS SMALL VOLUME FLUID FLOW  
GRUNWALD, A. NOV. 1966  
ARG-66

Hydraulic or pneumatic actuated valve accurately controls small volume flow of liquids or gases by expanding or relaxing an O-ring within an annular flow space. In one application, 2 such valves were used to accurately meter small volumes of helium under a pressure of 1000 psi.

B66-10477  
CONCEPT OF PLANETARY GEAR SYSTEM TO CONTROL FLUID MIXTURE RATIO  
MC GROARTY, J. D. /N. AM. AVIATION/ DEC. 1966  
M-FS-1785

Mechanical device senses and corrects for fluid flow departures from the selected flow ratio of two fluids. This system has been considered for control of rocket engine propellant mixture control but could find use wherever control of the flow ratio of any two fluids is desired.

B66-10484  
BRAKING MECHANISM IS SELF ACTUATING AND BIDIRECTIONAL  
PIZZO, J. /N. AM. AVIATION/ OCT. 1966  
M-FS-1299

Mechanism automatically applies a braking action on a moving item, in either direction of motion, immediately upon removal of the driving force and with no human operator involvement. This device would be useful wherever free movement is undesirable after an object has been guided into a precise position.

B66-10485  
COMBINATION SPACER AND GASKET PROVIDES EFFECTIVE STATIC SEAL  
JONES, F. B. /N. AM. AVIATION/ OCT. 1966  
M-FS-1397

Closely machined steel ring having narrow sealing lands on both faces and a thin coating of a commercially available halocarbon polymer combines the functions of a spacer and static seal ring or gasket having a minimum of potential leak paths. The device is effective over a wide range of temperatures down to minus 423 deg F and at pressure up to 180 psig.

B66-10489  
PLUG REPLACES WELD FILLER AS SEAL IN COMPLEX CASTING  
GOUNDREY, R. L. HARRIS, C. L. /AERJET-GEN. CORP./ OCT. 1966  
NU-0049

Expandable metal plug is inserted to provide a seal to support the mold core with small blocks, referred to as chaplets, during the casting of a complex volute. Weld-warpage and multiple X-ray inspection are eliminated by use of this technique.

B66-10495  
SPOOL VALVE CYCLES AT CONTROLLED FREQUENCY  
CHARLTON, K. W. VAN ARNAM, D. E. /BECKMAN INSTR./ NOV. 1966  
MSC-143

Spool valve accurately controls the cycle of a pneumatically-actuated system over long periods. Regulation of pressure from the external source, positioning of the adjusting plugs, and magnet selection, together afford wide variation in cyclic timing and speed of closure in either direction.

B66-10498  
QUICK-RESPONSE SERVO AMPLIFIES SMALL HYDRAULIC PRESSURE DIFFERENCES  
WIEGARD, D. E. NOV. 1966  
ARG-99

Hydraulic servo, which quickly diverts fluid to either of two actuators, controls the flow rates and pressures within a hydraulic system so that the output force of the servo system is independent of the velocity of the mechanism which the system actuates. This servo is a dynamic feedback control device.

B66-10513  
 OPPOSED ARCS PERMIT DEEP WELD PENETRATION  
 WITH ONLY ONE PASS  
 BUDDS, L. E. /N. AM. AVIATION/ NOV. 1966  
 M-FS-1696

Arc welding technique uses opposed electrodes on either side of the workpiece, operated in right angles, out-of-phase, pulsating direct current. Complete penetration has been obtained with this technique in metals ranging from 0.062- to 1.0-inch thickness.

B66-10514  
 IN-TANK SHUTOFF VALVE IS PROVIDED WITH  
 MAXIMUM BLAST PROTECTION  
 HOLDEN, C. F. /N. AM. AVIATION/ NOV. 1966  
 M-FS-1529

In-tank shutoff valve is installed with the valve poppet and actuator inside the tank to provide maximum blast protection during rocket engine test operation. This valve design is applicable wherever explosive fuels are used and is currently being used in lox and liquid hydrogen tanks at a rocket engine test site.

B66-10522  
 SELF-ACTUATING GRAPPLE AUTOMATICALLY  
 ENGAGES AND RELEASES LOADS FROM OVERHEAD  
 CRANES  
 FROELICH, J. A. KARASTAS, G. A. NOV. 1966  
 ARG-81

Two-piece grapple mechanism consisting of a lift knob secured to the load and a grapple member connected to the crane or lift automatically disengages the load from the overhead lifting device when the load contacts the ground. The key feature is the sliding collar under the lift knob which enables the grapple latch to be stripped off over the lift knob.

B66-10523  
 HYDRAULIC FLUID SERVES AS MANDREL FOR SMALL  
 DIAMETER REFRACTORY TUBE DRAWING  
 MAYFIELD, R. M. DEC. 1966  
 ARG-44

Sealing hydraulic fluid within a tube and passing the tube through a reducing die produces high quality small diameter refractory metal tubing. The encased fluid eliminates the need for mandrel or ductile core removal and drawing can proceed with less handling operations.

B66-10530  
 PERFORATIONS IN JET ENGINE SUPERSONIC INLET  
 INCREASE SHOCK STABILITY  
 KEPPLER, C. R. /UNITED AIRCRAFT CORP./ NOV. 1966  
 NEO-8

Modification of a conventional jet engine internal compression supersonic inlet results in increased shock stability and thus, engine instantaneous response to changes in inlet air properties. This technique provides a large amount of bleed near the maximum pressure recovery at the expense of minor bleed flow during critical operation.

B66-10537  
 GAGE TESTS TUBE FLARES QUICKLY AND  
 ACCURATELY  
 GRIFFIN, F. D. NOV. 1966  
 KSC-66-19

Flared tube gauge with a test cone that is precisely made with a tapering surface to complement the tube flare is capable of determining the accuracy of a tube flare efficiently and economically. This device should improve the speed, efficiency, and accuracy of tube flare inspections.

B66-10545  
 HOIST IS AUTOMATICALLY STOPPED AT LOW  
 DECELERATION RATE  
 GEORGE, T. R. HESS, H. C. /N. AM. AVIATION/  
 DEC. 1966  
 M-FS-1639

In operating a hoist to transport delicate or fragile components, an automatic stopping device is adjusted to impose a predetermined deceleration rate during stopping.

B66-10546  
 INTERNAL MACHINING ACCOMPLISHED AT CONSTANT  
 RADII  
 GOLLIHUGH, T. E. /N. AM. AVIATION/ DEC. 1966  
 M-FS-1573

Device machines fluid passages in workpieces at constant radii through two adjacent surfaces that are at included angles up to approximately 120 degrees. This technique has been used extensively in fabricating engine parts where close control of fluid flow is a requirement.

B66-10550  
 DAMPER REDUCES EFFECTS OF RESONANCE ON  
 FORCE TRANSDUCER  
 POSTMA, R. W. /N. AM. AVIATION/ NOV. 1966  
 WSO-321

Viscous-film damper eliminates response lag of resonance generated noise when inserted into the thrust measuring system. This technique can be applied to automated devices when pulsed force or low order impact is involved, and where signal noise is produced by stopping or reversal of mechanical travel or by water hammer.

B66-10562  
 METALLOGRAPHIC HOLDING FIXTURE PERMITS  
 POLISHING OF SOFT METALS ON VIBRATORY  
 LAPPING MACHINE  
 MATRAS, S. DEC. 1966  
 ARG-42

Circular fixture which mounts several specimens within a single turret prevents specimen smearing during grinding and polishing operations performed on a vibratory lapping machine. Each specimen is loaded individually with a weight small enough to prevent smearing but large enough to promote polishing.

B66-10567  
 HEAT EXCHANGER TUBES SUPPORTED IN HIGH  
 VIBRATION ENVIRONMENT  
 URQUIDI, R. /N. AM. AVIATION/ DEC. 1966  
 M-FS-1401

Cantilevered structure supports heat exchanger coils against vibration loading while allowing freedom for differential thermal growth. The support channels will accept a variety of coil angles with the same coil pitch, thus reducing the number of parts required. This design, with slight modification, could be used to support parallel rows of straight piping.

B66-10570  
 STATIONARY DEVICE PRODUCES HOMOGENEOUS  
 MIXTURE OF FLUIDS  
 BAKER, D. I. CALLISON, M. P. /N. AM. AVIATION/  
 DEC. 1966  
 M-FS-525

Stationary device produces a homogeneous mixture of two or more one-phase or two-phase fluids. The device contains two concentric flow guides with helical passageways through which the fluids are forced into turbulent flow by the system pressure differential.

B66-10571  
 DUCTILE MANDREL AND PARTING COMPOUND  
 FACILITATE TUBE DRAWING  
 BURT, W. R., JR. MAYFIELD, R. M. POLAKOWSKI, N. H. DEC. 1966  
 ARG-43

Refractory tubing is warm drawn over a solid ductile mandrel with a powder parting compound packed between mandrel and the tube's inner surface. This method applies also to the coextrusion of a billet and a ductile mandrel.

B66-10573  
 ORTHOPEDIC STRETCHER WITH AVERAGE-SIZED  
 PERSON CAN PASS THROUGH 18-INCH OPENING  
 LOTHSCHUETZ, F. X. /MASON-RUST CO./ DEC. 1966  
 M-FS-811

Modified Robinson stretcher for vertical lifting and carrying, will pass through an opening 18 inches in diameter, while containing a person of average height and weight. A subject 6 feet tall and weighing 200 pounds was lowered and raised out of an 18-inch diameter opening in a tank to test

the stretcher.

B66-10575

EMERGENCY ESCAPE SYSTEM USES SELF-BRAKING MECHANISM ON FIXED CABLE  
BILLINGS, C. R. MC DARIS, R. A. MC GOUGH, J. T. NEAL, P. F. DEC. 1966  
KSC-66-44

Slide-wire system with a twist level slide device incorporates automatic descent and braking for the safe and rapid evacuation of personnel from tall structures. This device is used on any tall structure that might require emergency evacuation. It is also used to transfer materials and equipment.

B66-10582

COMPOSITE BULKHEAD FABRICATION DEVELOPMENT  
ORR, J. DEC. 1966  
M-FS-1264

Composite bulkhead is produced by a fabrication concept utilizing vacuum and/or autoclave pressure to hold preformed welded sandwich elements in place during bonding and aging.

B66-10585

ROTATIONAL FLUID COUPLING ELIMINATES HOSE ENTANGLEMENTS  
AUBOL, P. B. /TRW/ DEC. 1966  
MSC-312

Rotational fluid coupling mechanism circulates a temperature controlled fluid between a stationary heat exchanger and a coolant plate on a rotating platform. The mechanism consists of two concentric cylinders containing one or more flexible tubes which are controlled and positioned in such a way that it eliminates tubing entanglement.

B66-10587

QUALITY CONTROL CRITERIA FOR ACCEPTANCE TESTING OF CROSS-WIRE WELDS  
BRYANT, R. D. /N. AM. AVIATION/ DEC. 1966  
MSC-627

Visual inspection criteria assure the metallurgical integrity of spot welds joining nickel 100 and nickel ribbon in a 90-degree cross-wire configuration.

B66-10588

PLASTIC TUBING PROTECTS FLEXIBLE COPPER HOSE  
MELLEGREN, B. E. /N. AM. AVIATION/ DEC. 1966  
M-FS-772

Flexible copper purge and coolant hoses is covered with a high-temperature shrinkable plastic for protection against severe vibration during rocket engine tests. This type of tubing is being used on all flexible water tubes used in F-1 engine tests.

B66-10589

POSITIVE DISPLACEMENT CYLINDER MEASURES CORROSIVE LIQUID VOLUME  
MAHIMAN, R. A. VENDL, C. J. /N. AM. AVIATION/ DEC. 1966  
MSC-1038

Positive displacement cylinder accurately measures volumetric flow rates of corrosive liquids. The cylinder is compatible with corrosive liquids and handles flow rates from zero to 75 gpm at pressures to 900 psig with an accuracy of 0.25 per cent.

B66-10593

FLUID LOGIC CONTROL CIRCUIT OPERATES NUTATOR ACTUATOR MOTOR  
INNOVATOR NOT GIVEN /BENDIX CORP./ DEC. 1966 SEE ALSO NASA-CR-54788  
LEWIS-294

Fluid logic control circuit operates a pneumatic nutator actuator motor. It has no moving parts and consists of connected fluid interaction devices. The operation of this circuit demonstrates the ability of fluid interaction devices to operate in a complex combination of series and parallel logic sequence.

B66-10595

TREATMENT INCREASES STRESS-CORROSION

# RESISTANCE OF ALUMINUM ALLOYS

JACOBS, A. J. /N. AM. AVIATION/ DEC. 1966  
M-FS-1840

Overaging during heat treatment of the aluminum alloys immediately followed by moderate plastic deformation, preferably by shock loading achieves near optimum values of both yield strength and resistance to stress corrosion. Similar results may be obtained by substituting a conventional deformation process for the shock loading step.

B66-10597

GRIT BLASTING NOZZLE FABRICATED FROM MILD TOOL STEEL PROVES SATISFACTORY  
MC FARLAND, J. E. TURBITT, B. DEC. 1966  
M-FS-1420

Dry blasting with glass beads through a nozzle assembly descales both the outside and inside surfaces of tubes of Inconel 718 used for the distribution of gaseous oxygen. The inside of the nozzle is coated with polyurethane and the deflector with a commercially available liquid urethane rubber.

B66-10601

EQUATIONS PROVIDE TUBULAR INFORMATION ON EFFECTS OF UNIFORM AND VARIABLE LOADS ON THIN, FLAT, CIRCULAR PLATES  
HEAP, J. C. DEC. 1966  
ARG-151 ARG-152

Unit-mass system of derivation of equations determines the deflection, slope, and moments for thin, flat, circular plates subjected to either a uniform or a symmetrical variable load. The derived equations are computed, organized in tabular form, and graphically depicted.

B66-10604

HOLE SAW DRILL ATTACHMENT HAS ZERO FORCE REACTION  
RILEY, R. H., JR. /BLACK AND DECKER MFG. CO./ HOLMES, A. E. /MARTIN CO./ DEC. 1966  
MSC-543

Zero reaction tools require no force application by workers in space. The tool accomplishes hole cutting by holding the workpiece and feeding the cutting blade into and through it by forces entirely absorbed within the tool.

B66-10608

FRICTION BRAKE CUSHIONS ACCELERATION AND VIBRATION LOADS  
FRASER, G. F. ZAWADSKI, G. Z. /N. AM. AVIATION/ DEC. 1966  
MSC-715

Friction brake cushions an object in a vehicle from axially applied vibration and steady-state acceleration forces. The brake incorporates a doubly tapered piston that applies a controlled radial force to friction brake segments bearing against the walls of a cylinder.

B66-10610

SELECTIVE TUBE ROUGHENING INCREASES HEAT TRANSFER CAPABILITY  
CARLSON, L. W. DEC. 1966  
M-FS-599

Selectively roughening inside surfaces of tubes increases the heat transfer capabilities, but, minimizes the pressure drop. This technique is used to construct roughened test sections for hydrogen heat transfer studies.

B66-10611

MULTILAYER REFRACTORY NOZZLES PRODUCED BY PLASMA-SPRAY PROCESS  
BLITON, J. L. RAUSCH, J. L. /IIT RES. INST./ DEC. 1966  
WOO-318

Multilayer rocket nozzles formed by plasma spraying have good thermal shock resistance and can be reheated in an oxidizing environment without loss of coating adherence. Suggested application of this process are for the production of refractory components, which can be formed as surfaces of revolution.

B66-10613  
NEW WELDABLE HIGH STRENGTH ALUMINUM ALLOY  
DEVELOPED FOR CRYOGENIC SERVICE  
INNOVATOR NOT GIVEN /ALUMIUM CO. OF AM./ DEC.  
1966

M-FS-737

Wrought aluminum alloy has improved low temperature notch toughness and weldability. This alloy can be mill-fabricated to plate and sheet without difficulty. Post-weld aging improves weld ductility and strength properties. A typical treatment is 8 hours at 225 deg F plus 16 hours at 300 deg F.

B66-10618  
A DESIGN PROCEDURE FOR THE WEIGHT  
OPTIMIZATION OF STRAIGHT FINNED RADIATORS  
BURIAN, R. J. HARRIS, D. W. KETCHMAN, J. J.  
/BATTELLE MEM. INST./ DEC. 1966 SEE ALSO  
NASA-TN-D-3489  
GSFC-547

Design technique evaluates optimum weight of space radiator consisting of finned, right circular cylinder.

B66-10620  
TURBINE BLADE ROOT DESIGN CONCEPT PROMISES  
SUPERIOR ALIGNMENT  
KING, O. D. /N. AM. AVIATION/ DEC. 1966  
M-FS-1685

Blade-to-hub mounting concept assures excellent alignment integrity and results in elimination of some welding problems associated with present designs. With this design, if rework is required, blade removal and replacement may be readily accomplished without damage to blade positioning media on the wheel hub.

B66-10626  
HYDRAULICALLY CONTROLLED FLEXIBLE ARM CAN  
BEND IN ANY DIRECTION  
GRIFFIN, F. D. DEC. 1966  
KSC-66-20

Arm assembly consisting of four flexible tubes controlled by a four-way hydraulic or pneumatic valve can bend in any direction. The flexible arm could be used for probing areas that cannot be reached by ordinary tools, handling hazardous materials, and for graph recording.

B66-10627  
QUICK ATTACH AND RELEASE FLUID COUPLING  
ASSEMBLY IS SELF-ALIGNING, SELF-SEALING  
HEROLD, C. P. STANLEY, S. D. DEC. 1966  
KSC-66-8

Fluid coupling assembly that is self-aligning, self-sealing and contains a bellows ball and socket coupling for quick attach and release is highly reliable and can handle cryogenic fluids where icing is encountered. The fluid coupling assembly is used in many fluid systems but is particularly applicable to cryogenic systems.

B66-10628  
CONTROLLED RELEASE DEVICE PREVENTS DAMAGE  
FROM DYNAMIC STRESSES  
BURCHAM, T. W. DEC. 1966  
KSC-66-14

Controlled release device that retards motion by extruding or drawing a tapered ductile pin through a die will control launch vehicle motion at liftoff. The device prevents the damaging dynamic stresses that are imposed on the vehicle when it is instantaneously released at full thrust.

B66-10633  
PREDICTING SURFACE HEATING RATES AND  
PRESSURES RESULTING FROM HOT EXHAUST GASES  
PIESKI, E. T. SIMKIN, D. J. /N. AM. AVIATION/  
DEC. 1966  
MSC-971

Structural tests determine experimentally the amount of thermal protection required on the Apollo service module because of plume impingement heating. Exhaust flow field analysis correlates with flat plate heating rate and surface pressure in a vacuum.

B66-10634  
EMERGENCY ESCAPE SYSTEM PROTECTS PERSONNEL  
FROM EXPLOSION AND FIRE  
OFFIK, W. G. /MARTIN CO./ DEC. 1966  
KSC-66-12

Elevator-type emergency escape system evacuates personnel from tall structures, especially when the possibility of explosion or fire exists. The system consists of a spike shaped rescue cabin which descends along a vertical guide cable, penetrates the dome shaped roof of an underground blast shelter and stops in a deceleration bed of granular material.

B66-10635  
LIGHTWEIGHT, ALL-METAL HOSE ASSEMBLY HAS  
HIGH FLEXIBILITY AND STRENGTH OVER WIDE  
RANGE OF TEMPERATURE AND PRESSURE  
BESSING, L. L. /N. AM. AVIATION/ DEC. 1966  
M-FS-1831

Lightweight flexible, metal braid reinforced hose assembly is used in high and low pressure oxygen, helium, and hydrogen systems. These hose assemblies have been successfully used on the Saturn-II stage to provide joints of sufficient flexibility to absorb movement resulting from structural and load induced excursions and temperature variations.

B66-10641  
POWER ARC WELDER TOUCH-STARTED WITH  
CONSUMABLE ELECTRODE  
JEANNETTE, J. C. /AIR REDUCTION CO./ DEC. 1966  
M-FS-1485

Power arc welder formed as a hand-held welding gun touch-starts, retracts a consumable electrode to create the desired arc, and then commences feeding of the consumable electrode at the rate required to form the intended bead or spot. This device achieves uniform spot welds repeatedly.

B66-10642  
DEVICE MEASURES REACTION ENGINE THRUST VECTOR  
DEVIATIONS  
LEONARD, K. SHIEBER, H. /TRW SPACE TECHNOL.  
LABS./ DEC. 1966  
JPL-SC-163

Gimbaled mounted test device measures thrust vector deviation of reaction engines in terms of angular displacement and thus precludes force interaction.

B66-10648  
FUEL AND OXIDIZER VALVE ASSEMBLY EMPLOYS  
SINGLE SOLENOID ACTUATOR  
INNOVATOR NOT GIVEN /PARKER AIRCRAFT CO./ DEC.  
1966  
MSC-1046

Valve assembly simultaneously starts or stops the flow of oxidizer and fuel from separate inlet channels to reaction control motors. The assembly combines an oxidizer shutoff valve and a fuel shutoff valve which are mechanically linked and operated by a single high-speed solenoid actuator.

B66-10655  
CHECK VALVE INSTALLATION IN PILOT OPERATED  
RELIEF VALVE PREVENTS REVERSE PRESSURIZATION  
OSWALT, L. /N. AM. AVIATION/ DEC. 1966  
M-FS-1925

Two check valves prevent reverse flow through pilot-operated relief valves of differential area piston design. Title valves control pressure flow to ensure that the piston dome pressure is always at least as great as the main relief valve discharge pressure.

B66-10656  
MECHANICAL GAUGE ACCURATELY CHECKS TUBING  
FLARE, ROUNDNESS, AND CONCENTRICITY  
CLARK, L. K. /IBM/ DEC. 1966  
M-FS-1822

Mechanical gauge checks flare roundness and concentricity of metal tubing. The gauge, which is available from off-the-shelf standard toolmaking supplies, provides the needed accuracy and is easily operated.

B66-10662  
METHOD FOR PREDICTING FRICTIONAL LOSS IN  
METAL BELLOW AND FLEXIBLE HOSE  
CLEVELAND, J. R. DANIELS, C. M. /N. AM.  
AVIATION/ DEC. 1966  
M-FS-883

Test data obtained concerning the frictional pressure loss to fluids flowing in unsleeved bellows and flexible hose. This data should be useful in the design of fluid systems where high delivery velocities are involved and flexible hose or bellows must be employed.

B66-10663  
LATERAL RING METAL ELASTIC WHEEL ABSORBS  
SHOCK LOADING  
GALAN, L. /BENDIX CORP./ DEC. 1966  
M-FS-1312

Lateral ring metal elastic wheel absorbs practically all shock loading when operated over extremely rough terrain and delivers only a negligible shock residue to associated suspension components. The wheel consists of a rigid aluminum assembly to which lateral titanium ring flexible elements with treads are attached.

B66-10665  
SPHERICAL PIPE JOINT DELIVERS LOADS EQUALLY  
TO MATING FLANGE  
PFLEGER, R. O. /N. AM. AVIATION/ DEC. 1966  
M-FS-807

Oxidizer inlet duct with a ball joint pipe fitting incorporating two spherical bearing races and balls in contact with centering cage springs transmits an evenly distributed load to the mating flange. This design should find application in piping systems where unequal load distributions exist.

B66-10667  
SILAZANE ELASTOMER REMAINS RESILIENT AT  
400 DEG C  
INNOVATOR NOT GIVEN /SOUTHERN RES. INST./ DEC.  
1966

M-FS-1144  
Smooth, unfoamed elastomer is unaffected by common acids, alkalis, and organic solvents. Its thermal stability, chemical resistance, and physical properties make it of interest for various applications.

B66-10672  
RESONANT FREQUENCY CAN BE ADJUSTED ON  
VIBRATION MOUNT  
HODGES, F. /RYAN AERON./ DEC. 1966  
JPL-SC-134

Vibration mount allows adjustment of its resonant frequency and is insensitive to wide temperature variation. The concept is essentially a multidirectional, frictionally damped spring with an adjustable cap. The mount provides vibration isolation in both compression and shear and may be applicable to space use.

B66-10674  
ELIMINATION OF ROCKET ENGINE ASYMMETRIC  
LOADS DURING TESTS AT SEA LEVEL  
JOHNSON, J. R. /N. AM. AVIATION/ DEC. 1966  
M-FS-1730

Secondary injection concept eliminates asymmetric loads and may increase thrust rocket engine loads during sea level tests. The concept uses either a tubular manifold with evenly spaced injection ports or secondary fluid injected at the turbine exhaust inlet to the thrust chamber.

B66-10676  
STUDY MADE OF DESTRUCTIVE SECTIONING OF  
COMPLEX STRUCTURES FOR EXAMINATION  
RILEY, T. DEC. 1966  
LEWIS-341

Advances in destructive sectioning of very small or complex structures are discussed. Examination is made by filling the structure in a vacuum with a low viscosity potting compound and then cutting without danger of spatial disorientation.

B66-10677  
STUDY MADE TO CONTROL DEPTH OF POTTING

COMPOUND FOR HONEYCOMB SANDWICH FASTENERS  
CUSHMAN, J. /GEN. DYN./CONVAIR/ DEC. 1966  
LEWIS-370

Study determines optimum fastener insert size and shape, type of embedding cement, diameter, undercut and depth control by fiberglass plug in a honeycomb structure for maximum tensile strength. The best potting compound is 5-5-1 weight mixture of epoxy resin, curing agent, and milled glass fibers.

B66-10678  
IMPROVED ROLLING ELEMENT BEARINGS PROVIDE  
LOW TORQUE AND SMALL TEMPERATURE RISE IN  
ULTRAHIGH VACUUM ENVIRONMENT  
GLENN, D. C. DEC. 1966  
LEWIS-359

Rolling element bearing with stainless steel races and rolling elements and a porous bronze cage successfully operates in ultrahigh vacuum environments at a low torque and with small temperature rise. All components are burnished in molybdenum disulfide.

B66-10683  
VALVE EFFECTIVELY CONTROLS AMOUNT OF  
CONTAMINANT IN FLOW STREAM  
SCHNITZER, T. E. DEC. 1966  
M-FS-1771

Contaminant valve with a coaxial groove rotor uniformly deposits contaminant into a flow stream under full pressure and flow conditions. The valve tests filters and filter elements of hydraulic oil, fuel, or lubricant systems without any detrimental effect on the performance.

B66-10686  
ACTUATOR DEVICE SCHEDULES RATE OF VALVE  
CLOSURE  
INNOVATOR NOT GIVEN /WHITTAKER CORP./ DEC. 1966  
M-FS-1556

Prevalve actuator schedules the closure rate of a valve. The actuator is spring-loaded to produce a normally open valve and pneumatically powered to close the valve. The closure rate is controlled by means of pneumatic snubber and booster circuitry.

B66-10688  
PREFORMED STIFFENERS USED TO FABRICATE  
STRUCTURAL COMPONENTS FOR PRESSURIZED  
TANKS  
LEWIS, J. C. SHERBA, E. S. /N. AM. AVIATION/  
DEC. 1966  
M-FS-1796

Process of fabricating stiffened section components of pressurized tanks for aerospace use was developed. A potential use of the fabrication process is the production of gore and quarter-panel sections of hydrogen and oxygen tanks for space-vehicle boosters.

B66-10694  
MECHANICAL DEVICE ACCURATELY MEASURES RF  
PHASE DIFFERENCES IN VHF OR UHF RANGES  
HOPP, L. A. /N. AM. AVIATION/ DEC. 1966  
M-FS-1738

Dual range linear measurement device accurately measures RF phase differences in either VHF or UHF ranges. The device has a capability consisting of a coarse range extending to 30 cm readable to 1 mm, and any fine range portion of 2.5 cm readable to .01 mm.

B66-10695  
MOTION DRIVE SYSTEM IS ACCURATELY CONTROLLED  
IN THE 1-MICRON RANGE  
MORECROFT, J. H. DEC. 1966  
JPL-864

Motion drive system has been developed for use with interferometers where accurate control of minuscule distance in the 1-micron range is of prime importance. The drive system is applicable to any device that requires extremely accurate positioning control.

B66-10697  
COMBINATION DOUBLE DOOR HIGH-VACUUM VALVE  
PROVIDES ACCESS TO VACUUM CHAMBER

YAGER, S. P. DEC. 1966  
JPL-849

Double door provides an extreme high vacuum seal as well as access to a vacuum chamber for insertion of test devices into the vacuum environment. This arrangement is applicable to any vacuum chamber and could be of value in cryopumping or mechanically pumped chambers.

B66-10698  
MECHANISM FACILITATES COATING OF INNER SURFACES OF METAL CYLINDERS  
BILLINGSLEY, J. M. TAFT, A. R. DEC. 1966  
GSFC-515

Cylinder is rotated about shielded hot filament to vapor deposit thin coatings of aluminum or other metallic substances on the inner surface of a cylinder while avoiding heat-producing high-density current flow which causes outgassing of the coating surface. This method is acceptable for glass or metal.

B66-10702  
TEFLON SHEET PERMITS VALVE AND VALVE OPERATOR TO MOVE AS A SINGLE UNIT IN A CRYOGENIC PIPE LINE  
KINDER, S. K. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1966  
NU-0077

Free floating support system in cryogenic pipe lines maintains the valve and valve operator in alignment. A Teflon sheet that is placed between the slide support plate and the base plate permits the valve and valve operator to move freely, as a unit, when the pipe line moves.

B66-10703  
SILVER PLATING TECHNIQUE SEALS LEAKS IN THIN WALL TUBING JOINTS  
BLENDERMAN, W. H. /N. AM. AVIATION/ DEC. 1966  
NU-0090

Leaks in thin wall tubing joints are sealed by cleaning and silver plating the hot gas side of the joint in the leakage area. The pressure differential across the silver during hydrostatic test and subsequent use forces the ductile silver into the leak area and seals it.

B66-10704  
METAL BOOT PERMITS FABRICATION OF HERMETICALLY SEALED SPLICES IN METAL SHEATHED INSTRUMENTATION CABLES  
CHAMBERS, G. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1966 SEE ALSO B66-10705  
NU-0083

Metal boot splices hard sheathed instrumentation cables used with high temperature strain gauges and thermocouples. Silver brazing the conductors together, hermetically seals the splice. This boot is a highly reliable sealed splice which is equally effective at cryogenic temperatures, high temperatures, nuclear environments, and combinations of the above.

B66-10707  
PNEUMATIC WRENCH RETAINS OR DISCHARGES NUTS OR BOLTS AS DESIRED  
BOUILLE, J. R. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1966  
NU-0085

Pneumatic wrench grips, screws or unscrews, and discharges a nut or bolt as desired. The device consists of a standard pneumatic wrench modified with a special hex bolt head socket assembly and a diaphragm air cylinder.

B66-10708  
AIR BEARING PROVIDES FRICTION-FREE SUPPORT FOR SHAKER SYSTEM SLIP TABLE  
SKOFF, R. W. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1966  
NU-0086

Air bearing system supports a shaker system slip table with minimum friction. At each corner of a square of grooves made on the table, a hole is drilled through the table and fitted with air connections. Air pressure is simultaneously fed to the four fittings forming an air bearing.

B66-10711  
CARRIAGE SYSTEM REMOTELY MOVES DRAWER OVER EXTENDED DISTANCE  
SALZAND, G. H. /PARSONS-JURDEN CORP./ DEC. 1966  
NU-0092

In the transferring of material remotely through thick radiation shielding walls, a drawer is mounted on rollers which operate on rails carried on a slide carriage to eliminate the feature of the slide hardware projecting beyond the drawer when the drawer is extended its full distance.

B66-10712  
SIMPLE MOTOR DRIVE SYSTEM OPERATES HEAVY HINGED DOOR  
PITKIN, R. G. /PARSONS-JURDEN CORP./ DEC. 1966  
NU-0093

Motor drive system remotely operates heavy steel radiation shielding doors. The drive consists of a standard motor reducer unit which is mounted on the door. This reducer drives a sprocket which is linked by chain to a fixed sprocket of the same size on the door jamb.

B66-10713  
SWING-OUT RAIL SYSTEM SEPARATES OVERHEAD CRANE RAILS  
PITKIN, R. G. /PARSONS-JURDEN CORP./ DEC. 1966  
NU-0094

Swing-out rail system separates and reconnects the overhead traveling crane rails of a building to provide for the passage of a thick concrete radiation shield sliding door through the rails. In the swing-out position, the rail cantilevered from an axial shaft.

B67-10004  
MICROMANIPULATION TOOL IS EASILY ADAPTED TO MANY USES  
SHLICHTA, P. J. JAN. 1967  
JPL-129

A special micromanipulation tool equipped with a plunger mounted in a small tube can be easily adapted to such work operations as cutting, precision clamping, and spot welding of microscopic filaments or other parts. This tool is valuable where extreme steadiness of high magnification is required.

B67-10006  
COMPLEX SURFACES PLATED BY THIN-FILM DEPOSITION IN ONE OPERATION  
BUCKLEY, D. H. PRZYBYSEWSKI, J. S. SPALVINS, T. JAN. 1967  
LEWIS-292

Ion plating deposits thin film on complex surface in one operation. The ionized materials follow electric lines of force to all points on the objects, uniformly plating the surface from all sides simultaneously.

B67-10010  
PROCESS SEQUENCE PRODUCES STRONG, LIGHTWEIGHT REFLECTORS OF EXCELLENT QUALITY  
READER, A. F. RUSSELL, W. E. WERNER, E. A. FEB. 1967  
LEWIS-331

Large compound curved surfaces for collecting and concentrating radiation are fabricated by the use of several common machining and forming processes. Lightweight sectors are assembled into large reflectors. With this concept of fabrication, integrally stiffened reflective sectors up to 25 square feet in area have been produced.

B67-10011  
ELASTIC GUIDES REDUCE HYSTERESIS EFFECT IN BELLEVILLE SPRING PACKAGE  
MC GLASHAN, F., JR. TOTH, L. R. JAN. 1967  
JPL-910

Peripheral support guides that elastically flex with the slight breathing on radial displacement during actuation can greatly reduce the hysteresis present in a Belleville spring package. This technique provides a control device that enhances the precision of pressure regulating valves, pressure switches, and vacuum actuators.

B67-10018

TECHNIQUE CUTS TIME AND COST OF BENDING  
JACKETED PIPINGGARDNER, J. N. /N. AM. AVIATION/ FEB. 1967  
WSD-333

Technique uses a stiff medium in the annular space between inner and outer pipes of jacketed piping in transfer lines. The process eliminates splitting and welding and makes possible the use of standard pipe-bending tools.

B67-10019

ORBITAL TUBE FLARING SYSTEM PRODUCES TUBING  
CONNECTORS WITH ZERO LEAKAGEWILLIAMS, J. R. FEB. 1967  
M-FS-2016

An orbital tube flaring system produces tubing connectors with a zero-leak potential needed in high pressure hydraulic and pneumatic systems. The flaring system incorporates a rolling cone and rolling die to closely control flare characteristics.

B67-10023

TESTS SHOW THAT ALUMINUM WELDS ARE IMPROVED  
BY BEAD REMOVALHOOD, D. W. /BOEING CO./ FEB. 1967  
M-FS-1817

Tests with 2218-T87 aluminum alloy plate indicate improvements in strength, ductility, fatigue properties, and burst pressure result when one or both of the top and bottom weld beads are removed. There is, however, a drop in yield strength. The consistency of test data is considerably improved by weld bead removal.

B67-10039

SIMPLE PUMP MAINTAINS LIQUID HELIUM LEVEL IN  
CRYOSTATBUCHHOLD, T. A. /GE/ MAR. 1967  
M-FS-1763

Reciprocating pump maintains a precise level of liquid helium in a cryostat. The pump contains a niobium solenoid armature that is maintained in a superconductive state by the liquid helium.

B67-10043

HIGH SPEED BLOWDOWN SYSTEM PROVIDES RAPID  
PRESSURE LOSSBRITTAN, H. C. /GEN. DYN./CONVAIR/ MAR. 1967  
LEWIS-375

High speed blowdown takes advantage of discretely maintained differential pressures to vent a test chamber from high to ambient pressure with minimum time lag. This technique is advantageous where the use of pyrotechnics is undesirable.

B67-10045

RESISTANCE HEATING RELEASES STRUCTURAL  
ADHESIVEGLEMSER, N. N. /BOEING CO./ MAR. 1967  
M-FS-1607

Composite adhesive package bonds components together for testing and enables separation when testing is completed. The composite of adhesives, insulation and a heating element separate easily when an electrical current is applied.

B67-10047

VISCO SEAL DESIGN OFFERS ZERO-LEAKAGE AND  
WEAR-FREE CHARACTERISTICSKETOLA, H. N. MC GREW, J. M. /GE/ MAR. 1967 SEE  
ALSO NASA-TM-X-52245  
WSD-329

Study provides specific design criteria in sealing applications for continuous duty pumps used in bulk liquid transfer. A basic sealing equation predicts visco seal performance in the turbulent regime.

B67-10048

TECHNIQUE FOR STRIPPING TEFLON INSULATED  
WIREBABB, B. D. /HAYES INTERN. CORP./ MAR. 1967  
M-FS-1774

Cryogenic stripping of Teflon insulated wire leaves no residue and produces no physical damage. After the wire is immersed in liquid nitrogen,

bent slightly, and returned to room temperature, the Teflon is removed by fingernails or flat-nosed pliers.

B67-10052

LABORATORY ARC FURNACE FEATURES  
INTERCHANGEABLE HEARTHESARMSTRONG, J. L. KRUGER, O. L. MAR. 1967  
ARG-125

Laboratory arc furnace using rapidly interchangeable hearths gains considerable versatility in casting so that buttons or special shaped castings can be produced. It features a sight glass for observation.

B67-10059

VACUUM CHAMBER IS REMOTELY SEALED BY  
EUTECTIC METALCORDOVA, R. SACOANE, G. H. /AEROJET-GEN. CORP./  
APR. 1967  
NU-0091

Vacuum chamber is remotely sealed by a design using metal seal blades which are inserted into a molten eutectic metal by pressurizing an expansion bellows. The process increases allowable manipulations by improving working space and safety factors.

B67-10063

FLUIDIC OSCILLATOR USED AS HUMIDITY SENSOR  
PROKOPIUS, P. R. MAR. 1967

LEWIS-340

Fluidic oscillator measures the humidity of the hydrogen stream leaving a hydrogen-oxygen fuel cell. The instrument provides continuous readings with a certain speed of response.

B67-10064

NEGATIVE FEEDBACK SYSTEM REDUCES PUMP  
OSCILLATIONSROSENMANN, W. /N. AM. AVIATION/ MAR. 1967  
M-FS-1852

External negative feedback system counteracts low frequency oscillations in rocket engine propellant pumps. The system uses a control piston to sense pump discharge fluid on one side and a gas pocket on the other.

B67-10066

HOLDING FIXTURE FACILITATES PIPE THREAD  
GAGE MEASUREMENTSCUPPS, B. HILL, J. /N. AM. AVIATION/ MAR. 1967  
M-FS-2009

Holding fixture that holds the thread gage and three wires in the proper relationship facilitates the measurement of the pitch diameter of the tapered threads of a pipe thread gage. Modified, this device can be used to involute spur gears.

B67-10067

ADJUSTABLE, SELF-LOCKING LADDER INCLUDES  
OPTIONAL WORK PLATFORMWEBSTER, R. E. /N. AM. AVIATION/ APR. 1967  
M-FS-1922

Height-adjustable ladder with a self-locking platform at its top makes elevated locations more accessible, increases the quantity and size of tools handled there, and decreases the risk of disturbance or damage to components. The retractable platform adapts the ladder to normal use.

B67-10073

COLDPLATE OF PIN FIN DESIGN MAKES EFFICIENT  
HEAT EXCHANGERDYER, W. F. /N. AM. AVIATION/ APR. 1967  
MSC-1093

Flat, hollow coldplate that permits the flow of coolant liquid within it removes heat from heat-generating electronic equipment. This coldplate solves usual problems of bulk, weight, and excessive pumping requirements.

B67-10081

RIGID-BODY MOTION EXTRACTED FROM TOTAL  
MOTION OF A FLEXIBLE BODYHOWARD, J. C. APR. 1967  
ARC-63

Control system eliminates or reduces flexibility



effects on the manual and automatic control of large flexible vehicles. It extracts rigid-body and flexible-body motion and adapts well when a flexible-body frequency coincides or nearly coincides with the control mode frequency.

B67-10094

ULTRASONICS PERMITS BRAZING COMPLEX STAINLESS STEEL ASSEMBLY WITHOUT FLUX

BAKER, W. H. /WESTINGHOUSE ASTRONUCL. LAB./ APR. 1967

NU-0115

Ultrasonic vibration of an assembly of stainless steel instrumentation tubes ensures brazing without flux. Vibration with an ultrasonic transducer permits the brazing material to flow down each tube in contact with a seal plug installed in a pressure vessel wall.

B67-10096

UNDERCOAT PREVENTS BLISTERING OF SILVER PLATING AT ELEVATED TEMPERATURES

KUSTER, C. A. /N. AM. AVIATION/ APR. 1967

M-FS-2049

Gold undercoat prevents blistering in the silver plating of Inconel 718 seals from steam at high temperatures. The undercoat is diffused into the surface of the parent metal by baking prior to silver plating.

B67-10098

TOROIDAL RING PREVENTS GAS IGNITION AT VENT STACK OUTLET

SPRING, T. R. /N. AM. AVIATION/ APR. 1967

M-FS-2042

Torodial ring welded to the vent stack outlet prevents static discharges which ignite combustible gases in a venting system. The ring inhibits the flow of current by removing the cause of turbulence characteristics of a sharply defined vent exit.

B67-10105

TOOL FACILITATES INSTALLATION OF MARMON CLAMPS

PETERS, G. A. WARMING, K. /N. AM. AVIATION/ MAY 1967

M-FS-2039

Adjustable tool facilitates the installation of Marmon clamps. It provides sufficient mechanical advantage to force the clamps into place, permitting one man operation. Two handles provide the major leverage, and a pivoting arm with a slot enables snap-out action.

B67-10107

COMPOSITE WELD ROD CORRECTS INDIVIDUAL FILLER WEAKNESSES

GRIMALDO, S. /N. AM. AVIATION/ MAY 1967

M-FS-1923

Composite filler wire welds together an assembly made from components of Rene 41 nickel base alloy. Using equal parts of Rene 41 and Hastelloy W weld wire in the filler reduces the cracking and weaknesses of the individual parent metals.

B67-10117

INVESTIGATION OF PRESSURIZED TOROIDAL SHELLS

INNOVATOR NOT GIVEN /MARTIN CO./ MAY 1967 SEE ALSO NASA-CR-261

HQ-27

The effect of internal pressure and external load on thin-walled toroidal shells was investigated. The result of the analysis agreed with experimental results on a 54-inch-diameter toroidal shell subjected to both pressurization and axial loading.

B67-10123

LOCK-DISCONNECT MECHANISM GIVES POSITIVE RELEASE TO JOINED BODIES

BEAVER, C. E. /BOEING CO./ MAY 1967

M-FS-2147

Umbilical system mechanism locks and unlocks through an internal collet device that is controlled by a single reciprocating shaft. The reduction in the number of operational parts results in higher reliability.

B67-10154

ASPIRATOR INCREASES RELIEF VALVE POPPET STROKE

BIDDLE, M. E. /N. AM. AVIATION/ MAY 1967

HQ-77

Addition of an aspirator to a relief valve increases the valve poppet stroke under dynamic flow conditions. The aspirator allows poppet inlet dynamic forces to overcome relief valve spring force. It reduces the fluid pressure in the skirt cavity by providing a low pressure sense probe.

B67-10158

SINGLE WRENCH SEPARATES NUTS FROM FREE-FLOATING BOLTS

THOMPSON, C. /WESTINGHOUSE ASTRONUCL. LAB./ MAY 1967

NUC-10013

Pneumatic impact wrench removes the nuts from freely turning bolts when the heads cannot be reached or the shafts anchored. It uses a fixed screwdriver blade that fits a slot cut into the threaded end of the bolt shaft.

B67-10167

HYDROSTATIC FORCE USED TO HANDLE OUTSIZED, HEAVY OBJECTS

CRAFT, G. W. STARKEY, A. W. /BELLCOMM. INC./ JUN. 1967

HQ-90

Specially fitted barge is used to load and transport large, heavy objects to a dock side site. There the barge itself can lift, rotate, and position the objects. Typical functions are economically accomplished by water buoyancy.

B67-10174

SCANNING MEANS FOR CASSEGRAINIAN ANTENNA

GIANDOMENICO, A. RUSCH, W. V. T. JUN. 1967

JPL-946

Mechanical antenna beam switching device detects weak signals over atmospheric and equipment noise sources in microwave antennas. It periodically nutates the paraboloidal subdish in a Cassegrainian reflector system.

B67-10177

EFFECT OF WELDING POSITION ON POROSITY FORMATION IN ALUMINUM ALLOY WELDS

HARYUNG, J. WROTH, R. S. /DOUGLAS AIRCRAFT/ JUN. 1967

M-FS-2318

Program investigates the effects of varied welding positions on weld qualities. Progressive changes in bead geometry occur as the weld plane angle is varied from upslope to downslope. The gravitational effect on the weld puddle varies greatly with welding position.

B67-10178

FIXTURE FACILITATES HELIUM LEAK TESTING OF PIPE WELDS

RONEY, J. A. /HAYES INTERN. CORP./ JUN. 1967

M-FS-2297

Fixture facilitates inspection testing of circumferential pipe welds for vacuum tightness, using helium gas as a leakage tracer in conjunction with a mass spectrometer. It consists of a split rubber torus and a mating clamping ring with a vacuum hose fitting.

B67-10180

WORK PLATFORM IS SUPPORTED BY SELF-LOCKING BLADES

RUDDEROW, T. /N. AM. AVIATION/ JUN. 1967

M-FS-2297

Work platform has a supporting plate to engage the deck edge of the supporting structure when lowered into place. The plate is attached to blades hinged to the platform, rigidly supporting the platform when latched, and allowing the platform to be moved away when unlatched.

B67-10183

CONTINUOUS INTERNAL CHANNELS FORMED IN ALUMINUM FUSION WELDS

GAULT, J. SABO, W. /N. AM. AVIATION/ JUN. 1967

M-FS-2399

Process produces continuous internal channel systems on a repeatable basis in 2014-T6 aluminum. Standard machining forms the initial channel, which is filled with tungsten carbide powder. TIG machine fusion welding completes formation of the channel. Chem-mill techniques enlarge it to the desired size.

B67-10195

WELD PROCEDURE PRODUCES QUALITY WELDS FOR THICK SECTIONS OF HASTELLOY-X  
FLENS, F. J. FLETCHER, C. W. GLASIER, L. F., JR.  
/AEROJET GEN./ JUN. 1967  
NUC-10048

Welding program produces premium quality, multipass welds in heavy tube sections of Hastelloy-X. It develops semiautomatic tungsten/inert gas procedures, weld wire procurement specifications, material weld properties, welder-operator training, and nondestructive testing inspection techniques and procedures.

B67-10198

GLASS BEAD SHOT PEENING RETARDS STRESS CORROSION FAILURE OF TITANIUM TANKS  
BALES, T. T. LISAGOR, W. B. MANNING, C. R.  
SEYFFORT, M. B. JUN. 1967  
LANGLEY-319

Rigidly controlled shot peening retards the incompatibility between titanium alloys and nitrogen tetroxide in rocket-propellant storage tanks. This sets up a residual compressive stress in the surface of a material which reduces tensile stresses in the material fibers, alleviating stress corrosion.

B67-10200

WORKMANSHIP STANDARDS FOR FUSION WELDING  
PHILLIPS, M. D. /AEROJET GEN./ JUN. 1967  
NUC-10050

Workmanship standards manual defines practices, that adhere to rigid codes and specifications, for fusion welding of component piping, assemblies, and systems. With written and pictorial presentations, it is part of the operating procedure for fusion welding.

B67-10202

APPARATUS FOR FABRICATION OF AMERICIUM-BERYLLIUM NEUTRON SOURCES PREVENTS CAPSULE CONTAMINATION  
MOHR, W. C. VAN LOOM, J. A. JUN. 1967  
ARG-184

Modified gloved enclosure is used to fill a capsule with a mixture of americium and beryllium radioactive powders to seal weld the opening, and to test it for leaks. It contains a horizontal partition, vortex mixer, mounting press, welder, test vessel, and radiation shielding to prevent surface contamination.

B67-10210

ENVIRONMENTAL STUDY OF MINIATURE SLIP RINGS  
RADNIK, J. L. /IIT RES. INST./ JUN. 1967  
M-FS-2443

Investigation studied the long term operation of miniature slip ring assemblies in high vacuum of space and included the influence of ring, brush, and insulator materials on electrical noise and mechanical wear. Results show that soft metal vapor plating and niobium diselenide miniature slip rings are beneficial.

B67-10211

HIGH-STRENGTH BRAZE JOINTS BETWEEN COPPER AND STEEL  
KUHN, R. F. /N. AM. AVIATION/ JUN. 1967  
M-FS-2519

High-strength braze joints between copper and steel are produced by plating the faying surface of the copper with a layer of gold. This reduces porosity in the braze area and strengthens the resultant joint.

B67-10212

DESIGN CONCEPT TO DECREASE RELATIVE SPEED OF BALL BEARINGS  
JESMAN, S. /N. AM. AVIATION/ MAY 1967

M-FS-2003

Intermediate ring decreases the rolling speed of a ball bearing relative to the rotational speed of the shaft. It has raceways on its inner and outer peripheries and an additional row of balls. The modification permits operation at much higher shaft speeds than usual.

B67-10214

SYSTEM ENABLES DIMENSIONAL INSPECTION OF VERY LARGE STRUCTURES  
SIMPSON, R. R. /BOEING CO./ JUN. 1967  
M-FS-2477

Precision rotary table with an integrated optical tooling bar system enables accurate and rapid measurement of linear and angular dimensions on very large structures of any configuration. The structure is mounted on the turntable, which can be rotated to expose any desired surface.

B67-10219

SOLENOID VALVE DESIGN HAS ONE MOVING PART  
ANDERSON, J. W. JUL. 1967  
NPD-10039

Solenoid valve structure has only one moving part, a ball and spring assembly. This eliminates wear caused by sliding motion contact between stationary and moving parts or between moving parts.

B67-10225

TEMPERATURE RESPONSIVE VALVE WITHSTANDS HIGH IMPACT LOADING  
GRAM, M. B. JUL. 1967  
NPD-10186

Valve regulates the flow of a reactant to a chemical heater used in a space application and withstands extreme impact loading. The valve has an upper and a lower housing, the lower containing an inlet and an outlet port, and upper containing a cavity.

B67-10237

POST-STRESSED CONCRETE FOUNDATION MAY REDUCE MACHINERY VIBRATION  
FISTEDIS, S. H. JUL. 1967  
ARG-130

Post-stressing concrete mat foundation reduces excessive vibrations in machinery. The mat is stressed in compression after the machinery is mounted, thus closing any cracks in it, altering the distribution of the soil subgrade reaction on the mat, and changing the mat-subgrade natural frequency.

B67-10238

TRAVELING WIRE ELECTRODE INCREASES PRODUCTIVITY OF ELECTRICAL DISCHARGE MACHINING /EDM/ EQUIPMENT  
KOTORA, J., JR. SMITH, S. V. AUG. 1967  
ARG-136

Traveling wire electrode on Electrical Discharge Machining /EDM/ equipment reduces the time requirements for precision cutting. This device enables cutting with a minimum of lost material and without inducing stress beyond that inherent in the material. The use of wire increases accuracy and enables tighter tolerances to be maintained.

B67-10241

A SIMPLIFIED PERT SYSTEM  
DUNCAN, J. G. MEYER, H. L. WHITE, G. R.  
/DOUGLAS AIRCRAFT CO./ JUL. 1967  
M-FS-2267

Modified PERT technique processes the input data and arranges it in familiar graphic form in a booklet which is issued at periodic intervals. The tabulated data provides readily available information to management personnel concerned with monitoring the progress of a program.

B67-10244

CABLE CLAMP BOLT FIXTURE FACILITATES ASSEMBLY IN CLOSE QUARTERS  
SUNDERLAND, G. H. /BOEING CO./ JUL. 1967  
KSC-67-80

Cable clamp bolt holding fixture facilitates forming of electrical cable runs in limited

equipment space. The fixture engages the threads of the short clamp bolt through the clamp and maintains tension against clamp tendency to open while the operator installs the nut without difficulty.

B67-10256

LINE ADAPTER PROVIDES QUICK DISCONNECT UNDER MODERATE SIDE LOADING

WOLFRAM, E. A. /N. AM. AVIATION/ JUL. 1967  
M-FS-2159

Line adapter acts as quick and simple disconnect system. It quickly separates upon the application of a side load of 15 pounds with standing line pressure at 100 psig.

B67-10271

PIPE JOINTS REINFORCED IN PLACE WITH FITTED ALUMINUM SLEEVES

CORTEZ, I., JR. SIEGFRIED, J. WOBIG, O. AUG. 1967

MSC-11109

Installation of an aluminum sleeve, using specially designed tools, reinforces solder-sealed ferrule joints in installed small-diameter aluminum tubing. Tubing joints reinforced by this method withstand considerable torsional, tensional, and vibrational stresses at moderately elevated temperatures.

B67-10272

PORTABLE MACHINE WELDING HEAD AUTOMATICALLY CONTROLS ARC

OLEKSIAK, C. E. ROBB, M. A. /N. AM. AVIATION/ AUG. 1967

M-FS-12763

Portable weld tool makes weld repairs out-of-station and on the side opposite the original weld. It provides full automatic control of the arc voltage, current, wire feed, and electrode travel speed in all welding attitudes. The device is readily adaptable to commercially available straight polarity dc weld packs.

B67-10273

SPHERICAL JOINT CONNECTS AXIALLY MISALIGNED FLANGES

MC GROARTY, J. D. /N. AM. AVIATION/ AUG. 1967  
M-FS-2238

Interconnecting straight tube connects axially misaligned flanges in a duct assembly. It adjusts to accommodate variations in relative location of the flanges by pivoting. Adjustment is by spherical mating faces and a spherical-faced indexing swivel flange for bolting backup.

B67-10283

CONCEPT FOR MODIFYING DRAFTING INSTRUMENTS TO MINIMIZE SMEARING

RENNIE, T. A. /BOEING CO./ AUG. 1967  
KSC-10056

Ball bearing standoffs added to drafting instruments enable the instruments to be moved about, with their surfaces out of contact with the drawing paper. This provides a safeguard against smearing of the lines.

B67-10285

STATIC SEAL CONCEPT TO ACCOMMODATE SEAT TOLERANCES

HARDY, J. F., III /N. AM. AVIATION/ AUG. 1967  
M-FS-1854

Static seal permits compensation for flange separation and flange-groove tolerances without large seal-leg deflections.

B67-10291

REMOTELY OPERATED HIGH PRESSURE VALVE PROTECTS TEST PERSONNEL

HOWLAND, B. T. /N. AM. AVIATION/ AUG. 1967  
MSC-11010

High pressure valve used in testing certain spacecraft systems, is safely opened and closed by a remotely stationed operator. The valve is self-regulating in that if the incoming pressure drops below a desired value the valve will automatically close, warning the operator that the testing pressure has dropped to an undesired level.

B67-10292

WELDING OF AM350 AND AM355 STEEL

DAVIS, R. J. WROTH, R. S. /DOUGLAS AIRCRAFT CO./ AUG. 1967

M-FS-2314

A series of tests was conducted to establish optimum procedures for TIG welding and heat treating of AM350 and AM355 steel sheet in thicknesses ranging from 0.010 inch to 0.125 inch. Statistical analysis of the test data was performed to determine the anticipated minimum strength of the welded joints.

B67-10293

SQUARE TUBING REDUCES COST OF TELESOPING BRIDGE CRANE HOIST

BERNSTEIN, G. GRAAE, J. SCHRAIDT, J. AUG. 1967  
ARG-13

Using standard square tubing in a telescoping arrangement reduces the cost of a bridge crane hoist. Because surface tolerances of square tubing need not be as accurate as the tubing used previously, and because no spline is necessary, the square tubing is significantly less expensive than splined telescoping tubes.

B67-10308

JACKETED CRYOGENIC PIPING IS STRESS RELIEVED

BOWERS, W. M. /N. AM. AVIATION/ AUG. 1967  
M-FS-985

Jacketed design of piping used to transfer cryogenic fluids, relieves severe stresses associated with the temperature gradients that occur during transfer cycles and ambient periods. The inner /transfer/ pipe is preloaded in such a way that stress relief takes place automatically as cycling occurs.

B67-10321

APPLICATION OF DISTORTED MODELS IN DEVELOPING SCALED STRUCTURAL MODELS

WHITE, R. W. /WYLE LABS./ SEP. 1967  
M-FS-2540

In the design and development of dynamically similar structural models a distorted model of the panel is used. The panel thickness is made larger than that dictated by geometric scaling, and the mass of the panel is decreased by adding mass to the surface of the panel to counteract the additional stiffness obtained by the thickness increase.

B67-10325

SEGMENTED, ARCH-BOUND CARBON SEAL IS PRESSURE LOADED

BURCHAM, R. E. /N. AM. AVIATION/ SEP. 1967  
M-FS-12777

Conventional segmented carbon seal has a low leakage rate and minimum loading requirements for a high pressure, large diameter fluid impeller shaft with large axial and radial movements. Modifications in the segments allow part of the load to be carried in hoop stress.

B67-10341

DEVELOPMENT OF TECHNOLOGY FOR HOT-DRAPE FORMING OF LARGE TORUS SECTIONS

INNOVATOR NOT GIVEN /FAIRCHILD HILLER CORP./ OCT. 1967

M-FS-12141

Compound-contoured sheet metal structure development is aided by hot-drape forming, a method combining hot-stretch forming, die quenching, and age forming. It permits in-process control of material gauge thin-out through a flexible process of heat zone control.

B67-10353

ULTRASONIC WRENCH PRODUCES LEAKTIGHT CONNECTIONS

BLAISE, H. T. MAROPIS, N. /TECHNIDYNE/ OCT. 1967

M-FS-12561

Ultrasonic wrench system produces leaktight seals in flared tubing connections. It induces a flexural vibration mode in the coupling nut. The system consists of a frequency converter, a junction box, and wrench assembly.

B67-10355  
EXTRUSION OF SMALL-DIAMETER, THIN-WALL  
TUNGSTEN TUBING  
AUG. 1967 SEE ALSO NASA-TN-D-3772  
LEWIS-335

Small-diameter, thin-wall seamless tubing of tungsten has been fabricated in lengths of up to 10 feet by hot extrusion over a floating mandrel. Extrusion of 0.50-inch-diameter tubing over 0.4-inch-diameter mandrels was accomplished at temperatures ranging from 3000 degrees to 4000 degrees F.

B67-10358  
STEEL TEST PANEL HELPS CONTROL ADDITIVES IN  
PYROPHOSPHATE COPPER PLATING  
HOLLAR, W. T. /GEN. DYN./CONVAIR/ OCT. 1967  
LEWIS-10101

Test panel helps control maximum tolerance level for plating solution contaminants. It provides low-, medium-, and high-current density areas such as exist in production plating, and plating is examined for uniformity of texture and ductility.

B67-10360  
PRESSURE LEVELS AND PULSATION FREQUENCIES  
CAN BE VARIED ON HIGH PRESSURE/FREQUENCY  
TESTING DEVICE  
ROUTSON, J. W. /GEN. DYN./CONVAIR/ OCT. 1967  
LEWIS-10205

Hydraulic system components test device obtains a pulsating pressure from a hydraulic actuator that is being driven by a vibration exciter of sufficient force and displacement. Input to the exciter controls the frequency of pressure variation.

B67-10364  
RESILIENT BEARING SUPPORTS ARE GAS  
CONTROLLED  
SIX, L. D. /GARRETT CORP./ OCT. 1967 SEE ALSO  
NASA-CR-706  
LEWIS-10109

Self-acting, partial-arc, pivoted-pad bearings in which the bearing-to-journal applied load is pneumatically controlled are used in the operation of a radial flow gas generator where shaft speeds are on the order of 38,500 rpm.

B67-10373  
ECCENTRIC DRIVE MECHANISM IS ADJUSTABLE  
DURING OPERATION  
DENISON, O. J., JR. KUEHNE, B. J. /GE/ OCT. 1967  
M-FS-2576

Eccentric drive mechanism can be adjusted throughout its off-center range while in the operating mode to change the width of a weld weaving pattern. No associated tooling need be removed.

B67-10377  
STABILIZING STAINLESS STEEL COMPONENTS FOR  
CRYOGENIC SERVICE  
HOLDEN, C. F. /N. AM. AVIATION/ OCT. 1967  
M-FS-13127

Warpage and creep in stainless steel valve components are decreased by a procedure in which components are machined to a semifinish and then cold soaked in a bath of cryogenic liquid. After the treatment they are returned to ambient temperature and machine finished to the final drawing dimensions.

B67-10379  
MACHINE TESTS SLOW-SPEED SLIDING FRICTION IN  
HIGH VACUUM  
SKYRUS, J. WILKINSON, C. /DOUGLAS AIRCRAFT/  
OCT. 1967  
M-FS-12341

Testing machine that operates without any lubrication of the machine elements within the vacuum chamber measures static friction and sliding friction at very low speeds. Moving parts are held to a minimum to simplify operation in the vacuum chamber.

B67-10380  
SINGLE-SOURCE MECHANICAL LOADING SYSTEM

PRODUCES BIAXIAL STRESSES IN CYLINDERS  
FLOWER, J. F. STAFFORD, R. L. /DOUGLAS AIRCRAFT  
CO./ OCT. 1967  
M-FS-12530

Single-source mechanical loading system proportions axial-to-hoop tension loads applied to cylindrical specimens. The system consists of hydraulic, pneumatic, and lever arrangements which produce biaxial loading ratios.

B67-10385  
WELDING TORCH AND WIRE FEED MANIPULATOR  
WILLIAMS, R. T. /N. AM. AVIATION/ OCT. 1967  
M-FS-13102

Welding torch and wire feed manipulator increase capability for performing automatic welding operations. The manipulator rotates on its horizontal axis to avoid obstacles as they approach the torch. The initial individual attitudes of the torch and wire guide are set with respect to the general configuration of the part.

B67-10393  
STUDY MADE TO ESTABLISH PARAMETERS AND  
LIMITATIONS OF EXPLOSIVE WELDING  
POLHEMUS, F. C. /PRATT AND WHITNEY AIRCRAFT/  
OCT. 1967  
M-FS-13006

It is theorized that metal jetting must be present for welding to occur, therefore an explosive weld interface may indicate the relation between the metal jet velocity and shock wave velocity in the welding. Parameters for effecting explosive welding in patches of 3 or 4 inches in diameter were established, and found applicable to explosive welding of patches of various sizes.

B67-10400  
STANDARD SURFACE GRINDER FOR PRECISION  
MACHINING OF THIN-WALL TUBING  
KOTORA, J., JR. REIN, J. SMITH, S. V. STRACK,  
D. STUCKEY, D. OCT. 1967  
ARG-10014

Standard surface grinder performs precision machining of thin-wall stainless steel tubing by electrical discharge grinding. A related adaptation, a traveling wire electrode fixture, is used for machining slots in thin-walled tubing.

B67-10401  
METAL TUBE REDUCER IS INEXPENSIVE AND  
SIMPLE TO OPERATE  
MAYFIELD, R. M. OCT. 1967 SEE ALSO ANL-7127 AND  
ANL-7176  
ARG-49

Low-cost metal tube reducer accepts tubing up to 1 inch outer diameter and can reduce this diameter to less than 1/2-inch with controlled wall thickness. This device can reduce all of the tube without waste. It produces extremely good surface finishes.

B67-10403  
WEAR STUDIES MADE OF SLIP RINGS AND GAS  
BEARING COMPONENTS  
FURN, A. K. /VIRGINIA POLYTECH. INST./ NOV. 1967  
M-FS-12882

Neutron activation analysis techniques were employed for the study of the wear and performance characteristics of slip ring and rotor assemblies and of the problems arising from environmental conditions with special reference to surface contamination. Results showed that the techniques could be successfully applied to measurement of wear parameters.

B67-10418  
HYDRAULIC SYSTEM PROVIDES SMOOTH CONTROL OF  
LARGE TRACKING AND ANTENNA DRIVE SYSTEMS  
AT VERY LOW TRACKING RATES  
PARKER, G. L. NOV. 1967  
NPO-10316

Hydraulic system provides smooth control of large tracking and antenna drive systems at very low tracking rates. This configuration modifies a series connection of the drive motors with compensating orifices to offset the effects of drain line loss. Linearization of response by eliminating cogging or cyclic operation is thus

obtained.

B67-10419  
COAXIAL CABLE STRIPPING DEVICE FACILITATES  
RF CABLING FABRICATION  
HUGHES, R. S. TOBIAS, R. A. NOV. 1967  
NPO-10315

Coaxial cable stripping device assures clean, right angled shoulder for RF cable connector fabrication. This method requires minimal skill and creates a low voltage standing wave ratio and mechanical stability in the interconnecting RF cables.

B67-10423  
PRECISION METAL MOLDING  
TOWNHILL, A. /N. AM. AVIATION/ OCT. 1967  
M-FS-13305

Method provides precise alignment for metal-forming dies while permitting minimal thermal expansion without die warpage or cavity space restriction. The interfacing dowel bars and die side facings are arranged so the dies are restrained in one orthogonal angle and permitted to thermally expand in the opposite orthogonal angle.

B67-10427  
HEAVY-GAGE BONDED HONEYCOMB SANDWICH AS  
PRIMARY LOAD-BEARING STRUCTURE  
INNOVATOR NOT GIVEN /GEN. DYN./ OCT. 1967  
M-FS-12060

Heavy-gauge bonded honeycomb sandwich is used as a primary load-bearing structural material in large-diameter boosters. Theoretical investigations based on small deflection theory for prediction of stress fields and buckling loads, and structural testing were made. This structure is a potential weight saver for compression load-critical components.

B67-10445  
SAFETY YOKE WOULD PROTECT CONSTRUCTION  
WORKERS FROM FALLING  
GOFORTH, O. H. /TRANS WORLD AIRLINES/ NOV. 1967  
KSC-10075

Simple dismountable yoke protects construction workers on narrow steel beams at high levels. The yoke engages the upper flat of the beam and slides freely along it to permit freedom of movement to the worker while limiting his ability to fall by a harness attached to the yoke.

B67-10453  
PUMP SIMULATOR PROVIDES VARIABLE PRESSURE-  
FLOW CHARACTERISTICS  
PACKE, D. R. /PRATT AND WHITNEY AIRCRAFT/ NOV. 1967

LEWIS-10122  
Pump simulator with variable pressure flow characteristics permits ready experimental determination of optimum pump-load matching. It has been successfully used to investigate the effect of feed pump characteristics on the stability of a Rankine system boiler.

B67-10464  
TUBE-TO-HEADER JOINT FOR BIMETALLIC  
CONSTRUCTION  
LESSMANN, G. G. STONER, D. R. /WESTINGHOUSE  
CORP./ NOV. 1967  
LEWIS-10282

Design advantages of bimetallic construction enables an all-welded bimetallic joint to be made from the accessible header side of the tube-to-header joint. In the two-piece header design the weld joints completely seal the tube-header plate crevice and prevent crevice and stringer corrosion.

B67-10466  
HAND-OPERATED PLUG INSERTION VALVE  
JONES, R. G. RONEY, J. A. /HAYES INTERN. CORP./  
NOV. 1967  
M-FS-12019

Hand-operated plug insertion valve seals an evacuated insulation system for upper stage liquid hydrogen tanks on the launch pad. It is light in

weight, demountable, and permits evacuation of the system plus sealing after evacuation.

B67-10472  
ALUMINUM AND STAINLESS STEEL TUBES JOINED  
BY SIMPLE RING AND WELDING PROCESS  
TOWNHILL, A. /N. AM. AVIATION/ NOV. 1967  
M-FS-13120

Duranel ring is used to join aluminum and stainless steel tubing. Duranel is a bimetal made up of roll-bonded aluminum and stainless steel. This method of joining the tubing requires only two welding operations.

B67-10473  
TOOL SAMPLES SUBSURFACE SOIL FREE OF  
SURFACE CONTAMINANTS  
KEMMERER, W. W. WOOLEY, B. C. NOV. 1967  
MSC-10988

Sampling device obtains pure subsurface soil that is free of any foreign substance that may exist on the surface. It is introduced through a contaminated surface area in a closed condition, opened, and a subsurface sample collected, sealed while in the subsurface position, and then withdrawn.

B67-10483  
CONCEPT FOR DESIGN OF VARIABLE STIFFNESS  
DAMPER  
LOHR, J. J. DEC. 1967  
ARC-11225

Damping mechanism, containing polymeric-like materials is applicable to a wide range of shock and vibration. The polymeric-like material changes from a relatively stiff material to a relatively soft, rubbery material in the region of their glass transition temperatures. The energy absorption characteristics and stiffness are controllable with temperature.

B67-10488  
COMBINED ATTENUATOR AND LATCH FOR  
CARTRIDGE POWERED ACTUATOR  
MURPHY, D. W. /N. AM. AVIATION/ DEC. 1967  
MSC-11242

Combined attenuator and latch stops and latches in place a given mass which is to be moved a discrete distance to effect a desired condition. This device is used in a retraction actuator driven by a pyrotechnic thruster, and can be tailored to meet specific design requirements.

B67-10498  
ROCK ANCHORS RESTORE BROKEN SWAMP ANCHORS  
ECONOMICALLY  
MC ALLISTER, J. W. DEC. 1967  
WLP-10004

Swamp anchors, used to convey power lines across marshes, are restored economically by installing a rock anchor in the upper portion of the pipe that remains attached to the original swamp anchor.

B67-10512  
FLOW LINER EXTENDS OPERATING LIFE OF HIGH-  
ANGULATION BELLWS  
RUMPH, D. G. /BOEING CO./ DEC. 1967  
M-FS-12023

Linear extends the service life of high-angulation /26-degree/ bellows used as ducts for high-velocity fluid flow in a liquid oxygen fill and drain system. It consists of a conical frustum or nozzle on the upstream side and a cylindrical section or catcher on the down-stream side.

B67-10518  
STUDY MADE OF THIN-WALLED PIPE RESPONSE TO  
TURBULENT FLUIDS  
CLINCH, J. M. /IIT RES. INST./ DEC. 1967  
M-FS-1321

Report summarizes the experimental and theoretical data on the vibrational response of thin-walled pipe sections to the wall pressure field applied within them by a fully-developed turbulent fluid flow. The predicted responses were in good agreement with previous data obtained.

B67-10525

VARIABLE-SPEED, PORTABLE ROUTING SKATE  
PESCH, W. A. /HAYES INTERN. CORP./ DEC. 1967  
M-FS-13772

Lightweight, portable, variable-speed routing skate is used on heavy metal subassemblies which are impractical to move to a stationary machine. The assembly, consisting of the housing with rollers, router, and driving mechanism with transmission, weighs about forty pounds. Both speed and depth of cut are adjustable.

B67-10526

DYNAMIC VALVE SEAL IS RELIABLE AT CRYOGENIC TEMPERATURES  
MOXLEY, H. E. /N. AM. AVIATION/ DEC. 1967  
M-FS-12987

C-shaped PTFE /polytetrafluoroethylene/ seal ring provides a reliable seal in cryogenic fluids over a fluid pressure range of 0 to 2000 psig. It is interference-fitted internally with a metal expander ring and a metal compressor ring.

B67-10528

ACCUMULATOR ISOLATOR PREVENTS MALFUNCTIONING OF FAULTY HYDRAULIC SYSTEM  
WALSH, G. D. /BOEING CO./ DEC. 1967  
M-FS-1415

Special isolator valve prevents malfunction of a closed hydraulic system by converting the initial accumulator-reservoir to a reservoir function only when the system loses oil, or gaseous nitrogen precharge, or has a jammed piston. This permits near-normal operation until the defect is corrected.

B67-10529

DEVELOPMENT OF LUNAR DRILL TO TAKE CORE SAMPLES TO 100-FOOT DEPTHS  
INNOVATOR NOT GIVEN /WESTINGHOUSE DEFENSE AND SPACE CENTER/ DEC. 1967  
M-FS-13015

Lunar drill takes lunar surface cores to depths of 100 feet and is being developed to the samples at greater depths. The wireline drill system has been adapted to operate in the lunar environment by providing a sealed dc motor and solid metallic base lubricants.

B67-10539

LEAD PLATED ALUMINUM RING PROVIDES STATIC HIGH PRESSURE SEAL FOR LARGE DIAMETER PRESSURE VESSEL  
LOCKE, J. N. /AEROJET-GEN. CORP./ DEC. 1967  
NUC-10008

Lead plated aluminum ring provides a positive static seal for a large diameter pressure vessel for use in a hazardous environment at cryogenic temperatures with high pressure fluid flow. This design can be used in high and low pressure lines of any diameter for any fluid, with appropriate material modification.

B67-10541

PRECISION TRIMMER AIDS IN PREPARING BIOMEDICAL SPECIMEN BLOCKS FOR ULTRATHIN SECTIONING  
TAHMISIAN, T. N. DEC. 1967  
ARG-242

Precision trimmer, which neatly trims biomedical specimen blocks for ultrathin sectioning, eliminates the risk of human error. 4 inches in diameter and 3 inches in height, it supports the block and serves as a support for a cutting tool and can be adjusted in three dimensions.

B67-10547

POWER TORQUE WRENCH CONCEPT FOR PRECISION TORQUE APPLICATION  
PETERS, G. A. WARMING, K. /N. AM. AVIATION/ DEC. 1967  
M-FS-13546

Precision electromechanical power wrench applies a given amount of torque to a series of fasteners. It uses a commercially available dc permanent magnet torque motor with a current-controllable torque output and torque value indicator designed to the principles of human engineering.

B67-10555

STUDY MADE OF HEAT TRANSFER AND PRESSURE DROP THROUGH TUBES WITH INTERNAL INTERRUPTED FINS  
NAMKOONG, D., JR. DEC. 1967 SEE ALSO  
NASA-TM-X-1428  
LEWIS-10280

Argon gas flow through an internal interrupted finned tube was investigated to obtain heat transfer and frictional pressure drop data. The results were plotted against the same data for corresponding louvered plate-finned surfaces.

B67-10563

INSTRUMENT ACCURATELY MEASURES WELD ANGLE AND OFFSET  
BOYD, W. G. /N. AM. AVIATION/ DEC. 1967  
M-FS-12849

Weld angle is measured to the nearest arc minute and offset to one thousandth of an inch by an instrument designed to use a reference plane at two locations on a test coupon. A special table for computation has been prepared for use with the instrument.

B67-10567

BUTTERFLY VALVE WITH METAL SEALS CONTROLS FLOW OF HYDROGEN FROM CRYOGENIC THROUGH HIGH TEMPERATURES  
JOHNSON, L. D. /AEROJET GEN. CORP./ DEC. 1967  
NUC-10034

Butterfly valve with metal seals operates over a temperature range of minus 423 deg. to plus 440 deg. F with hydrogen as a medium and in a radiation environment. Media flow is controlled by an internal butterfly disk which is rotated by an actuation shaft.

B67-10581

FLAT CABLE INSULATION STRIPPING MACHINE  
SCHAEFER, J. H. /VIKING IND./ DEC. 1967  
M-FS-13776

Flat cable insulation stripping machine operates on a principle of variable parameters of abrasive wheel speed, wheel pressure on the flat cable, and flat cable feed speed into the abrasive wheel. Application of connectors is handled efficiently with this flat terminal termination technique.

B67-10588

HIGH ENERGY FORMING FACILITY  
CIURLIONIS, B. /N. AM. AVIATION/ DEC. 1967  
M-FS-14026

Watertight, high-explosive forming facility, 25 feet in diameter and 15 feet deep, withstands repeated explosions of 10 pounds of TNT equivalent. The shell is fabricated of high-strength steel and allows various structural elements to deform or move elastically and independently while retaining structural integrity.

B67-10591

FLUOROCARBON SEAL REPLACES METAL PISTON RING IN LOW DENSITY GAS ENVIRONMENT  
MORATH, W. D. MORGAN, N. E. /VICKERS, INC./ DEC. 1967  
LEWIS-10277

Reinforced fluorocarbon cupseal, which provides an integral lip-type seal, replaces the metal piston rings in piston-cylinder configurations used in the compression of low density gases. The fluorocarbon seal may be used as cryogenic compressor piston seals.

B67-10594

SELF-ALIGNING ROD PREVENTS ECCENTRIC LOADING OF TENSILE SPECIMENS  
VANDERGRIFT, E. F. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1967  
NUC-10525

Tensile specimens can be tested in liquid nitrogen without subjecting the cryostat to tilting during assembly of the specimen in the liquid nitrogen-filled cryostat. A universal joint with a semielliptical head and socket that reduces misalignment and permits only limited side travel.

B67-10607  
HONEYCOMB SEAL BACKING RING INCREASES  
TURBOPUMP DISK LIFE  
BROOKS, W. S. LARSON, E. W. /N. AM. AVIATION/  
DEC. 1967  
M-FS-13303

Turbopump disk life increased by thin, relatively rigid metal backing ring installed to the honeycomb seal. The aerodynamic and friction damping provided by this modification eliminates first-stage disk cracking.

B67-10611  
ROLAMITE - A NEW MECHANICAL DESIGN CONCEPT  
WILKES, D. F. NOV. 1967  
SAN-10001

Rolamite, a mechanical suspension system, provides substantial reductions in friction in the realm of extremely low bearing pressures. In addition, rolamite devices are easily microminiaturized, are extremely tolerant of production variations and are inherently capable of virtually all functions to construct most electromechanical devices.

B67-10619  
FEED-THRU CONDUIT MINIMIZES HEAT PICKUP  
YAGER, S. P. DEC. 1967  
JPL-847

Insulated feed-thru conduit minimizes heat pickup by a cryogenic fluid passing through the walls of a double high-vacuum chamber, and is capable of expansion and contraction with the walls of the chamber. It uses a bellows and rigid cylinder to provide a low-loss feed-thru for the cryogenic liquid.

B67-10622  
FIRE EXTINGUISHER CONTROL SYSTEM PROVIDES  
RELIABLE COLD WEATHER OPERATION  
BRANUM, J. C. /N. AM. AVIATION/ DEC. 1967  
M-FS-13031

Fast acting, pneumatically and centrally controlled, fire extinguisher /Firex/ system is effective in freezing climates. The easy-to-operate system provides a \*\*fail-dry\*\* function which is activated by an electrical power failure.

B67-10623  
FERROMAGNETIC CORE VALVE GIVES RAPID ACTION  
ON MINIMUM ENERGY  
DETHLETSEN, R. LARSON, A. V. LIEBING, L. /GEN.  
DYN./CONVAIR/ DEC. 1967  
LEWIS-10135

Miniature solenoid valve controls propellant flow during tests on a coaxial plasma accelerator. It uses an advanced ferromagnetic core design which meets all the rapid-acting requirements with a minimum of input energy.

B67-10628  
TENSILE TESTING GRIPS ARE EASILY ASSEMBLED  
UNDER LIQUID NITROGEN  
SKALKA, R. J. VANDERGRIFT, E. F. /WESTINGHOUSE  
ASTRONUCL. LAB./ DEC. 1967  
NUC-10524

Split-screw grips for tensile testing provide uniform loading on the specimen shoulders. Holes in the heads enable the screws and specimen to be threaded as an assembly into a grip body, closely controlled guides and seats afford positive seating, and precision machining of mating surfaces minimizes misalignment effects.

B67-10638  
EDDY CURRENT DISK VALVE  
DETHLETSEN, R. LARSON, A. V. LIEBING, L. /GEN.  
DYN./CONVAIR/ DEC. 1967  
LEWIS-10123

Quick-opening, intermittent flow valve requires a small amount of electrical energy to open and closes by the restoring action of a rubber stop. This eddy current disk valve opens in less than 100 microseconds and takes only 10 joules of energy.

B67-10639  
SOLENOID HAMMER VALVE DEVELOPED FOR QUICK-  
OPENING REQUIREMENTS  
DETHLETSEN, R. LARSON, A. V. LIEBING, L. /GEN.

DYN./CONVAIR/ DEC. 1967  
LEWIS-10134

Quick-opening lightweight solenoid hammer valve requires a low amount of electrical energy to open, and closes by the restoring action of the mechanical springs. This design should be applicable to many quick-opening requirements in fluid systems.

B67-10655  
DEVELOPMENT OF HELICAL SEAL FOR HIGH  
TEMPERATURE /2000 DEGREES F/ APPLICATION  
HELD, C. /N. AM. AVIATION/ JAN. 1968  
M-FS-13304

Helical seal is used to seal bolted flange joints in a high temperature environment. The seal design incorporates a new cross-sectional shape, a metal strip with a slight radius, and the use of premolded asbestos. It provides equal load distribution under compression loads, allows for minimum loss and recovery values, and increases the temperature range.

B67-10667  
SOLENOID VALVE DESIGN MINIMIZES VIBRATION  
AND SLIDING WEAR PROBLEM  
GILLON, W. A., JR. /N. AM. AVIATION/ JAN. 1968  
M-FS-14079

Two-way cryogenic solenoid valve resists damage from vibration and metallic interfacial sliding. The new system features a flat-faced armature guided by a flexure disk which eliminates sliding surfaces and is less subject to contamination and wear.

B67-10670  
RECONNECT MECHANISM  
MOORE, D. L. /BOEING CO./ JAN. 1968  
M-FS-12968

Mechanism remotely-controls de-mating of two bodies by unlock and withdrawal of one body from the other and, upon command, extends, locates, remates and relocks the two bodies. The system is designed to transfer fluids from a dispensing body to a receiving body.

B67-10673  
CRYOGENIC SEAL CONCEPT FOR STATIC AND  
DYNAMIC CONDITIONS  
DE GAETANO, E.A./N. AM. AVIATION/  
JAN. 1968  
M-FS-12986

Seal rings reduce cryogenic pump seal leakage under static and dynamic conditions. The rings are fitted into annular diaphragms, which are affected by cryogenic pressure and temperature, to move against a mating ring, to increase seal-bearing loads under static conditions.

B67-10677  
IMPROVED CONTROL SYSTEM POWER UNIT FOR  
LARGE PARACHUTES  
CHANDLER, J. A. GRUBBS, T. M. JAN. 1968  
MSC-12052

Improved control system power unit drives the control surfaces of very large controllable parachutes. The design features subassemblies for determining control surface position and cable loading, and protection of the load sensor against the possibility of damage during manipulation.

## 06 COMPUTER PROGRAMS

B67-10169  
STUDY OF DYNAMIC RESPONSE OF ELASTIC SPACE  
STATIONS  
KAMRATH, P. /N. AM. AVIATION/ JUN. 1967  
NPO-10124

Analytical procedure and the requisite computer programs compute the dynamic responses of two large elastic space stations. The linearized equations of motion are derived from Lagrange's equations. Then the normal modes of free vibration of the nonrotating space station are used to define the elastic degrees of freedom.

# 06 COMPUTER PROGRAMS

B67-10172

SPACE TRAJECTORIES PROGRAM FOR IBM 7090  
HOLDRIE, D. B. JUN. 1967 SEE ALSO 32-223  
NPO-10125

Space Trajectories Program studies the motion of a space probe confined to the solar system and influenced by the nonspherical Earth and Moon, and the point masses defined by the Sun, Venus, Mars, and Jupiter. It is written in the Fortran Assembly Program language.

B67-10173

LINEAR CIRCUIT ANALYSIS PROGRAM FOR IBM  
1620 MONITOR II, 1311/1443 DATA PROCESSING  
SYSTEM /CIRCS/  
HATFIELD, J. JUN. 1967  
NPO-10131

CIRCS is modification of IBSNAP Circuit Analysis Program, for use on smaller systems. This data processing system retains the basic dc, transient analysis, and Fortran II formats. It can be used on the IBM 1620/1311 Monitor I Mod 5 system, and solves a linear network containing 15 nodes and 45 branches.

B67-10193

COMPUTER PROGRAM SIMULATES PHYSICAL SYSTEMS  
BY SOLVING THE SIMULTANEOUS DIFFERENTIAL  
EQUATIONS DESCRIBING THE SYSTEMS  
MANKOVITZ, R. J. JUN. 1967  
NPO-10019

DIANA, a digital-analog simulation program for IBM 1620 II computer, simulates physical systems by solving the simultaneous differential equations describing the systems. It expands and optimizes the input-output capabilities, permits additional flexibility in midstream program alternation, and minimizes the computational time.

B67-10217

A MODAL COMBINATION COMPUTER PROGRAM FOR  
DYNAMIC ANALYSIS OF STRUCTURES  
BAMFORD, R. M. JUN. 1967  
NPO-10129

Computer program determines the response of a composite linear structure to sinusoidal base motion of a restrained structure or sinusoidal forces of a free structure. This program is applied to problems of testing practices and closed-loop stability of autopilot controlled space vehicles. It is written for the IBM 7094 in Fortran IV language.

B67-10222

SUBROUTINES GEORGE AND DRASTIC SIMPLIFY  
OPERATION OF AUTOMATIC DIGITAL PLOTTER  
ENGLEL, F., III GRAY, W. H. RICHARD, P. J.  
/WESTINGHOUSE ASTRONUCL. LAB./ JUL. 1967  
NUC-10044

Fortran language subroutines enable the production of a tape for a 360-30 tape unit that controls the CALCOMP 566 Digital Incremental Plotter. This provides the plotter with instructions for graphically displaying data points with the proper scaling of axes, numbering, lettering, and tic marking.

B67-10223

CALCULATION OF RESONANCE NEUTRON ABSORPTION  
IN TWO-REGION PROBLEMS /THE GAROL CODE/  
SMITH, C. V. STEVENS, C. A. /GEN. DYN./ JUL.  
1967  
NUC-10045

GAROL computer program explicitly takes into account those effects which arise from neutron resonance overlap of an individual resonance absorber and of mixtures of different resonance absorbers. GAROL computes effective group cross-sections for the resolved resonances of a mixture of isotopes in a two-region cell.

B67-10224

COMPUTER PROGRAM CALCULATES STEADY-STATE  
TEMPERATURE DISTRIBUTION WITHIN PLANE OR  
AXISYMMETRIC SOLIDS  
WILSON, E. L. /AEROJET-GEN. CORP./ JUL. 1967  
NUC-10049

Digital computer program, using the finite element analysis technique, determines the steady-state

temperature within plan or axisymmetric solids composed of many different materials of various geometry. Program output is used to plot isotherms and provide data enabling the performance of stress analysis or heat transfer calculations upon the bodies.

B67-10233

LAND LANDING COUCH DYNAMICS COMPUTER PROGRAM  
HERTING, D. N. POHLEN, J. C. POLLACK, R. A. /N.  
AM. AVIATION/ JUL. 1967  
MSC-1210

Computer programs perform landing stability studies of mechanical impact system designs for advanced spacecraft. The programs consider variation in spacecraft vertical and horizontal velocity, attitude and orientation, shock strut load-stroke characteristics, and ground coefficient of friction.

B67-10235

COMPUTER PROGRAM SIMPLIFIES DESIGN OF  
ROTATING COMPONENTS OF TURBOMACHINERY  
LEFEVRE, J. C. /AEROJET-GEN. CORP./ JUL. 1967  
NUC-10046

Digital computer program performs stress analysis and burst speed calculations on rotating axisymmetric turbomachinery components. The computer printout contains the displacement of each nodal point, the stress at the center of each element, the average tangential stress within the component, and the burst speed.

B67-10240

VIS-A-PLAN /VISUALIZE A PLAN/ MANAGEMENT  
TECHNIQUE PROVIDES PERFORMANCE-TIME SCALE  
RANCK, N. H. /TRANS WORLD AIRLINES/ JUL. 1967  
KSC-10073

Vis-A-Plan is a bar-charting technique for representing and evaluating project activities on a performance-time basis. This rectilinear method presents the logic diagram of a project as a series of horizontal time bars. It may be used supplementary to PERT or independently.

B67-10261

ANALYTICAL TECHNIQUE PERMITS COMPARISON OF  
RELIABILITY OF ALTERNATE MECHANICAL DESIGNS  
HENNING, F. W. /WESTINGHOUSE ASTRONUCL. LAB./  
JUL. 1967  
NUC-10065

Failure Rate Index analysis permits comparison of reliability of alternate mechanical designs. All failure modes for a mechanical component are identified, and computed on an index which relates the failure mode to failure of the component. The summation of all failure mode indexes relates the potential reliability of the component.

B67-10278

CINDA - CHRYSLER IMPROVED NUMERICAL  
DIFFERENCING ANALYZER COMPUTER PROGRAM  
GASKI, J. D. LEWIS, D. R. /CHRYSLER CORP./ AUG.  
1967 SEE ALSO B66-10404  
M-FS-2298

Dimensionless multioption systems compiler computer program constructs and analyzes a mathematical model of any arbitrary one, two, or three dimensional lumped parameter representation of a physical system. It automatically optimizes the utilization of computer core space and is more general and versatile than BETA.

B67-10279

COMPUTER PROGRAM FOR DETERMINATION OF  
NATURAL FREQUENCIES OF CLOSED SPHERICAL  
SANDWICH SHELLS  
WILKINSON, J. P. D. /N. AM. AVIATION/ AUG. 1967  
MSC-1246

Solutions for the axially symmetric motion of an elastic spherical sandwich shell have been obtained from a theory of shells which includes the effects of transverse shear deformation and rotary inertia. Frequency equations and mode shapes are derived for the full vibrations of a closed spherical shell.

B67-10280

MASTER CONTROL DATA HANDLING PROGRAM USES



## AUTOMATIC DATA INPUT

ALLISTON, W. DANIEL, J. /BOEING CO./ AUG. 1967  
M-FS-2259

General purpose digital computer program is applicable for use with analysis programs that require basic data and calculated parameters as input. It is designed to automate input data preparation for flight control computer programs, but it is general enough to permit application in other areas.

B67-10281  
COMPUTER PROGRAM PREDICTS THERMAL AND FLOW TRANSIENTS EXPERIENCED IN A REACTOR LOSS-OF-FLOW ACCIDENT  
HALE, C. J. /GEN. DYNAMICS/ AUG. 1967  
NUC-10054

Program analyzes the consequences of a loss-of-flow accident in the primary cooling system of a heterogeneous light-water moderated and cooled nuclear reactor. It produces a temperature matrix 36X 41 /x,y/ which includes fuel surface temperatures relative to the time the pump power was lost.

B67-10287  
COMPUTER PROGRAM PROVIDES LINEAR SAMPLED-DATA ANALYSIS FOR HIGH ORDER SYSTEMS  
BUNN, D. B. KIMBALL, R. B. /N. AM. AVIATION/ AUG. 1967  
M-FS-12821

Computer program performs transformations in the order S-to-W-to-Z to allow arithmetic to be completed in the W-plane. The method is based on a direct transformation from the S-plane to the W-plane. The W-plane poles and zeros are transformed into Z-plane poles and zeros using the bilinear transformation algorithm.

B67-10306  
COMPUTER PROGRAM USES MONTE CARLO TECHNIQUES FOR STATISTICAL SYSTEM PERFORMANCE ANALYSIS  
WOHL, D. P. /N. AM. AVIATION/ AUG. 1967  
M-FS-2234

Computer program with Monte Carlo sampling techniques determines the effect of a component part of a unit upon the overall system performance. It utilizes the full statistics of the disturbances and misalignments of each component to provide unbiased results through simulated random sampling.

B67-10307  
COMPUTER PROGRAM DETERMINES THERMAL ENVIRONMENT AND TEMPERATURE HISTORY OF LUNAR ORBITING SPACE VEHICLES  
HEAD, D. E. MITCHELL, K. L. /BOEING CO./ AUG. 1967  
M-FS-12916

Program computes the thermal environment of a spacecraft in a lunar orbit. The quantities determined include the incident flux /solar and lunar emitted radiation/, total radiation absorbed by a surface, and the resulting surface temperature as a function of time and orbital position.

B67-10309  
STUDY OF RANDOM PROCESS THEORY-AIDS DIGITAL DATA PROCESSING  
BORDNER, G. W. /CORNELL AERON. LAB./ AUG. 1967  
M-FS-1475

Study of techniques for all random process technology, including stationary, nonstationary, and Gaussian bivariate, aids digital data processing. It presents material on digital filtering, correlation function, optimal spectral smoothing, deterministic data processing, and nonstationary spectrum and correlation analyses.

B67-10310  
COMPUTER PROGRAM FOR MASS OPTIMAL SOLUTIONS OF SOME ENDPOINT TRAJECTORY PROBLEMS  
BENNETT, A. G. ESHRIDGE, C. D. OMAHONY, M. S. /BOEING CO./ AUG. 1967  
M-FS-12976

Optimization of trajectories for minimal propellant consumption is achieved by incorporating a coast arc device into a three-

dimensional fixed end-point steepest ascent computer program. It calculates a trajectory between any two points in space defined by initial and final position vectors, without restrictions on thrust or orbit characteristics.

B67-10319  
TRANSIENT ANALYSIS GENERATOR /TAG/ SIMULATES BEHAVIOR OF LARGE CLASS OF ELECTRICAL NETWORKS  
THOMAS, W. J. SEP. 1967  
NPO-10031

Transient Analysis Generator program simulates both transient and dc steady-state behavior of a large class of electrical networks. It generates a special analysis program for each circuit described in an easily understood and manipulated programming language. A generator or preprocessor and a simulation system make up the TAG system.

B67-10323  
COMPUTER PROGRAM UTILIZES FORTRAN IV SUBROUTINES FOR CONTOUR PLOTTING  
BLOCK, N. GARRET, R. LAWSON, C. SEP. 1967  
NPO-10127

Computer program constructs lists of xy-coordinate pairs that define contour curves for an arbitrary given function of two variables and transmits these lists to plotting equipment to produce contour plots. The principal subroutine, CONTOUR, is independent of any specific system of plotting subroutines and equipment.

B67-10327  
MULTIPLE CORRELATION COMPUTER PROGRAM DETERMINES RELATIONSHIPS BETWEEN SEVERAL INDEPENDENT AND DEPENDENT VARIABLES  
KASPAR, H. NEWSBAUM, J. B. /N. AM. AVIATION/ SEP. 1967  
M-FS-13024

Relationships between independent and dependent variables determined by multiple correlation computer program. This is applied to research and experimental design and development of complex hardware and components that require test programs.

B67-10328  
COMPUTER OPTIMIZATION PROGRAM FINDS VALUES FOR SEVERAL INDEPENDENT VARIABLES THAT MINIMIZE A DEPENDENT VARIABLE  
WARECH, E. J. /N. AM. AVIATION/ SEP. 1967  
M-FS-13030

Computer program finds values of independent variables which minimize the dependent variable. This optimization program has been used on the F-1 and J-2 engine programs to establish minimum film coolant requirements.

B67-10329  
COMPUTER PROGRAM RESOLVES RADIATIVE, CONDUCTIVE, AND CONVECTIVE HEAT TRANSFER PROBLEMS FOR VARIETY OF GEOMETRIES  
ELKIN, R. MC GARRITY, A. L. SEP. 1967  
M-FS-1910

Computer program computes temperature distribution as a function of time in a given body which has been subdivided into a network of nodes. Thermal resistances and capacitances may be computed from nodal geometry.

B67-10330  
IMPROVED COMPUTER PROGRAM FOR ELASTIC ANALYSIS OF HIGHLY REDUNDANT STRUCTURAL CONFIGURATIONS  
HROMJAK, A. J. /N. AM. AVIATION/ SEP. 1967  
M-FS-13087

Computer program provides elastic analysis of highly redundant structural configurations. Punched output of flexibility and stiffness matrices are obtained for use in a natural frequency analysis. Member reaction output in card or tape form is used in conjunction with other programs to perform stress analyses.

B67-10331  
GENERAL PURPOSE COMPUTER PROGRAMS FOR NUMERICALLY ANALYZING LINEAR AC ELECTRICAL

## AND ELECTRONIC CIRCUITS FOR STEADY-STATE CONDITIONS

EGEBRECHT, R. A. THORBJORNSEN, A. R. /BOEING CO./ SEP. 1967  
M-FS-13094

Digital computer programs determine steady-state performance characteristics of active and passive linear circuits. The ac analysis program solves the basic circuit parameters. The compiler program solves these circuit parameters and in addition provides a more versatile program by allowing the user to perform mathematical and logical operations.

B67-10344  
COMPUTER SUBROUTINE ISUDS ACCURATELY SOLVES LARGE SYSTEM OF SIMULTANEOUS LINEAR ALGEBRAIC EQUATIONS  
COLLIER, G. /WESTINGHOUSE ASTRONUCL. LAB./ SEP. 1967  
NUC-10051

Computer program, an Iterative Scheme Using a Direct Solution, obtains double precision accuracy using a single-precision coefficient matrix. ISUDS solves a system of equations written in matrix form as  $AX=B$ , where  $A$  is a square non-singular coefficient matrix,  $X$  is a vector, and  $B$  is a vector.

B67-10345  
COMPUTER PROGRAM VARI-QUIR III PROVIDES SOLUTION OF STEADY-STATE, MULTIGROUP, TWO-DIMENSIONAL NEUTRON DIFFUSION EQUATIONS  
COLLIER, G. /WESTINGHOUSE ASTRONUCL. LAB./ SEP. 1967  
NUC-10052

Computer program VARI-QUIR III provides Gauss-Seidel type of solution with inner and outer iterations for steady-state, multigroup, two-dimensional neutron diffusion equations. The program has no restrictions on any of the input parameters such as the number of groups, regions, or materials.

B67-10348  
COMPUTERIZED PARTS LIST SYSTEM COORDINATES ENGINEERING RELEASES, PARTS CONTROL, AND MANUFACTURING PLANNING  
HORTON, W. KINSEY, M. /WESTINGHOUSE ASTRONUCL. LAB./ SEP. 1967  
NUC-10073

Computerized parts list system compiles and summarizes all pertinent and available information on complex new systems. The parts list system consists of three computer subroutines - list of parts, parts numerical sequence list, and specifications list.

B67-10405  
SATURN S-II AUTOMATIC SOFTWARE SYSTEM  
/SASS/  
PARKER, P. E. /N. AM. AVIATION/ NOV. 1967  
M-FS-1741

Saturn S-II Automatic Software System /SASS/ was designed and implemented to aid Saturn S-II program development and to increase the overall operating efficiency within the S-II data laboratory. This program is written in Fortran II for SDS 920 computers.

B67-10406  
COMPUTER PROGRAM FOR NETWORK SYNTHESIS BY FREQUENCY RESPONSE FIT  
GREEN, S. /IBM/ NOV. 1967  
M-FS-12686

Computer program synthesizes a passive network by minimizing the difference in desired and actual frequency response. The program solves for the critical points of the error function /weighted least squares fit between calculated and desired frequency response/ by the multivariable Newton-Raphson method with components constrained to an admissible region.

B67-10407  
EARTH ORBIT RENDEZVOUS EVALUATION PROGRAM  
BENNETT, A. G. ESKRIDGE, C. D. HANAFY, L. M. HOLM, G. L. OMAHONY, M. L. /BOEING CO./  
QUARLES, I. D. NOV. 1967

M-FS-13016

Study program written in Fortran IV develops an orbital rendezvous guidance scheme for large, constant thrust launch vehicles. It concentrates on /1/ an investigation of the direct extension of the present Saturn Iterative Guidance Mode /IGM/ Scheme, and /2/ a scheme formulated in a reference frame moving with the target satellite.

B67-10411  
COMPUTER PROGRAM GENERATES AVERAGED VALUE DATA TAPES  
WATKINS, F. L. /N. AM. AVIATION/ NOV. 1967  
M-FS-12728

Computer program generates a magnetic output tape containing time and averaged data values of a specified number of major frames over a specified time interval. A decommutation system is used to acquire the raw data, which is then reformatted and averaged.

B67-10414  
COMPUTER PROGRAM PROVIDES STEADY STATE ANALYSIS FOR LIQUID PROPELLANT PROPULSION SYSTEMS  
CLARK, R. L. /N. AM. AVIATION/ NOV. 1967  
MSC-10064

Computer program uses Bernoulli's formula and Newton-Raphson method to provide steady state fluid flow analysis of line pressure drop in a system with six outlets for each of two main storage tanks. Program flexibility arises in the ease with which changes in the fluid line geometry can be made.

B67-10415  
COMPUTER PROGRAM ANALYZES GENERALIZED ENVIRONMENTAL CONTROL AND LIFE SUPPORT SYSTEMS  
VAUGHAN, R. L. /DOUGLAS AIRCRAFT CO./ NOV. 1967  
MSC-1157

Versatile computer program analyzes environmental control and life support systems. The program permits changes of /1/ system component arrangements, /2/ component design details, and /3/ operating modes. It is written in Fortran IV language for use on the IBM 7094 computer.

B67-10450  
COMPUTER PROGRAM FPIP-REV CALCULATES FISSION PRODUCTS INVENTORY FOR U-235 FISSION  
BROWN, W. S. CALL, D. W. /WESTINGHOUSE ASTRONUCL. LAB./ NOV. 1967  
NUC-10089

Computer program calculates fission product inventories and source strengths associated with the operation of U-235 fueled nuclear power reactor. It utilizes a fission-product nuclide library of 254 nuclides, and calculates the time dependent behavior of the fission product nuclides formed by fissioning of U-235.

B67-10456  
COMPUTER PROGRAM MCAP-TOSS CALCULATES STEADY-STATE FLUID DYNAMICS OF COOLANT IN PARALLEL CHANNELS AND TEMPERATURE DISTRIBUTION IN SURROUNDING HEAT-GENERATING SOLID  
LEE, A. Y. /WESTINGHOUSE ASTRONUCL. LAB./ NOV. 1967  
NUC-10042

Computer program calculates the steady state fluid distribution, temperature rise, and pressure drop of a coolant, the material temperature distribution of a heat generating solid, and the heat flux distributions at the fluid-solid interfaces. It performs the necessary iterations automatically within the computer, in one machine run.

B67-10457  
COMPUTER PROGRAM MCAP PROVIDES FOR STEADY STATE THERMAL AND FLOW ANALYSIS OF MULTIPLE PARALLEL CHANNELS IN HEAT GENERATING SOLID  
PIERCE, B. L. /WESTINGHOUSE ASTRONUCL. LAB./  
DEC. 1967  
NUC-10043

Computer program /MCAP/ calculates the temperature distribution in a heat generating

solid complicated by nonuniform power and flow distributions between multiple channels. It determines the channel diameters coefficients, the effects of tolerances, the pressure drop at a given flowrate, or the flowrate for a specific pressure drop.

B67-10476

COMPUTER PROGRAM CONDUCTS FACILITIES UTILIZATION AND OCCUPANCY SURVEY

MINER, R. R. SPRAGUE, H. R. ZIMMERMAN, J. S.

DEC. 1967

NPO-10326

Computer program identifies the various uses of all facility rooms and provides information on the net area in each room as well as the number and classification of people occupying them. The program, which is easily updated, also provides a means to indicate unsatisfactory work areas.

B67-10478

KOPE /KALENDAR ORIENTED PROGRAM EFFORTS/ PROVIDES DATA FOR MANAGEMENT DECISIONS

KARKAINEN, T. A. /CHRYSLER CORP./ DEC. 1967

M-FS-12331

KOPE /Kalendar Oriented Program Efforts/ is a computer program that establishes controls over project efforts to assure management of meeting a specified completion date. With the appropriate input data, KOPE computes the starting and completion dates, the manning level for each activity, and the composite manning level for the program.

B67-10479

FORTRAN PROGRAM FOR TWO-IMPULSE RENDEZVOUS ANALYSIS

BARLING, W. H., JR. BROTHERS, W. J. /LOCKHEED

MISSILES AND SPACE CO./ DEC. 1967

M-FS-13971

Program determines if rendezvous in near space is possible, and performs an analysis to determine the approximate required values of the magnitude and direction of two thrust applications of the upper stage of a rocket firing. The analysis is performed by using ordinary Keplerian mechanics.

B67-10480

NUMERICAL LEAST-SQUARE METHOD FOR RESOLVING COMPLEX PULSE HEIGHT SPECTRA

SCHMADEBECK, R. TROMBKA, J. I. /MELPAR/ DEC.

1967

GSFC-10142

Linear least-square method resolves complex pulse height spectra, allowing for calculation of relative intensity, of statistical variance based on counting statistics of the correlation between library components, and of the goodness-of-fit chi square. Some applications are to gamma-ray, X-ray, and charged-particle spectroscopy.

B67-10489

COMPUTER PROGRAM CALCULATES SONIC-BOOM PRESSURE SIGNATURES

CRAIDON, C. B. DEC. 1967

LANGLEY-10096

Computer programs calculate sonic boom characteristics of airplane configurations for a range of flight conditions. One program provides the area distribution, and another program provides the equivalent area due to lift. Program outputs are the complete near field /or far field/ pressure signature, including shock wave strengths and locations.

B67-10490

COMPUTER PROGRAM USES CHARACTERISTICS METHOD FOR FREE-JET INVESTIGATION

CRAIDON, C. B. DEC. 1967

LANGLEY-10117

Computer program computes the free-jet boundary contours and other flow properties within the exhaust plume from highly underexpanded nozzles operating in near-vacuum conditions. The calculations are made by the method of characteristics which makes use of three-dimensional irrotational equations of flow.

B67-10492

COMPUTER PROGRAM REDUCES AND PROVIDES PROFILE PLOT OF SURFACE PLATE CALIBRATION DATA

REED, R. W. /N. AM. AVIATION/ DEC. 1967

M-FS-13866

Computer program which yields CRT displays will decrease the time and labor required to reduce and provide a profile plot of surface plate calibration data. The displays depict actual and resolved data points for each individually calibrated line.

B67-10493

ASSEMBLY PROCESSOR PROGRAM CONVERTS SYMBOLIC PROGRAMMING LANGUAGE TO MACHINE LANGUAGE

PELTO, E. V. /N. AM. AVIATION/ DEC. 1967

M-FS-13262

Assembly processor program converts symbolic programming language to machine language. This program translates symbolic codes into computer understandable instructions, assigns locations in storage for successive instructions, and computer locations from symbolic addresses.

B67-10494

COMPUTER PROGRAM PERFORMS AEROTHERMODYNAMIC FLIGHT TEST DATA CORRELATION

SCHMUS, F. SOWERS, D. A. /N. AM. AVIATION/ DEC.

1967

MSC-10075

Computer program plots flight test data /stored on magnetic tape during the flight/ with comparative data from other tapes /design and post-flight predictions/. Information as to which measurements are on each tape, the order in which they appear, and the exact time span is supplied by the source of the data.

B67-10495

MULTIDIMENSIONAL REACTION KINETIC ABLATION PROGRAM /REKAP/

ASTON, B. BINCK, E. COLLINGSWOOD, B. /GE/ DEC.

1967

MSC-10079

Multidimensional reaction kinetics ablation program provides an improved capability for analyzing thermal performance of partially penetrated charring ablator heat shields. The capability was provided for determining transient temperature histories in an ablating three-dimensional shape consisting of up to five layers of material.

B67-10504

COMPUTER PROGRAMS FOR ANTENNA FEED SYSTEM DESIGN AND ANALYSIS

LUDWIG, A. DEC. 1967

NPO-10359

Fourteen computer programs have been developed for antenna feed system design and analysis. The programs cover a large spectrum of feed design problems, from primary feed pattern synthesis to the farfield pattern of the main reflector, including analyses of structural distortions.

B67-10509

PROGRAM COMPUTES EQUILIBRIUM NORMAL SHOCK AND STAGNATION POINT SOLUTIONS FOR ARBITRARY GAS MIXTURES

CALLIS, L. B. KEMPER, J. T. DEC. 1967

LANGLEY-10090

Program computes solutions for flow parameters in arbitrary gas mixtures behind a normal and a reflected normal shock, for in-flight and shock-tube stagnation conditions. Equilibrium flow calculations are made by a free-energy minimization technique coupled with the steady-flow conservation equations and a modified Newton-Raphson iterative scheme.

B67-10510

PROBABILISTIC APPROACH TO LONG RANGE PLANNING OF MANPOWER

LEJK, R. A. /TEX. A AND M UNIV./ DEC. 1967

MSC-11524

Publication presents a total long range planning model for project oriented organizations. The

total model consists of planning systems which originate - /1/ at the project level and consolidate into an overall plan, and /2/ from a budgetary ceiling and allocate to the individual projects. Analysis of /1/ and /2/ is provided for management decision making.

B67-10511

LOGIC REALIZATION OF SIMPLE MAJORITY VOTING CONNECTIVES

ANDERSON, T. O. GOLOMB, S. W. LUSHBAUGH, W. A. DEC. 1967

JPL-727

Redundant circuitry is added to computer network to eliminate incorrect output obtained due to a component failure, noise, or some other disturbance. This circuitry provides majority operation. Only NAND gates are employed, and the modules used are among the most popular microelectronic or integrated circuits presently in use.

B67-10520

COMPUTER PROGRAM PERFORMS RECTANGULAR FITTING STRESS ANALYSIS

BERTRAND, A. R. /BOEING CO./ DEC. 1967

M-FS-13010

Computer program simulates specific bulkhead fittings by subjecting the desired geometry configuration to a membrane force, an external force, an external moment, an internal tank pressure, or any combination of the above. This program generates a general model of bulkhead fittings for the Saturn boosters.

B67-10521

GENERAL FREQUENCY RESPONSE PROGRAM CALCULATES FREQUENCY RESPONSE OF SYSTEM, OPEN AT ANY SPECIFIED ELEMENT

PROSCH, J. /BOEING CO./ DEC. 1967

M-FS-12817

The general frequency response program provides the frequency response of any linear feedback control system including the open loop control system. The system characteristic matrix, obtained from the Laplace transformations of the dynamic and control equations, is input to the program. A variety of outputs are available.

B67-10522

COMPUTERIZED SCHEDULE EFFECTIVENESS TECHNIQUE /SET/ DETERMINES PRESENT AND FUTURE SCHEDULE POSITION

BALLARD, D. BIRDSONG, J. CALVA, R. /BOEING CO./ DEC. 1967

M-FS-13012

Computerized scheduling system calculates an index of overall schedule effectiveness. The schedule-effectiveness index is a measurement of actual overall performance against the existing schedule, and a series of schedule-effectiveness values indicates the trend of actual performance. This computer program is written in Fortran IV.

B67-10523

ANALYSIS OF DYNAMIC SYSTEMS WITH DAP4H COMPUTER PROGRAM

ABSALOM, J. G. /N. AM. AVIATION/ DEC. 1967

M-FS-13999

Dynamic Analysis Program, Fortran IV Level H /DAP4H/, developed from 27 subprograms, features liberal use of the subroutines, subprograms, and skeletonization to minimize programming effort in formulating models of new systems and components. It formulates mathematical models of complex mechanical, pneumatic, and hydraulic dynamic systems.

B67-10524

DYANA - AN ADVANCED PROGRAMMING SYSTEM FOR LARGE CLASSES OF DYNAMIC AND EQUIVALENT SYSTEMS

MC CORMICK, W. J. /BOEING CO./ NOV. 1967

DYANA /dynamic analyzer/ is an advanced programming system which performs automatically the computing of a problem, as well as a major portion of the programming and analysis. The system is divided into time response and frequency response of dynamic and equivalent systems.

B67-10530

PROGRAM COMPUTES ZERO LIFT WAVE DRAG OF ENTIRE AIRCRAFT

CRAIDON, C. B. HARRIS, R. V., JR. DEC. 1967

LANGLEY-10079

Computer program computes zero lift wave drag of an entire aircraft including any combination of the wing, body, pods, fins, and canard. The program computes the external volume of the wing and the axial area distribution of the wing equivalent body.

B67-10531

COMPUTER PROGRAM PROVIDES IMPROVED LONGITUDINAL RESPONSE ANALYSIS FOR AXISYMMETRIC LAUNCH VEHICLES

SMITH, W. W. WALTON, W. C., JR. DEC. 1967

LANGLEY-10093

Computer program calculates axisymmetric launch vehicle steady-state response to axisymmetric sinusoidal loads. A finite element technique is utilized to construct the total launch vehicle stiffness matrix and mass matrix by subdividing the prototype structure into a set of /1/ - axisymmetric shell components, /2/ fluid components, and spring-mass components.

B67-10536

N-SAP AND G-SAP NEUTRON AND GAMMA RAY ALBEDO MODEL SCATTER FIELD ANALYSIS PROGRAM

SAPOVCHAK, B. J. STEPHENSON, L. D. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1967

NUC-10126

Computer program calculates neutron or gamma ray first order scattering from a plane or cylindrical surface to a detector point. The SAP Codes, G-SAP and N-SAP, constitute a multiple scatter albedo model shield analysis.

B67-10537

SOC-DS COMPUTER CODE PROVIDES TOOL FOR DESIGN EVALUATION OF HOMOGENEOUS TWO-MATERIAL NUCLEAR SHIELD

DISNEY, R. K. RICKS, L. O. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1967

NUC-10142

SOC-DS Code /Shield Optimization Code--

Direct Search/, selects a nuclear shield material of optimum volume, weight, or cost to meet the requirements of a given radiation dose rate or energy transmission constraint. It is applicable to evaluating neutron and gamma ray shields for all nuclear reactors.

B67-10543

COMPUTER PROGRAM CALCULATES PERIPHERAL WATER INJECTION COOLING OF AXISYMMETRIC SUBSONIC DIFFUSER

GREY, J. /GREYRAD CORP./ JAN. 1968

NUC-10541

Digital computer program calculates the cooling effectiveness and flow characteristics resulting from the mixing of a cool liquid injectant /water/ with a hot sonic or subsonic gas stream /hydrogen/. The output of the program provides pressure, temperature, velocity, density, composition, and Mach number profiles at any location in the mixing duct.

B67-10549

COMPUTER PROGRAM FOR OPTICAL SYSTEMS RAY TRACING

FERGUSON, T. J. KONN, H. JAN. 1968

FRC-10017

Program traces rays of light through optical systems consisting of up to 65 different optical surfaces and computes the aberrations. For design purposes, paraxial tracings with astigmatism and third order tracings are provided.

B67-10566

COMPUTER PROGRAM ETC IMPROVES COMPUTATION OF ELASTIC TRANSFER MATRICES OF LEGENDRE

POLYNOMIALS P/0/ AND P/1/ GIBSON, G. MILLER, M. /WESTINGHOUSE ASTRONUCL. LAB./ DEC. 1967

NUC-10070

Computer program ETC improves computation of elastic transfer matrices of Legendre polynomials

P/0/ and P/1/. Rather than carrying out a double integration numerically, one of the integrations is accomplished analytically and the numerical integration need only be carried out over one variable.

B67-10568

# GRAPHIC VISUALIZATION OF PROGRAM PERFORMANCE AIDS MANAGEMENT REVIEW

EISENHART, G. N. /AEROJET-GEN. CORP./ DEC. 1967  
NUC-10011

Chart technique /PERTREE/ which displays the essential status elements of a PERT system in a vertical flow array, of high graphic quality, enables visual review by management of program performance. Since the display is versatile, it can accommodate any aspect of the program which the presenter wishes to accent.

B67-10612

# EQUATION RELATES FLOW AT FREE JET TO FLOW DOWNSTREAM

FENWICK, J. R. /N. AM. AVIATION/ DEC. 1967  
M-FS-13789

Nonlinear equation relates the flowrate at an orifice to that at a station downstream from the orifice. This equation should aid in understanding combustion instabilities and should not be subject to the substantial errors of prior analytical methods.

B67-10625

# PROPELLANT TANK PRESSURIZATION ANALYSIS PROGRAM

EPSTEIN, M. /N. AM. AVIATION/ DEC. 1967  
M-FS-1506

Computer program for the analysis of a single propellant tank pressurization system includes many pertinent physical phenomena previously ignored in other mathematical models. This program can be used for analysis, simulation, and design of propellant pressurization systems.

B67-10626

# VERSATILE ANALOG PULSE HEIGHT COMPUTER PERFORMS REAL-TIME ARITHMETIC OPERATIONS

BRENNER, R. STRAUSS, M. G. DEC. 1967  
ARG-10052

Multipurpose analog pulse height computer performs real-time arithmetic operations on relatively fast pulses. This computer can be used for identification of charged particles, pulse shape discrimination, division of signals from position sensitive detectors, and other on-line data reduction techniques.

B67-10630

# COMPUTER PROGRAM FOR VIDEO DATA PROCESSING SYSTEM /VDPS/

BILLINGSLEY, F. C. NATHAN, R. DEC. 1967  
NPO-10042

Video data from spacecraft photographic mission telemetry is scanned to generate digital tape computer program which prints out intensity points, cleans noise and telemetry drop-out, enhances contrast, modifies the picture, and calculates contour lines. The output is converted into new photographic film.

B67-10631

# DIGITAL COMPUTER PROGRAM PREDICTS EFFECTS OF LOCAL PRESSURE TRANSIENTS ON DEFORMATION AND STRESSES IN CYLINDRICAL DUCTS

ECHENOZ, Y. LUBERACKI, W. PADLOG, J. REISMANN, H. /BELL AEROSYSTEMS CO./ DEC. 1967  
M-FS-13058

Digital computer program determines the dynamic response of circular cylinders subjected to pressure transient forms commonly encountered in propulsion systems. The method can be readily used to obtain solutions for all possible combinations of admissible boundary conditions.

B67-10632

# AUTOMATIC DESIGN OF OPTICAL SYSTEMS BY DIGITAL COMPUTER

CASAD, T. A. SCHMIDT, L. F. DEC. 1967  
NPO-10265

Computer program uses geometrical optical

techniques and a least squares optimization method employing computing equipment for the automatic design of optical systems. It evaluates changes in various optical parameters, provides comprehensive ray-tracing, and generally determines the acceptability of the optical system characteristics.

B67-10651

# DEVELOPMENT OF RELIABILITY PREDICTION TECHNIQUE FOR SEMICONDUCTOR DIODES

RYERSON, C. M. /HUGHES AIRCRAFT CO./ DEC. 1967  
SEE ALSO NASA-CR-702

GSFC-10231

New fundamental technique of reliability prediction for semiconductor diodes based on realistic mathematical models can be applied to component failure rate prediction including mechanical degradation, electrical degradation, environmental stress factors, and electrical load stress factors.

B67-10654

# X-Y PLOTTER ADAPTER DEVELOPED FOR SDS-930 COMPUTER

ROBERTSON, J. B. JAN. 1968  
NPO-10220

Graphical Display Adapter provides a real time display for digital computerized experiments. This display uses a memory oscilloscope which records a single trace until erased. It is a small hardware unit which interfaces with the J-box feature of the SDS-930 computer to either an X-Y plotter or a memory oscilloscope.

B67-10664

# DIGITAL PROGRAM ANALYZES SUPERSONIC FLOW

ELLIOTT, J. J. STROMSTA, R. R. /N. AM. AVIATION/ JAN. 1968  
M-FS-14292

Digital computer program analyzes the supersonic flow field within an axisymmetric, bell-shaped rocket nozzle for specified gas properties, nozzle geometry, and input or starting line. This program is written in Fortran II for the IBM 360 computer.

B67-10665

# COMPUTER PROGRAM CALCULATES GAMMA RAY SOURCE STRENGTHS OF MATERIALS EXPOSED TO NEUTRON FLUXES

HEISER, P. C. RICKS, L. O. /WESTINGHOUSE ASTRONUCL. LAB./ JAN. 1968  
NUC-10143

Computer program contains an input library of nuclear data for 44 elements and their isotopes to determine the induced radioactivity for gamma emitters. Minimum input requires the irradiation history of the element, a four-energy-group neutron flux, specification of an ally composition by elements, and selection of the output.

B67-10666

# COMPUTER PROGRAM CALCULATES WING AERODYNAMIC CHARACTERISTICS FOR FIXED WINGS WITH DIHEDRAL AND VARIABLE-SWEEP WINGS AT SUBSONIC SPEEDS

LAMAR, J. E. MARGASON, R. J. DEC. 1967  
LANGLEY-10191

Vortex lattice is used to describe the lifting surface of an arbitrary wing planform in steady potential subsonic compressible flow in computer program which calculates wing aerodynamic characteristics. Estimates of flow field characteristics in the vicinity of a lifting wing can also be programmed.

B67-10678

# COMPUTER PROGRAM /P1-GAS/ CALCULATES THE P-0 AND P-1 TRANSFER MATRICES FOR NEUTRON MODERATION IN A MONATOMIC GAS

COLLIER, G. GIBSON, G. /WESTINGHOUSE ASTRONUCL. LAB./ JAN. 1968  
NUC-10141

Fortran IV program /P1-GAS/ calculates the P-0 and P-1 transfer matrices for neutron moderation in a monatomic gas. The equations used are based on the conditions that there is isotropic scattering in the center-of-mass coordinate system, the scattering cross section is constant,

## 06 COMPUTER PROGRAMS

and the target nuclear velocities satisfy a Maxwellian distribution.

# SUBJECT INDEX

Cumulative Index to Tech Briefs

Issue 6

## Subject Index

The title of each Tech Brief is listed under several selected subject headings to provide the user with a variety of approaches in his search for specific information. The Tech Brief number, e.g., B67-10148, is located under and to the right of the title and is followed by a two-digit number, e.g., 05, which designates the subject category in which the entire entry can be found.

## A

### ABLATING MATERIAL

Computer simulation program is adaptable to industrial processes  
LEWIS-240 B66-10426 01

High intensity radiation heat source is capable of sustained operation  
ARC-61 B66-10547 02

Sensors measure surface ablation rate of reentry vehicle heat shield  
LANGLEY-287 B66-10592 01

New class of thermosetting plastics has improved strength, thermal and chemical stability  
LEWIS-10108 B67-10197 03

Improved compression molding process  
LANGLEY-10027 B67-10302 03

### ABLATION

Computational procedure for finite difference solution of one-dimensional heat conduction problems reduces computer time  
MSC-1120 B66-10566 01

Multidimensional reaction kinetic ablation program /REKAP/  
MSC-10079 B67-10495 06

### ABRASION

Portable sandolaster cleans small areas  
MSC-523 B66-10242 05

### ABRASIVE

Cracks in glass electrical connector headers removed by dry blasting with fine abrasive  
LEWIS-381 B67-10148 03

### ABSORBER

Kinetic-energy absorber employs frictional force between mating cylinders  
LEWIS-75 B63-10442 05

Bellows joint absorbs torsional deflections in duct system  
M-FS-882 B66-10332 05

Electron beam standby absorber system

M-FS-14108 B67-10650 01

### ABSORPTION

Bidirectional torque filter eliminates backlash  
GSFC-335 B65-10148 05

Removable well in reaction flask facilitates carbon dioxide collection  
ARC-47 B65-10316 03

Hole saw drill attachment has zero force reaction  
MSC-543 B66-10604 05

### ABSORPTION SPECTRUM

A radiometer-pyrometer  
LEWIS-284 B66-10606 01

Status of ultrachemical analysis for semiconductors  
M-FS-2254 B67-10138 03

### ACCELERATION

Low-cost tape system measures velocity of acceleration  
GSFC-85 B63-10512 01

Rectilinear display gives acceleration load factor and velocity information  
MSC-1045 B67-10248 01

### ACCELERATION PROTECTION

Friction brake cushions acceleration and vibration loads  
MSC-715 B66-10608 05

### ACCELEROMETER

Crystal measures short-term, large-magnitude forces  
JPL-77 B65-10187 01

Simple device produces accelerometer calibration pulse  
M-FS-363 B65-10269 01

Miniature servo accelerometer is force-balanced  
JPL-155 B65-10340 01

Tool enables proper mating of accelerometer and cable connector  
M-FS-611 B66-10208 05

Damping technique gives accelerometer flat frequency response  
M-FS-471 B66-10293 01

Rectilinear accelerometer possesses self-calibration feature  
M-FS-1480 B66-10452 01

Instrument automatically selects peak acceleration signal from several accelerometers  
JPL-816 B66-10462 01

Miniature capacitive accelerometer is especially applicable to telemetry  
ARC-72 B66-10491 01

Low level accelerometer test methods are investigated  
M-FS-908 B66-10510 01

Miniature piezoelectric triaxial accelerometer measures cranial accelerations ARC-71 B66-10534	01	NUC-10143	B67-10665	06
Instrument sequentially samples ac signals from several accelerometers JPL-884 B67-10029	01	<b>ACTIVATION ENERGY</b> Electrically controlled optical latch and switch requires less current JPL-SC-111 B66-10414		01
Fixture tests bellows reliability through repetitive pressure/temperature cycling MSC-1176 B67-10111	01	<b>ACTUATOR</b> Stepping switch with simple actuator provides many contacts in small space JPL-122 B63-10118		01
<b>ACCUMULATOR</b> High-pressure regulating system prevents pressure surges JPL-231 B63-10170	05	Three-position rocker switch actuator has positive centering MSC-261 B65-10376		01
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<b>ACETONE</b> Freon provides heat transfer for solid CO2 calibration standard M-FS-644 B66-10257	02	Fluid logic control circuit operates nutator actuator motor LEWIS-294 B66-10593		05
<b>ACETYLENE</b> Miniature oxygen-hydrogen cutting torch constructed from hypodermic needle JPL-545 B63-10517	05	Fuel and oxidizer valve assembly employs single solenoid actuator MSC-1046 B66-10648		05
<b>ACID</b> Nonhazardous acid etches weld samples M-FS-975 B66-10378	05	Actuator device schedules rate of valve closure M-FS-1556 B66-10686		05
Acid spray technique mills aluminum alloy materials without immersion M-FS-12500 B67-10463	03	Low speed, long term tracking electric drive system has zero backlash NPO-10173 B67-10220		01
<b>ACOUSTIC ATTENUATION</b> Transistor biased amplifier minimizes diode discriminator threshold attenuation ARG-163 B67-10311	01	<b>ADAPTATION</b> Adapter assembly prevents damage to tubing during high pressure tests MSC-563 B66-10330		05
<b>ACOUSTIC GENERATOR</b> Device detects unbonded areas in plastic laminates WOO-206 B65-10380	01	<b>ADAPTIVE CONTROL SYSTEM</b> Adaptive control circuit prevents amplifier saturation ERC-10026 B67-10648		02
System enables more complete calibrations of dynamic-pressure transducers M-FS-2063 B67-10099	01	<b>ADDITIVE</b> Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application LANGLEY-6A B63-10318		03
<b>ACOUSTIC RADIATION</b> Ultrasonic emission method enables testing of adhesive bonds M-FS-799 B66-10341	01	<b>ADHESION</b> Electrolytic etching process provides effective bonding surface on stainless steel GSFC-484 B66-10299		03
<b>ACOUSTIC SIMULATION</b> Electronic dummy for acoustical testing MSC-206 B67-10298	01	Ultrasonic emission method enables testing of adhesive bonds M-FS-799 B66-10341		01
<b>ACOUSTIC STABILITY</b> Damping technique gives accelerometer flat frequency response M-FS-471 B66-10293	01	Dot patterns provide reproducible flaw areas for study of adhesive bonds M-FS-862 B66-10367		05
<b>ACOUSTICS</b> Study made of acoustical monitoring for mechanical checkout M-FS-13372 B67-10430	02	Technique for measuring magnetic tape interlayer adhesion NPO-10011 B67-10417		03
<b>ACTIVATION ANALYSIS</b> Wear studies made of slip rings and gas bearing components M-FS-12882 B67-10403	05	<b>ADHESIVE</b> Screening technique makes reliable bond at room temperature M-FS-227 B65-10004		03
Computer program calculates gamma ray source strengths of materials exposed to neutron fluxes		Improved conductive paste secures biomedical electrodes MSC-107 B65-10015		03
		Adhesive for vacuum environments resists shock and vibration		



## SUBJECT INDEX

## AIRCRAFT DETECTION

MSC-56	B65-10016	03	AERODYNAMICS		
Peel resistance of adhesive bonds accurately measured			Averaging probe reduces static-pressure sensing errors		
GSFC-320	B65-10173	03	LANGLEY-36	B65-10114	05
Electronic modules easily separated from heat sink			AEROSOL		
MSC-142	B65-10186	02	Improved atmospheric particle analyzer	B67-10231	01
Fastener distributes stress evenly from sandwich-panel-hung items			AGING		
MSC-236	B65-10358	05	Thermal stress-relief treatments for 2219 aluminum alloy are evaluated	B66-10448	03
Adhesive-backed terminal board eliminates mounting screws			Treatment increases stress-corrosion resistance of aluminum alloys		
MSC-173	B65-10396	01	M-FS-1840	B66-10595	05
Improved electrode paste provides reliable measurement of galvanic skin response			Excellent spring properties developed in two nickel alloys for use at cryogenic temperatures		
MSC-146	B66-10049	04	NUC-10084	B67-10349	03
Compound improves thermal interface between thermocouple and sensed surface			AIR		
NU-0028	B66-10121	02	Rapid helium-air analyzer can measure other binary gas mixtures		
Improved adhesive for cryogenic applications cures at room temperature			LANGLEY-16	B63-10557	03
WOO-132	B66-10185	03	Device induces lungs to maintain known constant pressure		
Mylar film eliminates silk screening of equipment panels			MSC-50	B64-10108	04
MSC-798	B66-10455	05	Pneumatic power is transmitted through air bearing		
Adhesive for polyester films cures at room temperature, has high initial tack			MSC-8	B64-10141	05
M-FS-938	B66-10487	03	Thermistor connector assembly increases accuracy of measurements		
Resistance heating releases structural adhesive			LANGLEY-62	B65-10045	01
M-FS-1607	B67-10045	05	Averaging probe reduces static-pressure sensing errors		
Nonwoven glass fiber mat reinforces polyurethane adhesive			LANGLEY-36	B65-10114	05
M-FS-2309	B67-10113	03	Air bearing provides friction-free support for shaker system slip table		
Flowmeter determines mix ratio for viscous adhesives			NU-0086	B66-10708	05
M-FS-2308	B67-10378	01	AIR CONDITIONING		
Adhesives for laminating polyimide insulated flat conductor cable			New nut and sleeve improve flared connections		
M-FS-12066	B67-10429	03	M-FS-194	B65-10180	05
Solvent permits solid curing agents to be used at room temperatures			AIR CURRENT		
M-FS-13434	B67-10593	03	Electron beam seals outer surfaces of porous bodies		
Synthesis of pure aromatic glycidyl esters for use as adhesives			M-FS-562	B66-10033	03
M-FS-12705	B67-10647	03	AIR PURIFICATION		
ADSORPTION			Gas diffusion cell removes carbon dioxide from occupied airtight enclosures		
Radioactive method enables determination of surface areas rapidly and accurately			MSC-118	B64-10319	03
NU-0088	B66-10710	03	AIR SAMPLING		
AERIAL PHOTOGRAPHY			Air sampler collects and protects minute particles		
Aerial-image enables diagrams and animation to be inserted in motion pictures			HQ-10037	B67-10661	01
ARG-165	B67-10398	02	AIRBORNE EQUIPMENT		
AERODYNAMIC CHARACTERISTICS			Frequency offset in linear FM/CW transponder eliminates clutter		
Computer program calculates wing aerodynamic characteristics for fixed wings with dihedral and variable-sweep wings at subsonic speeds			M-FS-249	B65-10146	01
LANGLEY-10191	B67-10666	06	AIRCRAFT		
AERODYNAMIC HEATING			Device measures fluid drag on test vehicles		
Instrument accurately measures small temperature changes on test surface			LANGLEY-34	B65-10195	01
LANGLEY-174	B66-10637	01	Drill bit design assures clean holes in laminated materials		
AERODYNAMIC NOISE			WOO-098	B65-10386	05
Study of hot wire techniques in low density flows with high turbulence levels			Program computes zero lift wave drag of entire aircraft		
M-FS-1269	B66-10687	01	LANGLEY-10079	B67-10530	06
			AIRCRAFT DETECTION		
			Frequency offset in linear FM/CW transponder eliminates clutter		
			M-FS-249	B65-10146	01

## AIRCRAFT INSTRUMENT

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## AIRCRAFT INSTRUMENT

FM/CW system measures aircraft attitude  
M-FS-276 B65-10290 01

## AIRCRAFT INSTRUMENTATION

FM/CW system measures aircraft attitude  
M-FS-276 B65-10290 01

## AIRFRAME

Material fatigue data obtained by card-  
programmed hydraulic loading system  
LANGLEY-10042 B67-10491 03

## ALBEDO

N-SAP and G-SAP neutron and gamma ray  
albedo model scatter shield analysis program  
NUC-10126 B67-10536 06

## ALGEBRA

Algebraic Monte Carlo procedure reduces  
statistical analysis time and cost factors  
M-FS-1887 B67-10434 01

## ALGORITHM

Computer program calculates monotonic  
maximum likelihood estimates using method  
of reversals  
M-FS-1516 B67-10136 01

## ALIGNMENT

Design of valve permits sealing even if the  
stem is misaligned  
LEWIS-38 B63-10341 05

Novel clamps align large rocket cases,  
eliminate back-up bars  
M-FS-1 B63-10376 05

Mirror device aligns machine surface  
perpendicular to sight lines  
WOO-5 B63-10421 02

Guide for extrusion dies eliminates  
straightening operation  
LEWIS-152 B64-10014 05

Attachment converts microscope to point source  
autocollimator  
JPL-499 B64-10124 05

Light ray modulation controls optical system  
alignment  
GSFC-171 B65-10211 02

Titanium diaphragm makes excellent amplatron  
cathode support  
GSFC-394 B65-10298 01

Photosensors used to maintain welding  
electrode-to-joint alignment  
MSC-243 B65-10401 05

Instrument quickly transposes ground reference  
target to eye level  
MSC-275 B66-10061 05

Threaded pilot insures cutting tool  
alignment  
M-FS-527 B66-10074 05

Tool enables proper mating of accelerometer  
and cable connector  
M-FS-611 B66-10208 05

Adjustable cutting guide aligns and positions  
stacks of material  
MSC-321 B66-10210 05

Fastener provides for bolt misalignment and  
quick release of flange  
NU-0074 B66-10275 05

Friction loading device enables accurate  
testing of brittle materials  
NU-0051 B66-10345 05

Direction indicator system does not require  
complicated optics  
WOO-305 B66-10407 01

Alignment tool facilitates pin placement on  
irregular horizontal surfaces  
LANGLEY-219 B66-10410 05

Heavy duty precision leveling jacks expedite  
setup time on horizontal boring mill  
M-FS-1084 B66-10411 05

Simplified fixture permits precision  
alignment of an optical target  
M-FS-1181 B66-10556 01

Turbine blade root design concept promises  
superior alignment  
M-FS-1685 B66-10620 05

Visual attitude orientation and alignment  
system  
MSC-647 B67-10120 02

Precision metal molding  
M-FS-13305 B67-10423 05

Connector shorting cap provides pin  
alignment, inspection, and stray voltage  
protection  
M-FS-13111 B67-10635 01

Telescope mount with azimuth-only primary  
NPO-10468 B67-10671 02

## ALKALI

Composite seal reduces alkaline battery  
leakage  
GSFC-337 B65-10271 01

## ALKALI METAL

Apparatus enables accurate determination of  
alkali oxides in alkali metals  
LEWIS-256 B66-10296 03

Process for preparing dispersions of  
alkali metals  
JPL-734 B66-10639 03

Radiation counting technique allows density  
measurement of metals in high-pressure -  
high-temperature environment  
ARG-124 B67-10316 02

## ALLOY

Integral coolant channels simply made by melt-  
out method  
M-FS-91 B63-10497 05

Titanium treatment improves brazed joints  
MSC-127 B65-10153 05

Single-crystal semiconductor films grown on  
foreign substrates  
WOO-076 B66-10225 01

Braze alloys used as temperature indicators  
NU-0063 B66-10274 01

Tantalum alloys resist creep deformation at  
elevated temperatures  
LEWIS-350 B66-10558 03

Recommended values of the thermophysical  
properties of eight alloys, their major  
constituents and oxides  
NU-0095 B67-10062 03

Thermodynamic properties of solid palladium-  
silver alloys and other alloys are  
investigated by torsion-effusion technique  
ARG-277 B67-10324 03

## ALPHA RADIATION

Alpha particle backscattering measurements  
used for chemical analysis of surfaces  
ARG-116 B67-10186 03

## ALTERNATING CURRENT /AC/

Dc to ac converter operates efficiency at  
low input voltages  
GSFC-130 B65-10178 01

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## ALUMINUM ALLOY

Field effect transistor presents high input impedance in ac amplifier JPL-500	B65-10232	01	Electroless nickel resist used in alkali-etching of aluminum GSFC-284	B65-10162	03
High-speed square-wave current limiter operates efficiently JPL-SC-073	B65-10233	01	Epoxy-resin patterns speed shell-molding of aluminum parts M-FS-303	B65-10177	05
Dual-voltage power supply has increased efficiency LEWIS-107A	B66-10002	01	Anodization process produces opaque, reflective coatings on aluminum M-FS-348	B65-10336	03
Two-light circuit continuously monitors ac ground, phase, and neutral wires MSC-356	B66-10163	01	Electromagnetic hammer removes weld distortions from aluminum tanks M-FS-287	B65-10342	05
Substituting transistor for diode improves rectifying means GSFC-474	B66-10295	01	Aluminized fiberglass insulation conforms to curved surfaces M-FS-477	B66-10024	03
Electronic bidirectional valve circuit prevents crossover distortion and threshold effect MSC-193	B65-10420	01	Cryogenic trap valve has no moving parts M-FS-487	B66-10136	05
Rectilinear accelerometer possesses self-calibration feature M-FS-1480	B66-10452	01	Aluminum doping improves silicon solar cells LEWIS-206	B66-10181	02
Instrument automatically selects peak acceleration signal from several accelerometers JPL-816	B66-10462	01	Jig protects transistors from heat while tinning leads MSC-515	B66-10240	05
Solid state circuit switches ac load JPL-798	B66-10465	01	Fixed vacuum plate clamps styrofoam for machining M-FS-683	B66-10283	05
Simple technique determines ac properties of hard superconductive materials M-FS-1818	B66-10657	02	Chemical milling solution produces smooth surface finish on aluminum MSC-549	B66-10312	03
Stable ac phase and amplitude comparator M-FS-13086	B67-10459	01	Brazing process provides high-strength bond between aluminum and stainless steel M-FS-803	B66-10352	05
<b>ALTERNATING CURRENT GENERATOR</b>			Self-supported aluminum thin films produced by vacuum deposition process ARC-58	B66-10387	03
New low level ac amplifier provides adjustable noise cancellation and automatic temperature compensation ARC-2	B63-10003	04	System for etching thick aluminum layers minimizes bridging and undercutting M-FS-1366	B66-10400	03
<b>ALTIMETER</b>			New backup-bar groove configuration improves heliarc welding of 2014-T6 aluminum MSC-806	B66-10443	05
Frequency offset in linear FM/CW transponder eliminates clutter M-FS-249	B65-10146	01	Heat treatment stabilizes welded aluminum jig and tool structures MSC-800	B66-10458	03
<b>ALTITUDE</b>			Continuous internal channels formed in aluminum fusion welds M-FS-2399	B67-10183	05
Scanning photometer system automatically determines atmospheric layer height MSC-245	B66-10170	01	Aluminum-titanium hydride-boron carbide composite provides lightweight neutron shield material NUC-10069	B67-10265	03
<b>ALUMINUM</b>			Pipe joints reinforced in place with fitted aluminum sleeves MSC-11109	B67-10271	05
Chain friction system gives positive, reversible drive ARC-8	B63-10009	05	Study made of anodized aluminum circuit boards M-FS-13580	B67-10425	01
Helical tube separates nitrogen gas from liquid nitrogen JPL-398	B63-10251	05	Aluminum and stainless steel tubes joined by simple ring and welding process M-FS-13120	B67-10472	05
Portable flooring protects finished surfaces, is easily moved M-FS-15	B63-10387	05	Lead plated aluminum ring provides static high pressure seal for large diameter pressure vessel NUC-10008	B67-10539	05
Built-in templates speed up process for making accurate models LANGLEY-23	B63-10526	05	Study of corrosion of 1100 aluminum ARG-10045	B67-10578	03
Stringent cleaning technique assures reliable epoxy bond GSFC-161	B64-10142	03	<b>ALUMINUM ALLOY</b>		
Magnetic field test coils are temperature compensated GSFC-294	B65-10081	02	Lightweight aluminum casting alloy is useful		
Galvanic corrosion reduced in aluminum fabrications M-FS-272	B65-10140	03			

at cryogenic temperatures M-FS-267	B65-10092	03	ALUMINUM CHLORIDE Crack detection method is safe in presence of liquid oxygen M-FS-236	B65-10107	03
Aluminum alloys protected against stress- corrosion cracking M-FS-235	B65-10172	03	ALUMINUM OXIDE Gate valve with ceramic-coated base operates at high temperatures ARC-23	B63-10562	03
White primer permits a corrosion-resistant coating of minimum weight M-FS-304	B66-10207	03	Fabrication method produces high-grade alumina crucibles M-FS-216	B65-10078	05
Brazing process using Al-Si filler alloy reliably bonds aluminum parts MSC-448	B66-10241	05	Aluminum oxide filler prevents obstructions in tubing during welding MSC-222	B66-10125	05
Aluminum/steel wire composite plates exhibit high tensile strength M-FS-401	B66-10262	05	Chromium oxide coatings improve thermal emissivity of alumina WOD-263	B66-10227	03
Differential expansion provides pressure for diffusion bonding of large diameter rings M-FS-588	B66-10269	05	Rubber and alumina gaskets retain vacuum seal in high temperature EMF cell ARG-17	B66-10472	05
Aluminum core structures brazed without use of flux M-FS-659	B66-10360	05	Tritiated alumina serves as reagent for self-labeling analysis ARG-209	B67-10315	03
Weldable aluminum alloy has improved mechanical properties M-FS-295	B66-10445	03	Flame sprayed dielectric coatings improve heat dissipation in electronic packaging M-FS-13569	B67-10534	01
Thermal stress-relief treatments for 2219 aluminum alloy are evaluated M-FS-1213	B66-10448	03	AMERICIUM Apparatus for fabrication of americium- beryllium neutron sources prevents capsule contamination ARG-184	B67-10202	05
Electroless nickel plating on stainless steels and aluminum GSFC-533	B66-10479	03	AMERICIUM 241 Low-energy gamma ray inspection of brazed aluminum joints MSC-1189	B67-10337	02
Treatment increases stress-corrosion resistance of aluminum alloys M-FS-1840	B66-10595	05	Neutron irradiation of Am241 effectively produces curium ARG-10030	B67-10501	03
New weldable high strength aluminum alloy developed for cryogenic service M-FS-737	B66-10613	05	AMOEBAS Liquid micrurgy chamber and microsyringe designs allow more efficient micromanipulations ARG-251	B67-10305	04
Tests show that aluminum welds are improved by bead removal M-FS-1817	B67-10023	05	AMPLIFICATION FACTOR Temperature transducer has high output, is time stable GSFC-446	B65-10362	01
Materials data handbooks prepared for aluminum alloys 2014, 2219, and 5456, and stainless steel alloy 301 M-FS-1959	B67-10089	03	AMPLIFIER Transfluxor circuit amplifies sensing current for computer memories JPL-406	B63-10255	01
Heat treatment study of aluminum casting alloy M45 M-FS-2397	B67-10159	03	Improved variable-reluctance transducer meas- ures transient pressures LANGLEY-10	B63-10321	01
Effect of welding position on porosity formation in aluminum alloy welds M-FS-2318	B67-10177	05	Digital logic elements provide additional functions from analog input MSC-64	B64-10064	01
Materials data handbook, aluminum alloy 7075 M-FS-2349	B67-10301	03	Improved insertion-loss tester JPL-358	B64-10080	01
Study made of ductility limitations of aluminum-silicon alloys M-FS-12524	B67-10392	03	Field-effect transistor improves electrometer amplifier ARC-36	B64-10143	01
Corrosion of aluminum alloys by chlorinated hydrocarbon/methanol mixtures MSC-11365	B67-10442	03	Stepping motor drive circuit designed for low power drain GSFC-198	B65-10026	01
Acid spray technique mills aluminum alloy materials without immersion M-FS-12500	B67-10463	03	Phase detector circuit synthesizes own reference signal M-FS-247	B65-10080	01
Study of stress corrosion in aluminum alloys M-FS-13906	B67-10533	03	Traveling-wave tube circuit simplifies		
Study of crevice-galvanic corrosion of aluminum ARG-10013	B67-10583	03			

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## ANALYTIC FUNCTION

microwave relay GSFC-299	B65-10127	01	M-FS-1769	B66-10636	01
Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01	Analog voicing detector responds to pitch GSFC-10085	B67-10571	01
Logarithmic amplifier uses field effect transistors JPL-509	B65-10145	01	Versatile analog pulse height computer performs real-time arithmetic operations ARG-10052	B67-10626	06
Digital system provides superregulation of nanosecond amplifier-discriminator circuit ARG-61	B66-10500	01	ANALOG DATA		
Electrometer amplifier operates over dynamic range of five orders of magnitude ARC-75	B67-10199	01	Digital logic elements provide additional functions from analog input MSC-64	B64-10064	01
Amplifier provides dual outputs from a single source with complete isolation NUC-10056	B67-10221	01	Auxiliary circuit enables automatic monitoring of EKG MSC-106	B65-10142	01
Absolute frequency stabilization of laser oscillator against laser amplifier M-FS-2559	B67-10255	01	Fast-response frequency-to-analog converter M-FS-709	B67-10257	01
SiC/Si diode trigger circuit provides automatic range switching for log amplifier M-FS-1879	B67-10314	01	Automatic testing device facilitates noise checks and electronic calibrations LEWIS-10173	B67-10467	01
Field effect transistors improve buffer amplifier M-FS-916	B67-10334	01	ANALOG SIMULATION		
Review of research and development in fluid logic elements M-FS-420	B67-10438	01	Analog device simulates physiological waveforms MSC-51	B64-10109	01
Series transistors isolate amplifier from flyback voltage MSC-11023	B67-10468	01	Analog solar system model relates celestial bodies spatially JPL-195	B66-10413	01
Improved circuit for measuring capacitive and inductive reactances M-FS-13083	B67-10513	01	Study made of application of stereoscopic display system to analog computer simulation M-FS-1263	B66-10590	01
Analog buffer isolates high impedance source from low impedance load M-FS-13481	B67-10544	01	ANALOG-TO-DIGITAL CONVERTER		
Adaptive control circuit prevents amplifier saturation ERC-10026	B67-10648	02	Pneumotachometer counts respiration rate of human subject MSC-92	B64-10259	01
AMPLITUDE			Analog-to-digital converter has increased reliability and reduced power consumption GSFC-246	B65-10194	01
Device calibrates vibration transducers at amplitudes up to 20g M-FS-86	B63-10572	01	Simple pulse counting circuit computes sum of squares GSFC-391	B65-10260	01
System precisely controls oscillation of vibrating mass M-FS-1875	B67-10276	01	Electronic ohmmeter provides direct digital output GSFC-363	B65-10274	01
Transient sensor development M-FS-13370	B67-10471	01	Nonlinear feedback reduces analog-to-digital converter error ARC-46	B65-10277	01
AMPLITUDE MODULATION			Variable word length encoder reduces TV bandwidth requirements LANGLEY-87	B65-10345	01
Solid-state laser transmitter is amplitude modulated MSC-121	B65-10238	01	FET comparator detects analog signal levels without loading analog device M-FS-503	B66-10224	01
Amplifier provides dual outputs from a single source with complete isolation NUC-10056	B67-10221	01	Simple first order data compression processor concept NPD-10338	B67-10553	01
Stable ac phase and amplitude comparator M-FS-13086	B67-10459	01	Improved digital TV encoding and decoding system MSC-11147	B67-10562	01
ANALOG COMPUTER			ANALYTIC FUNCTION		
Hybrid computer technique yields random signal probability distributions ARC-34	B65-10208	01	Computer program performs flow analysis through turbines LEWIS-236	B66-10496	01
FET comparator detects analog signal levels without loading analog device M-FS-503	B66-10224	01	An orthonormalization procedure for multivariable function approximation M-FS-1313	B66-10579	01
Automatic system determines moments of inertia of asymmetrical objects			Analytical drafting curves provide exact equations for plotted data LANGLEY-285	B67-10601	02

## ANALYZER

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## ANALYZER

Pulse height analyzer operates at high repetition rates, low power  
W00-046 B65-10041 01

Multiaxial analyzer detects low-energy electrons  
GSFC-329 B65-10213 01

Highly sensitive solids mass spectrometer uses inert-gas ion source  
ERC-11 B66-10114 02

Single channel pulse-height analyzer operates in subnanosecond range  
LEWIS-267 B66-10377 01

A calibration means for spectrum analyzers  
MSC-10987 B67-10254 01

Spectrophotometric technique quantitatively determines NaMBT inhibitor in ethylene glycol-water solutions  
MSC-11496 B67-10573 03

**ANEMOMETER**  
New anemometer has fast response, measures dynamic pressure directly  
LANGLEY-28 B63-10530 05

**ANESTHESIOLOGY**  
Test monkeys anesthetized by routine procedure  
HQ-18 B65-10332 04

**ANGULAR ACCELERATION**  
Switching mechanism senses angular acceleration  
GSFC-462 B66-10158 01

**ANGULAR MOTION**  
System measures angular displacement without contact  
LANGLEY-46 B65-10073 01

Universal bellows joint restraint permits angular and offset movement  
W00-102 B65-10371 05

Mount enables precision adjustment of optical-instrumentation mirror  
MSC-184 B66-10199 02

Modified hydraulic braking system limits angular deceleration to safe values  
GSFC-476 B66-10310 05

Motion drive system is accurately controlled in the 1-micron range  
JPL-864 B66-10695 05

**ANIMAL STUDY**  
A technique for making animal restraints  
ARC-25 B63-10564 05

**ANNULAR FLOW**  
Miniature valve accurately controls small volume fluid flow  
ARG-66 B66-10473 05

**ANNULAR PLATE**  
Fastener provides cooling and compensates for thermal expansion  
NU-0003 B65-10038 05

**ANODE**  
Tantalum cathode improves electron-beam evaporation of tantalum  
JPL-W00-021 B65-10175 03

Titanium diaphragm makes excellent amplatron cathode support  
GSFC-394 B65-10298 01

Anodization process produces opaque, reflective coatings on aluminum  
M-FS-348 B65-10336 03

X-ray source uses interchangeable target anodes to vary X-ray wavelength

NPD-10036 B67-10218 02

Water cooled anode increases life of high temperature arc lamp  
NPD-10180 B67-10247 02

**ANTENNA**  
Polychart contour plotter enables data extrapolation from multiple plotting charts  
M-FS-37 B64-10406 05

Helical coaxial-resonator makes excellent RF filter  
GSFC-243 B65-10012 01

Oceanborne transponder platform has good stability  
M-FS-171 B65-10035 05

Sheet metal strip unrolls to form circular boom  
GSFC-423 B66-10032 05

Modified hydraulic braking system limits angular deceleration to safe values  
GSFC-476 B66-10310 05

Movable RF probe eliminates need for calibration in plasma accelerators  
LEWIS-10127 B67-10362 01

Computer programs for antenna feed system design and analysis  
NPD-10359 B67-10504 06

Broadband choke suppresses spurious currents in antenna structure  
MSC-10013 B67-10675 01

**ANTENNA ARRAY**  
Modified interelement spacing improves Yagi antenna array  
LANGLEY-130 B65-10183 01

**ANVIL**  
Low power heating element provides thermal control during swaging operations  
M-FS-457 B66-10206 05

**APERTURE**  
Micromachining produces optical apertures to micron dimensions  
GSFC-206 B64-10211 05

Submicron holes in thin films increase sampling range of mass spectrometers  
JPL-SC-097 B66-10380 03

A conceptual, parallel operating data compression processor  
NPD-10068 B67-10204 01

**APOLLO PROJECT**  
Spiral spring/strain gage combination accurately measures shock induced deflection  
MSC-789 B66-10488 01

**APOLLO SPACECRAFT**  
Predicting surface heating rates and pressures resulting from hot exhaust gases  
MSC-971 B66-10633 05

Analytical technique characterizes all trace contaminants in water  
MSC-11032 B67-10243 03

**APPROXIMATION METHOD**  
An orthonormalization procedure for multivariable function approximation  
M-FS-1313 B66-10579 01

**ARC DISCHARGE**  
Improved carbon electrode reduces arc sputtering  
MSC-219 B66-10026 01

**ARC GENERATOR**  
Magnetic field controls carbon arc tail flame  
MSC-139 B65-10108 01

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## AUDIOFREQUENCY

ARC HEATING			JPL-892	B67-10168	03			
Carbon arc ignition improved by simple auxiliary circuit	MSC-103	B65-10018	01	ASBESTOS				
Electric arc heater is self starting	LANGLEY-208	B66-10230	03	Improved method facilitates debulking and curing of phenolic impregnated asbestos	B66-10459	05		
Experimental investigation of megawatt dc arc heating of nitrogen	LEWIS-313	B66-10508	02	A ceramic composite thermal insulation	M-FS-13991	B67-10608	03	
Laboratory arc furnace features interchangeable hearths	ARG-125	B67-10052	05	ASTRONAUT PERFORMANCE				
ARC LAMP			Helmet system broadcasts electroencephalograms of wearer			ARC-70	B66-10536	01
Water cooled anode increases life of high temperature arc lamp	NPD-10180	B67-10247	02	ATMOSPHERE				
ARC MELTING			Scanning photometer system automatically determines atmospheric layer height			MSC-245	B66-10170	01
High-strength tungsten alloy with improved ductility	LEWIS-10257	B67-10340	03	ATMOSPHERIC ENTRY				
ARC WELDING			High intensity radiation heat source is capable of sustained operation			ARC-61	B66-10547	02
Photosensors used to maintain welding electrode-to-joint alignment	MSC-243	B65-10401	05	ATMOSPHERIC PRESSURE				
Fingertip current control facilitates use of arc welding gun	MSC-289	B66-10092	05	Segmented electrode increases operating pressure of MHD accelerator	LANGLEY-95	B65-10356	02	
Standard arc welders provide high amperage direct current source	LANGLEY-267	B66-10441	01	Process reduces secondary resonant emission in electronic components	JPL-934	B66-10685	01	
Opposed arcs permit deep weld penetration with only one pass	M-FS-1696	B66-10513	05	ATMOSPHERIC TURBULENCE				
Power arc welder touch-started with consumable electrode	M-FS-1485	B66-10641	05	Rough surface improves stability of air-sounding balloons	M-FS-320	B65-10326	05	
ARGON			ATTENUATOR					
Argon purge gas cooled by chill box	M-FS-560	B66-10153	02	Electrometer amplifier operates over dynamic range of five orders of magnitude	ARC-75	B67-10199	01	
Simple device facilitates inert-gas welding of tubes	M-FS-558	B66-10155	05	Combined attenuator and latch for cartridge powered actuator	MSC-11242	B67-10488	05	
Cold trap increases sensitivity of gas chromatograph	M-FS-1617	B66-10517	03	ATTITUDE CONTROL				
Study made of heat transfer and pressure drop through tubes with internal interrupted fins	LEWIS-10280	B67-10555	05	Rectilinear display gives acceleration load factor and velocity information	MSC-1045	B67-10248	01	
ARITHMETIC			ATTITUDE INDICATOR					
Subroutine allows easy computation in extended precision arithmetic	M-FS-1136	B66-10504	01	Hydraulic device provides accurate displacements to microinches	MSC-112	B65-10230	05	
ARITHMETIC AND LOGIC UNIT /ALU/			FM/CW system measures aircraft attitude			M-FS-276	B65-10290	01
Transfluxor circuit amplifies sensing current for computer memories	JPL-406	B63-10255	01	Developmental instrument supplies accurate attitude and attitude-rate data	HQ-57	B66-10607	01	
AROMATIC COMPOUND			Visual attitude orientation and alignment system			MSC-647	B67-10120	02
Irradiation improves properties of an aromatic polyester	LANGLEY-115	B65-10164	03	AUDIO EQUIPMENT				
Polymer film exhibits thermal and radiation stability	LANGLEY-100	B66-10043	03	High-gain amplifier has excellent stability and low power consumption	GSFC-272	B65-10138	01	
Process for preparing dispersions of alkali metals	JPL-734	B66-10639	03	Phonocardiograph microphone is rugged and moistureproof	MSC-212	B66-10314	04	
Isostatic compression process converts polyaromatics into structural material				Personal communication system combines high performance with miniaturization	MSC-720	B67-10119	01	
				AUDIOFREQUENCY				
				Circuit reduces distortion of FM modulator	GSFC-257	B65-10152	01	
				Pressure transducers dynamically tested with sinusoidal pressure generator	LEWIS 268	B66-10031	01	

## AUDITORY SIGNAL

Microphone multiplex system provides multiple outlets from single source  
GSFC-426 B66-10308 01

## AUTOCORRELATION

Accuracy of laser measurements improved by pulse autocorrelator electronic system  
MSC-10033 B67-10338 01

## AUTOMATIC CONTROL

New low level ac amplifier provides adjustable noise cancellation and automatic temperature compensation  
ARC-2 B63-10003 04

Level of super-cold liquids automatically maintained by levelometer  
JPL-397 B63-10250 01

Unmanned seismometer levels self, corrects drift errors  
GSFC-100 B63-10551 01

Ring valve responds to differential pressure changes  
WOO-247 B66-10022 05

Braking mechanism is self actuating and bidirectional  
M-FS-1299 B66-10484 05

Computer used to program numerically controlled milling machine  
M-FS-1608 B66-10541 01

Hoist is automatically stopped at low deceleration rate  
M-FS-1639 B66-10545 05

Emergency escape system uses self-braking mechanism on fixed cable  
KSC-66-44 B66-10575 05

Automated tester permits precise calibration of pressure transducers from 0 to 1050 psi  
NUC-10067 B67-10263 01

Battery charge regulator is coulometer controlled  
GSFC-561 B67-10446 01

Automatic transducer switching provides accurate wide range measurement of pressure differential  
NUC-10001 B67-10540 01

## AUTOMATIC DATA PROCESSING SYSTEM

New computer system simplifies programming of mathematical equations  
M-FS-441 B66-10361 01

Data retrieval system provides unlimited hardware design information  
MSC-1144 B67-10170 01

Structural Analysis and Matrix Interpretive System /SAMIS/  
NPO-10130 B67-10171 01

Linear circuit analysis program for IBM 1620 Monitor II, 1311/1443 data processing system /CIRCS/  
NPO-10131 B67-10173 06

Master control data handling program uses automatic data input  
M-FS-2259 B67-10280 06

Saturn S-II Automatic Software System /SASS/  
M-FS-1741 B67-10405 06

DYANA - An advanced programming system for large classes of dynamic and equivalent systems  
B67-10524 06

## AUTOMATIC FREQUENCY CONTROL

Concept for automatic Doppler compensation

in two-way communication systems  
GSFC-10213 B67-10643 01

## AUTOMATIC GAIN CONTROL /AGC/

Automatic gain control circuit handles wide input range  
MSC-166 B66-10089 01

Optical automatic gain channel  
M-FS-1550 B66-10596 02

## AUTOMATION

Automatic telemetry checkout system  
M-FS-12580 B67-10402 01

Automatic design of optical systems by digital computer  
NPO-10265 B67-10632 06

## AVALANCHE

Improved frequency divider employs transistor avalanche effect  
NPO-10008 B67-10575 01

## AXIAL COMPRESSION

Analysis of stability-critical orthotropic cylinders subjected to axial compression  
M-FS-12869 B67-10375 03

Buckling strength of filament-wound cylinders under axial compression is investigated  
HQ-10032 B67-10659 03

## AXIAL FLOW

Pressure probe compensates for dimensional tolerance variations  
LEWIS-302 B66-10599 01

## AXIAL FLOW COMPRESSOR

Noise study of single stage compressor rotor-stator interaction  
LANGLEY-137 B67-10516 02

## AXIAL LOAD

Fatigue tester achieves true axial motion through flex plates and bars  
NU-0021 B66-10164 01

Semiautomatic device tests components with biaxial loads  
MSC-516 B66-10337 05

Investigation of pressurized toroidal shells  
HQ-27 B67-10117 05

Single-source mechanical loading system produces biaxial stresses in cylinders  
M-FS-12530 B67-10380 05

## AXIAL STRESS

Bearing transmits rotary and axial motion  
LANGLEY-27 B64-10130 05

Testing device subjects elastic materials to biaxial deformations  
JPL-616 B65-10189 03

Simple key locks turbine rotor blades  
WOO-103 B66-10023 05

Thin plastic sheet eliminates need for expensive plating  
M-FS-1896 B66-10681 03

Transducer measures embedment stresses in electronic modules  
M-FS-13486 B67-10367 01

## AXISYMMETRIC BODY

Computer program simplifies design of rotating components of turbomachinery  
NUC-10046 B67-10235 06

Computer program provides improved longitudinal response analysis for axisymmetric launch vehicles  
LANGLEY-10093 B67-10531 06



## SUBJECT INDEX

## BEARING

Digital program analyzes supersonic flow field within bell-shaped rocket nozzles M-FS-14292	B67-10664	06	KSC-10056	B67-10283	05
<b>AXISYMMETRY</b>			<b>BAND PASS FILTER</b>		
Friction loading device enables accurate testing of brittle materials NU-0051	B66-10345	05	Thin carbon film serves as UV bandpass filter ERC-8	B66-10060	02
<b>AZIMUTH</b>			High-performance RC bandpass filter is adapted to miniaturized construction ARC-60	B66-10309	01
Optical automatic gain channel M-FS-1550	B66-10596	02	Composite filter steepens rejection slopes in microwave application GSFC-480	B66-10393	01
<b>B</b>			<b>BANDWIDTH</b>		
<b>BACKGROUND EFFECT</b>			Bandwidth switching is transient-free, avoids loss of loop lock WOO-054	B64-10349	01
Point-source light sensor circuit is insensitive to background light JPL-778	B66-10502	01	Variable word length encoder reduces TV bandwidth requirements LANGLEY-87	B65-10345	01
<b>BACKSCATTER</b>			Broadband choke suppresses spurious currents in antenna structure MSC-10013	B67-10675	01
Alpha particle backscattering measurements used for chemical analysis of surfaces ARG-116	B67-10186	03	<b>BAR</b>		
<b>BACTERIA</b>			Novel clamps align large rocket cases, eliminate back-up bars M-FS-1	B63-10376	05
Cytology is advanced by studying effects of deuterium environment ARG-205	B67-10304	04	Vacuum-type backup bar speeds weld repairs M-FS-12	B63-10384	05
Bacteriostatic conformal coating for electronic components GSFC-10007	B67-10599	03	Mounting for diodes provides efficient heat sink M-FS-197	B64-10283	01
<b>BALANCE</b>			<b>BARIUM FLUORIDE</b>		
System measures unidirectional forces, excludes extraneous forces LEWIS-170	B65-10154	05	Fluoride coatings make effective lubricants in molten sodium environment LEWIS-229	B66-10005	03
Proposed method of rotary dynamic balancing by laser M-FS-12422	B67-10452	02	<b>BARIUM SULFIDE</b>		
Digital servo readout system increases recording accuracy of servo-balance scales NUC-10125	B67-10496	01	Crack detection method is safe in presence of liquid oxygen M-FS-236	B65-10107	03
<b>BALANCE EQUATION</b>			<b>BATTERY</b>		
Equations provide tubular information on effects of uniform and variable loads on thin, flat, circular plates ARG-151	B66-10601	05	Pressure sensor responds only to shock wave M-FS-238	B65-10184	01
<b>BALL BEARING</b>			Composite seal reduces alkaline battery leakage GSFC-337	B65-10271	01
Ball bearing used in design of rugged flow-meter LEWIS-159	B64-10170	05	Circuit prevents overcharging of secondary cell batteries GSFC-454	B66-10492	01
Miniature bearings lubricated by sonic dispersion method M-FS-202	B65-10106	03	Converter provides constant electrical power at various output voltages GSFC-519	B67-10481	01
Control of component differential hardness increases bearing life LEWIS-190	B65-10251	05	Development of low temperature battery LEWIS-10326	B67-10546	01
Friction device damps linear motion of rotating shaft WOO-214	B66-10030	05	Improved calorimeter provides accurate thermal measurements of space batteries GSFC-10003A	B67-10615	01
Polytetrafluoroethylene lubricates ball bearings in vacuum environment M-FS-379	B66-10081	03	<b>BEACON</b>		
Bearing puller facilitates removal and replacement of bearing assemblies M-FS-1538	B66-10418	05	High-intensity flashing beacon powered by mercury cells LANGLEY-80	B65-10361	01
Improved rolling element bearings provide low torque and small temperature rise in ultrahigh vacuum environment LEWIS-359	B66-10678	05	<b>BEAM CURRENT</b>		
Design concept to decrease relative speed of ball bearings M-FS-2003	B67-10212	05	Nonreciprocal gain control for ring laser M-FS-14041	B67-10653	02
Concept for modifying drafting instruments to minimize smearing			<b>BEAM SWITCHING</b>		
			Brushless dc motor uses electron beam switching tube as commutator GSFC-345	B65-10237	01
			<b>BEARING</b>		
			Device transmits rotary motion through hermetically sealed wall		

# BHAVIOR

# SUBJECT INDEX

JPL-303	B63-10198	05	Rubber-coated bellows improves vibration damping in vacuum lines	LEWIS-273	B66-10187	02	
Gallium useful bearing lubricant in high-vacuum environment	LEWIS-12	B63-10337	03	Bellows design features low spring rate and long life	MSC-521	B66-10190	05
Molybdenum disulfide mixtures make effective high-vacuum lubricants	M-FS-54	B63-10453	03	Fluid damping reduces bellows seal fatigue failures	M-FS-565	B66-10249	05
Lead oxide ceramic makes excellent high-temperature lubricant	LEWIS-144	B64-10116	03	Bellows joint absorbs torsional deflections in duct system	M-FS-882	B66-10332	05
Bearing transmits rotary and axial motion	LANGLEY-27	B64-10130	05	Method for predicting frictional loss in metal bellows and flexible hose	M-FS-883	B66-10662	05
Pneumatic power is transmitted through air bearing	MSC-8	B64-10141	05	Fixture tests bellows reliability through repetitive pressure/temperature cycling	MSC-1176	B67-10111	01
Fluid pressure used to test turbopump bearings	NU-0001	B65-10024	03	Flow liner extends operating life of high-angulation bellows	M-FS-12023	B67-10512	05
Nonresonant support facilitates vibration testing of structures	M-FS-224	B65-10039	05	<b>BENDING</b>			
Electron beam seals outer surfaces of porous bodies	M-FS-562	B66-10033	03	Handtool bends component leads accurately	M-FS-308	B65-10181	05
Bearing alloys with hexagonal crystal structures provide improved friction and wear characteristics	LEWIS-320	B66-10373	03	Tool forms right angles in component leads	M-FS-722	B66-10346	05
Air bearing provides friction-free support for shaker system slip table	NU-0086	B66-10708	05	Hydraulically controlled flexible arm can bend in any direction	KSC-66-20	B66-10626	05
Composites of porous metal and solid lubricants increase bearing life	LEWIS-307	B67-10007	03	Technique cuts time and cost of bending jacketed piping	WSO-333	B67-10018	05
Tester for study of rolling element bearings	LEWIS-305	B67-10009	01	<b>BENDING FATIGUE</b>			
Resilient bearing supports are gas controlled	LEWIS-10109	B67-10364	05	Machine tests crease durability of sheet materials	JPL-604	B64-10178	05
<b>BEHAVIOR</b>			<b>BENDING MOMENT</b>				
Experiments to investigate particulate materials in reduced gravity fields	M-FS-13308	B67-10394	02	Metal-bending brake facilitates lightweight, close-tolerance fabrication	ARC-29	B64-10069	05
<b>BELLOWS</b>			<b>BERNOULLI EQUATION</b>				
Device transmits rotary motion through hermetically sealed wall	JPL-303	B63-10198	05	Computer program provides steady state analysis for liquid propellant propulsion systems	MSC-10064	B67-10414	06
Composite, vacuum-jacketed tubing replaces bellows in cryogenic systems	LEWIS-67	B63-10368	05	<b>BERYLLIUM</b>			
Filler device for handling hot corrosive materials	MSC-85	B64-10166	03	Accurate depth control provided for thermocouple junction locations	LANGLEY-289	B66-10632	01
Fastener provides cooling and compensates for thermal expansion	NU-0003	B65-10038	05	Apparatus for fabrication of americium-beryllium neutron sources prevents capsule contamination	ARG-184	B67-10202	05
Mouthpiece adapter for pipettes protects mouth from harmful liquids	LANGLEY-47	B65-10043	03	Porous mandrels provide uniform deformation in hydrostatic powder metallurgy	M-FS-1972	B67-10209	03
Metal bellows custom-fabricated from tubing	LEWIS-192	B65-10150	05	<b>BERYLLIUM FLUORIDE</b>			
Lightweight hinged bellows restraint has high load capacity	WOO-151	B65-10341	03	Beryllium fluoride film protects beryllium against corrosion	LEWIS-363	B67-10026	03
Universal bellows joint restraint permits angular and offset movement	WOO-102	B65-10371	05	<b>BERYLLIUM OXIDE</b>			
				Indium foil with beryllia washer improves transistor heat dissipation	GSFC-42	B63-10033	01
				Carbon-arc rod holder has long life, reduces arc splatter	MSC-144	B65-10095	03
				Mounting improves heat-sink contact with			

## SUBJECT INDEX

BISMUTH

beryllia washer MSC-194	B66-10144	01	Improved electrode gives high-quality biological recordings MSC-17	B64-10025	04
Crucible cast from beryllium oxide and refractory cement is impervious to flux and molten metal ARG-22	B66-10527	03	Device induces lungs to maintain known constant pressure MSC-50	B64-10108	04
Flame sprayed dielectric coatings improve heat dissipation in electronic packaging M-FS-13569	B67-10534	01	Subminiature biotelemetry unit permits remote physiological investigations ARC-39	B64-10171	01
<b>BILLET</b> Rapid billet loader aids extrusion of refractory metals LEWIS-50	B63-10354	05	Inexpensive, stable circuit measures heart rate MSC-95	B65-10010	01
<b>BINARY CODE</b> Frequency divider is free of spurious outputs GSFC-308	B65-10334	01	Improved conductive paste secures biomedical electrodes MSC-107	B65-10015	03
Binary sequence detector uses minimum number of decision elements JPL-673	B66-10264	01	Mouthpiece adapter for pipettes protects mouth from harmful liquids LANGLEY-47	B65-10043	03
<b>BINARY DATA</b> Logic redundancy improves digital system reliability JPL-SC-069	B65-10025	01	Photoelectric sensor output controlled by eyeball movements M-FS-274	B65-10079	01
Frequency discriminator with binary output eliminates tuned circuits M-FS-376	B65-10349	01	Simulator produces physiological waveforms MSC-94	B65-10091	01
Binary counter accumulates time by complementary preset MSC-242	B65-10399	01	Tiny biomedical amplifier combines high performance, low power drain ARC-41	B65-10203	01
Simplified circuit corrects faults in parallel binary information channels JPL-SC-090	B66-10261	01	Rugged pressed disk electrode has low contact potential MSC-158	B65-10320	01
Subroutine allows easy computation in extended precision arithmetic M-FS-1136	B66-10504	01	Direct force-measuring transducer used in blood pressure research ARC-53	B65-10325	01
Computer routine adds plotting capabilities to existing programs GSFC-490	B66-10511	01	Improved electrode paste provides reliable measurement of galvanic skin response MSC-146	B66-10049	04
Oscillator circuit operates as digitally controlled frequency synthesizer GSFC-570	B67-10447	01	Miniature bioelectric device accurately measures and telemeters temperature ARC-52	B66-10057	01
<b>BINARY MIXTURE</b> Rapid helium-air analyzer can measure other binary gas mixtures LANGLEY-16	B63-10557	03	Gelatin coated electrodes allow prolonged bioelectronic measurements MSC-153	B66-10088	01
<b>BINARY SUMMATOR</b> Simple circuit performs binary addition and subtraction GSFC-399	B65-10355	01	Plant respirometer enables high resolution of oxygen consumption rates HQ-47	B66-10406	04
Binary counter uses fluid logic elements M-FS-323	B65-10377	01	Spray-on electrodes enable EKG monitoring of physically active subjects FRC-36	B66-10649	04
<b>BINDER</b> Solid-film lubricant is effective at high temperatures in vacuum LEWIS-228	B66-10087	03	Review of biological mechanisms for application to instrument design HQ-33	B67-10663	04
<b>BIOCHEMISTRY</b> Ultraviolet microscopy aids in cytological and biomedical research ARG-178	B67-10590	04	<b>BIOMECHANICS</b> Integrated mobility measurement and notation system MSC-726	B67-10114	04
<b>BIOELECTRIC POTENTIAL</b> Miniature electrometer preamplifier effectively compensates for input capacitance ARC-69	B66-10549	01	Review of biological mechanisms for application to instrument design HQ-33	B67-10663	04
<b>BIOINSTRUMENTATION</b> New low level ac amplifier provides adjustable noise cancellation and automatic temperature compensation ARC-2	B63-10003	04	<b>BIPROPELLANT</b> Addition of solid oxidizer increases liquid fuel specific impulse JPL-861	B67-10058	03
			<b>BIREFRINGENT COATING</b> Sprayable birefringent coating enables strain measurements on large surfaces M-FS-1484	B66-10578	03
			<b>BISMUTH</b> Development of Curie point switching for thin film, random access, memory device		

## BISMUTH ALLOY

## SUBJECT INDEX

NPO-10402	B67-10633	02	bellows in cryogenic systems LEWIS-67	B63-10368	05
<b>BISMUTH ALLOY</b>			<b>BODY FLUID</b>		
Bismuth alloy potting seals aluminum connector in cryogenic application WOO-260	B66-10138	03	Apparatus enables automatic microanalysis of body fluids JPL-962	B66-10515	04
<b>BISMUTH OXIDE</b>			<b>BODY OF REVOLUTION</b>		
IR-transmission glasses formed from oxides of bismuth and tellurium M-FS-279	B65-10190	03	Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05
<b>BISTABLE AMPLIFIER</b>			<b>BODY TEMPERATURE /BIOL/</b>		
Experimental scaling study of fluid amplifier elements M-FS-1882	B67-10088	02	Miniature bioelectric device accurately measures and telemeters temperature ARC-52	B66-10057	01
<b>BIT SYNCHRONIZATION</b>			<b>BOLOMETER</b>		
Pn acquisition demodulator achieves automatic synchronization of a telemetry channel JPL-612	B66-10271	01	Wedge immersed thermistor bolometer measures infrared radiation GSFC-443	B65-10330	02
<b>BLACK BODY RADIATION</b>			Ferroelectric bolometer measures RF absolute power at submillimeter wavelengths GSFC-422	B66-10051	01
Reference black body is compact, convenient to use ARC-3	B63-10004	03	<b>BOLT</b>		
Blackbody cavity radiometer has rapid response JPL-521	B66-10679	01	Modified power tool rapidly drives series torque bolts MSC-221	B66-10054	05
Modified blackbody device emits high-density radiation M-FS-12744	B67-10388	02	Omnidirectional antennas transmit and receive over large bandwidth GSFC-436	B66-10133	01
<b>BLADDER</b>			Fastener provides for bolt misalignment and quick release of flange NU-0074	B66-10275	05
Inflatable bladder provides accurate calibration of pressure switch M-FS-367	B65-10279	01	Nondestructive test method accurately sorts mixed bolts M-FS-1426	B66-10574	01
<b>BLADE</b>			Single wrench separates nuts from free- floating bolts NUC-10013	B67-10158	05
Blade valve isolates compartment in pipe, opens to allow free flow JPL-585	B64-10188	05	<b>BONDING</b>		
Adjustable knife cuts honeycomb material to specified depth MSC-475	B66-10237	05	New method forms bond line free of voids LANGLEY-20	B63-10558	05
Work platform is supported by self-locking blades M-FS-2297	B67-10180	05	Elastomers bonded to metal surfaces seal electrochemical cells GSFC-168	B64-10113	03
<b>BLAST</b>			Screening technique makes reliable bond at room temperature M-FS-227	B65-10004	03
In-tank shutoff valve is provided with maximum blast protection M-FS-1529	B66-10514	05	Thermocompression bonding produces efficient surface-barrier diode JPL-SC-066	B65-10007	05
Grit blasting nozzle fabricated from mild tool steel proves satisfactory M-FS-1420	B66-10597	05	Thermistor connector assembly increases accuracy of measurements LANGLEY-62	B65-10045	01
<b>BLINDNESS</b>			Selenium bond decreases on resistance of light-activated switch JPL-SC-101	B65-10324	01
Translator program converts computer printout into Braille language M-FS-2061	B67-10087	01	Calibrated clamp facilitates pressure application MSC-298	B66-10059	05
<b>BLOOD</b>			Reflective insulator layers separated by bonded silica beads MSC-215	B66-10070	03
Blood oxygen saturation determined by transmission spectrophotometry of hemolyzed blood samples MSC-11018	B67-10252	04	Dot patterns provide reproducible flaw areas for study of adhesive bonds M-FS-862	B66-10367	05
<b>BLOOD COAGULATION</b>			Composite weld rod corrects individual filler weaknesses M-FS-1923	B67-10107	05
Hand-held instrument should relieve hematoma pressure MSC-599	B67-10332	04	Liquid crystals detect voids in fiberglass		
<b>BLOOD PRESSURE</b>					
Direct force-measuring transducer used in blood pressure research ARC-53	B65-10325	01			
Blood pressure reprogramming adapter assists signal recording MSC-265	B67-10475	01			
<b>BLOWER</b>					
Composite, vacuum-jacketed tubing replaces					

# SUBJECT INDEX

# BRAZING

laminates  
LEWIS-10104 B67-10286 03

Radiant heat source, vacuum bag, provide  
portable bonding oven  
MSC-11342 B67-10570 03

Nondestructive testing techniques used in  
analysis of honeycomb structure bond  
strength  
M-FS-1214 B67-10574 01

**BONE**  
Ultrasonic hand tool allows convenient  
diagnostic scanning of bone integrity  
M-FS-14102 B67-10486 02

**BOOLEAN ALGEBRA**  
Veitch diagram plotter simplifies boolean  
functions  
JPL-385 B63-10241 05

**BOOM**  
Apparatus of small size can be extended into  
long, rigid boom  
JPL-305 B63-10200 05

Metal strip forms 21 foot boom, rolls up for  
compact storage  
GSFC-151 B64-10011 05

Scoop attachment makes helicopter recoveries  
easier and safer  
MSC-130 B65-10229 05

Sheet metal strip unrolls to form circular  
boom  
GSFC-423 B66-10032 05

**BORATE**  
Borate glass efficiently transmits  
ultraviolet light  
ARG-91 B66-10475 03

**BORON**  
Boron-deoxidized copper withstands brazing  
temperatures  
M-FS-762 B66-10273 03

**BORON CARBIDE**  
Boron carbide whiskers produced by vapor  
deposition  
HQ-24 B65-10261 03

Radial furnace shows promise for growing  
straight boron carbide whiskers  
HQ-50 B67-10070 03

Aluminum-titanium hydride-boron carbide  
composite provides lightweight neutron  
shield material  
NUC-10069 B67-10265 03

**BORON FLUORIDE**  
Current pulse amplifier transmits detector  
signals with minimum distortion and  
attenuation  
NUC-10055 B67-10347 01

**BORON NITRIDE**  
Boron nitride housing cools transistors  
W00-079 B65-10289 01

**BORON OXIDE**  
Thin-film ferrites vapor deposited by one-step  
process in vacuum  
MSC-259 B66-10398 03

**BOUNDARY LAYER CONTROL**  
Experimental scaling study of fluid  
amplifier elements  
M-FS-1882 B67-10088 02

**BOUNDARY LAYER TRANSITION**  
Thin-film gage measures low heat-transfer  
rates  
LANGLEY 205 B66-10180 01

## BRAKE

Frictional wedge shock mount is inexpensive,  
has good damping characteristics  
JPL-IT-1001 B63-10289 05

Metal-bending brake facilitates lightweight,  
close-tolerance fabrication  
ARC-29 B64-10069 05

Compressed gas system operates semitrailer  
brakes during winching operation  
JPL-0036 B64-10306 05

Air brake-dynamometer accurately measures  
torque  
LEWIS-163 B65-10312 05

Hydraulic drive system prevents backlash  
JPL-371 B65-10351 05

Calculations enable optimum design of  
magnetic brake  
LEWIS-251 B66-10073 05

Modified hydraulic braking system limits  
angular deceleration to safe values  
GSFC-476 B66-10310 05

Braking mechanism is self actuating and  
bidirectional  
M-FS-1299 B66-10484 05

Emergency escape system uses self-braking  
mechanism on fixed cable  
KSC-66-44 B66-10575 05

Friction brake cushions acceleration and  
vibration loads  
MSC-715 B66-10608 05

## BRAZING

New alloy brazes titanium to stainless steel  
MSC-102 B65-10060 05

Titanium treatment improves brazed joints  
MSC-127 B65-10153 05

Refractory metals welded or brazed with  
tungsten inert gas equipment  
LEWIS-219 B65-10319 05

Inert-gas welding and brazing enclosure  
fabricated from sheet plastic  
LEWIS-220 B65-10338 05

Brazing method produces solid-solution bond  
between refractory metals  
LEWIS-212 B65-10370 05

Tungsten wire and tubing joined by nickel  
brazing  
M-FS-394 B65-10391 05

New brazing alloy eliminates metal-stress  
cracking  
W00-249 B65-10397 03

Improved tool easily removes brazed tube  
connectors  
MSC-263 B66-10003 05

Brazing process using Al-Si filler alloy  
reliably bonds aluminum parts  
MSC-448 B66-10241 05

High-speed furnace uses infrared radiation  
for controlled brazing  
NU-0047 B66-10268 02

Braze alloys used as temperature indicators  
NU-0063 B66-10274 01

Union would facilitate joining of tubing,  
minimize braze contamination  
MSC-777 B66-10311 05

Brazing process provides high-strength bond  
between aluminum and stainless steel  
M-FS-803 B66-10352 05

## BRIDGE

## SUBJECT INDEX

Aluminum core structures brazed without use of flux  
M-FS-659 B66-10360 05

Brazing retort manifold design concept may minimize air contamination and enhance uniform gas flow  
M-FS-707 B66-10371 05

Braze alloy holds bonding strength over wide temperature range  
LEWIS-337 B66-10519 03

Silver-palladium braze alloy recovered from masking materials  
M-FS-1845 B66-10631 03

Metal boot permits fabrication of hermetically sealed splices in metal sheathed instrumentation cables  
NU-0083 B66-10704 05

Ultrasonics permits brazing complex stainless steel assembly without flux  
NU-0115 B67-10094 05

High-strength braze joints between copper and steel  
M-FS-2519 B67-10211 05

**BRIDGE**  
Electronic modules easily separated from heat sink  
MSC-142 B65-10186 02

Sensitive bridge circuit measures conductance of low-conductivity electrolyte solutions  
ARG-147 B67-10294 01

**BRITTLENESS**  
Friction loading device enables accurate testing of brittle materials  
NU-0051 B66-10345 05

**BUBBLE**  
Instrument calibrates low gas-rate flowmeters  
MSC-134 B65-10137 01

**BUCKLING**  
Analysis of stability-critical orthotropic cylinders subjected to axial compression  
M-FS-12869 B67-10375 03

Buckling strength of filament-wound cylinders under axial compression is investigated  
HQ-10032 B67-10659 03

**BUFFER**  
Intermediate rotating ring improves reliability of dynamic shaft seal  
M-FS-575 B66-10197 05

An efficient, temperature-compensated subcarrier oscillator  
JPL-SC-091 B67-10251 01

Field effect transistors improve buffer amplifier  
M-FS-916 B67-10334 01

Analog buffer isolates high impedance source from low impedance load  
M-FS-13481 B67-10544 01

**BULKHEAD**  
Composite bulkhead fabrication development  
M-FS-1264 B66-10582 05

Computer program performs rectangular fitting stress analysis  
M-FS-13010 B67-10520 06

Explosive-train initiated through solid bulkhead by pressure cartridge  
MSC-11395 B67-10589 03

**BUOY**  
Oceanborne transponder platform has good stability  
M-FS-171 B65-10035 05

**BUOYANCY**  
Hydrostatic force used to handle outsized, heavy objects  
HQ-90 B67-10167 05

**BURNOUT**  
Lamp automatically switches to new filament on burnout  
M-FS-498 B66-10046 01

## C

**CADMIUM**  
Abraded cadmium-plated cable connectors repaired by conversion coating  
M-FS-1424 B67-10014 03

**CADMIUM SELENIDE**  
Thin-film semiconductor rectifier has improved properties  
MSC-207 B66-10012 01

**CALCIUM COMPOUND**  
Hydrated multivalent cations are new class of molten salt mixtures  
ARG-211 B67-10033 03

**CALCIUM FLUORIDE**  
Fluoride coatings make effective lubricants in molten sodium environment  
LEWIS-229 B66-10005 03

Solid-film lubricant is effective at high temperatures in vacuum  
LEWIS-228 B66-10087 03

**CALIBRATION**  
Variable light source with a million-to-one intensity ratio  
JPL-W00-008 B63-10424 03

Fluid-pressure meter can be calibrated without removal from flow line  
M-FS-98 B63-10502 05

Device calibrates vibration transducers at amplitudes up to 20g  
M-FS-86 B63-10572 01

Attachment converts microscope to point source autocollimator  
JPL-499 B64-10124 05

Raster linearity of video cameras calibrated with precision tester  
GSFC-200 B64-10209 01

Gage measures electrical connector pin retention force  
JPL-SC-071 B65-10034 03

Metal diaphragm used to calibrate miniature transducers  
M-FS-207 B65-10059 01

Oil-damped mercury pool makes precise optical alignment tool  
GSFC-353 B65-10253 02

Simple device produces accelerometer calibration pulse  
M-FS-363 B65-10269 01

Inflatable bladder provides accurate calibration of pressure switch  
M-FS-367 B65-10279 01

Volumetric system calibrates meters for large flow rates  
W00-130 B65-10323 05

Noncontacting vibration transducer has constant sensitivity  
LANGLEY-99 B65-10392 01

# SUBJECT INDEX

# CAPACITANCE

PTFE-aluminum films serve as neutral density filters LANGLEY-189	B66-10017	02	Servo calorimeter measures material heating rate NU-0024	B65-10247	01
Pressure transducers dynamically tested with sinusoidal pressure generator LEWIS-268	B66-10031	01	Calorimeter accurately measures thermal radiation energy LANGLEY-173	B66-10058	02
Freon provides heat transfer for solid CO2 calibration standard M-FS-644	B66-10257	02	Instrument accurately measures small temperature changes on test surface LANGLEY-174	B66-10637	01
Flexible arms provide constant force for pressure switch calibration HQ-38	B66-10317	05	Sensing disks for slug-type calorimeters have higher temperature stability M-FS-1867	B67-10161	01
High voltage potential divider calibrated by simple device ARG-83	B66-10497	01	Fast-acting calorimeter measures heat output of plasma gun accelerator LEWIS-388	B67-10192	01
Pyrometry handbook describes practical aspects of surface temperature measurements of opaque materials LEWIS-349	B66-10520	01	Calibration technique for electromagnetic flowmeters LEWIS-10328	B67-10554	01
Volume-ratio calibration system for vacuum gages LEWIS-303	B66-10640	01	Study of thermal effects on nickel-cadmium batteries GSFC-10003	B67-10614	01
Blackbody cavity radiometer has rapid response JPL-521	B66-10679	01	Improved calorimeter provides accurate thermal measurements of space batteries GSFC-10003A	B67-10615	01
Method accurately measures mean particle diameters of monodisperse polystyrene latexes ARG-207	B67-10054	02	<b>CAMERA</b>		
System enables more complete calibrations of dynamic-pressure transducers M-FS-2063	B67-10099	01	System selects framing rate for spectrograph camera LANGLEY-55	B65-10086	01
A calibration means for spectrum analyzers MSC-10987	B67-10254	01	Planetary camera control improves microfiche production HQ-1	B65-10313	01
Automated tester permits precise calibration of pressure transducers from 0 to 1050 psi NUC-10067	B67-10263	01	Modified procedure speeds camera copy layout for offset printing GSFC-424	B65-10373	02
Circuit automatically calibrates flowmeter against liquid-level gage reference M-FS-2194	B67-10376	01	New television camera eliminates vidicon tube M-FS-472	B66-10112	01
Modified blackbody device emits high-density radiation M-FS-12744	B67-10388	02	Gas pressure feeds film into camera at high speed ARG-97	B66-10474	02
Automatic testing device facilitates noise checks and electronic calibrations LEWIS-10173	B67-10467	01	Photographic method measures particle size and velocity in fluid stream M-FS-1536	B66-10668	01
Computer program reduces and provides profile plot of surface plate calibration data M-FS-13866	B67-10492	06	Camera lens adapter magnifies image M-FS-11955	B67-10431	02
Calibration technique for electromagnetic flowmeters LEWIS-10328	B67-10554	01	Method for X-ray study under extreme temperature and pressure conditions MSC-11232	B67-10474	02
<b>CALIBRATOR</b>			<b>CAMERA SHUTTER</b>		
Explosives actuate nonmagnetic indexing device GSFC-237	B65-10017	05	Electromechanically operated camera shutter provides uniform exposure JPL-357	B63-10227	01
Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01	Camera shutter is actuated by electric signal ARC-20	B63-10560	05
Design concept for pressure switch calibrator HQ-36	B66-10598	01	<b>CANTILEVER BEAM</b>		
Device enables calibration of microphones at high sound pressure levels M-FS-11980	B67-10336	01	Method permits mechanical and electrical checkout of piezoelectric transducers while installed in a system ARC-73	B66-10533	01
<b>CALORIMETER</b>			<b>CAPACITANCE</b>		
Probe measures characteristics of hot gas stream M-FS-240	B65-10133	02	Thin-film resistors used in functional electronic blocks GSFC-380	B65-10305	01
			Capacitive system detects and locates fluid leaks M-FS-478	B66-10099	01
			Variable-capacitance tachometer eliminates troublesome magnetic fields GSFC-435	B66-10126	01

## CAPACITOR

## SUBJECT INDEX

Miniature capacitive accelerometer is especially applicable to telemetry ARC-72	B66-10491	01	JPL-943	B67-10505	01
Improved circuit for measuring capacitive and inductive reactances M-FS-13083	B67-10513	01	High-temperature /1100 degrees F/ capacitors operate without supplement cooling LEWIS-10324	B67-10550	01
CAPACITOR			CAPILLARY		
Improved sensor counts micrometeoroid penetrations LEWIS-76	B63-10443	01	Tensile-strength apparatus applies high strain-rate loading with minimum shock JPL-28	B66-10063	05
Circuit switches latching relay in response to signals of different polarity WOO-055	B63-10508	01	CAPSULE		
Highly efficient square-wave oscillator operator at high power levels GSFC-112	B63-10554	01	Apparatus for fabrication of americium-beryllium neutron sources prevents capsule contamination ARG-184	B67-10202	05
Thermistor connector assembly increases accuracy of measurements LANGLEY-62	B65-10045	01	Improved sample capsule for determination of oxygen in hemolyzed blood MSC-11017	B67-10408	04
Microparticle impact sensor measures energy directly GSFC-252	B65-10048	01	CARBON		
Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01	Improved carbon electrode reduces arc sputtering MSC-219	B66-10026	01
Circuit reduces distortion of FM modulator GSFC-257	B65-10152	01	Thin carbon film serves as UV bandpass filter ERC-8	B66-10060	02
Electrostatically driven dynamic capacitor employs capacitive feedback JPL-771	B65-10293	01	New tungsten alloy has high strength at elevated temperatures LEWIS-336	B66-10551	03
Coaxial capacitor used to determine fluid density LEWIS-232	B65-10296	02	CARBON ARC		
Compact SCR trigger circuit for ignitron switch operates efficiently M-FS-371	B65-10347	01	Carbon arc ignition improved by simple auxiliary circuit MSC-103	B65-10018	01
Three-dimensional wire-mesh capacitor system measures fluid density WOO-194	B65-10379	01	Carbon-arc rod holder has long life, reduces arc splatter MSC-144	B65-10095	03
Large capacitor performs as a distributed parameter pulse line LEWIS-176	B66-10291	01	Magnetic field controls carbon arc tail flame MSC-139	B65-10108	01
Pulse stretcher has improved dynamic range and linearity ARG-82	B66-10509	01	Segmented, arch-bound carbon seal is pressure loaded M-FS-12777	B67-10325	05
Nonelectrolytic tantalum capacitors developed M-FS-1546	B66-10552	01	CARBON DIOXIDE		
Compact microwave mixer has high conversion efficiency GSFC-197	B66-10625	01	Gas diffusion cell removes carbon dioxide from occupied airtight enclosures MSC-118	B64-10319	03
Thermocouples easily installed in hard-to-get-to places M-FS-1946	B66-10653	01	Freon provides heat transfer for solid CO2 calibration standard M-FS-644	B66-10257	02
Miniature capacitor functions as pressure sensor JPL-903	B67-10020	01	CARBON DIOXIDE CONCENTRATION		
Integrator can easily be set and reset with an electronic switch ARC-10002	B67-10135	01	Test strips detect different CO2 concentrations in closed compartments MSC-210	B65-10390	03
Precision capacitor has improved temperature and operational stability ARG-189	B67-10313	01	CARBON DIOXIDE REMOVAL		
Study made of dielectric properties of promising materials for cryogenic capacitors M-FS-13620	B67-10366	03	Removable well in reaction flask facilitates carbon dioxide collection ARC-47	B65-10316	03
Thin film thermal detector			CARDIOGRAPHY		
			Digital cardiometer computes and displays heartbeat rate MSC-93	B64-10258	01
			Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01
			Ultraminiature manometer-tipped cardiac catheter ARC-10054	B67-10669	01
			CARDIOLOGY		
			Computer circuit calculates cardiac output MSC-274	B66-10006	01
			CARDIOTACHOMETRY		
			Cardiotachometer with linear beat-to-beat frequency response ARC-10033	B67-10598	01



### CERAMIC COATING

MSC-216

B65-10321 03

### CATALYTIC ACTIVITY

863-10340 05

### CATHODE

Wire winding increases lifetime of oxide-coated cathodes

Tantalum cathode improves electron-beam  
evaporation of tantalum  
JPL-WOO-021 B65-10175 03

Titanium diaphragm makes excellent amplatron  
cathode support  
GSFC-394 B65-10298 01

Rod and dish cathode improves Penning-type  
vacuum gauge  
GSFC-447 866-10082 01

Nixie tube display unit employs time-shared  
logic  
ARG-117 866-10512 01

### CATHODE RAY TUBE

Electronic filter discriminates between  
true and false reflections

## CAVITATION

Studies reveal effects of pipe bends on fluid  
flow cavitation

M-FS-516 R66-10228 05

## CAVITY

Sensitive low-pressure relief valve has positive seating against leakage

Improved cavity-type absolute total-  
radiation radiometer  
JPL-807

### CELESTIAL OBSERVATION

Glancing incidence telescope for far  
ultraviolet and soft X-rays  
GSFC-10052 B67-10508 02

## CENTRIFUGAL COMPRESSOR

Electropneumatic transducer automatically  
limits motor current

### CENTRIFUGAL FORCE

Helical tube separates nitrogen gas from  
liquid nitrogen

JPL-398 B63-10251 05

Centrifugal device separates liquid from gas  
MSC-282 B65-10394 05

Flexible arms provide constant force for  
pressure switch calibration  
HQ-38 B66-10317 05

### CERAMAL PROTECTIVE COATING

KRAMAL PROTECTIVE COATING	
Air-cured ceramic coating insulates against high heat fluxes	
M-FS-150	B65-10357 03

## CERAMIC BONDING

RAMIC BONDING  
Mounting for diodes provides efficient heat  
sink  
M-FS-197  
B64-10283 01

A ceramic composite thermal insulation  
M-FS-13991 B67-10608 03

## CERAMIC COATING

Gate valve with ceramic-coated base operates at high temperatures

ARC-23 B63-10562 03

Ceramic-coated boat is chemically inert,  
provides good heat transfer

## CATALYST

## Plated nickel wire mesh makes superior catalyst bed

## CERAMICS

## SUBJECT INDEX

LANGLEY-90	B65-10063	05	simplified method NU-0070	B66-10267	05
Improved method of edge coating flat ribbon wire M-FS-902	B66-10684	03	Continuous internal channels formed in aluminum fusion welds M-FS-2399	B67-10183	05
Newly developed foam ceramic body shows promise as thermal insulation material at 3000 deg F M-FS-11968	B67-10441	03	Use of color-coded sleeve shutters accelerates oscillograph channel selection KSC-10092	B67-10382	01
<b>CERAMICS</b>			<b>CHANNEL CAPACITY</b>		
Refractory ceramic has wide usage, low fabrication cost M-FS-67	B63-10481	03	Monitoring system determines amplitude and time of vibration channel peaks JPL-879	B66-10699	01
Lead oxide ceramic makes excellent high- temperature lubricant LEWIS-144	B64-10116	03	<b>CHAPMAN-JOUGET FLAME</b>		
Fabrication method produces high-grade alumina crucibles M-FS-216	B65-10078	05	Computer program determines chemical equilibria in complex systems LEWIS-281	B66-10671	01
Ceramic materials purified by experimental method LEWIS-225	B65-10270	03	<b>CHAR</b>		
Fibers of newly developed refractory ceramics produced by improved process W00-169	B66-10196	03	Argon purge gas cooled by chill box M-FS-560	B66-10153	02
<b>CESIUM</b>			<b>CHARGE DISTRIBUTION</b>		
Bypass rod transfers heat developed in thermionic diode JPL-SC-136	B66-10303	05	Computer programs calculate potential and charge distributions in a plasma M-FS-871	B66-10553	01
Special treatment reduces helium permeation of glass in vacuum systems HQ-25	B66-10372	02	<b>CHARGE TRANSFER</b>		
<b>CESIUM IODIDE</b>			Primary cells utilize halogen-organic charge transfer complex JPL-926	B66-10682	02
Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03	Primary cell uses neither liquid nor fused electrolytes NPD-10001	B67-10275	01
<b>CESIUM 137</b>			Photovoltaic effect in organic polymer- iodine complex NPD-10373	B67-10634	03
Separation technique provides rapid quantitative determination of cesium-137 in irradiated nuclear fuel NUC-10047	B67-10194	03	<b>CHART</b>		
<b>CHAMBER</b>			Polychart contour plotter enables data extra- polation from multiple plotting charts M-FS-37	B64-10406	05
Control system maintains compartment at constant temperature JPL-SC-145	B66-10188	05	Chart case opens to form briefing easel MSC-349	B66-10135	05
Liquid micrurgy chamber and microsyringe designs allow more efficient micromanipulations ARG-251	B67-10305	04	Chart system simplifies identification of complex design assemblies MSC-752	B66-10460	05
<b>CHAMBER PRESSURE</b>			Slide rule-type color chart predicts reproduced photo tones MSC-1227	B66-10680	01
Rugged switch responds to minute pressure differentials M-FS-12704	B67-10389	01	Vis-A-Plan /visualize a plan/ management technique provides performance-time scale KSC-10073	B67-10240	06
<b>CHANNEL</b>			<b>GMT/Local-time conversion chart</b>		
Integral coolant channels simply made by melt- out method M-FS-91	B63-10497	05	GSFC-10521	B67-10548	01
Logic redundancy improves digital system reliability JPL-SC-069	B65-10025	01	<b>Graphic visualization of program performance aids management review</b>		
Pulsed plasma accelerator operates repetitively without complex controls LANGLEY-48	B65-10062	01	NUC-10011	B67-10568	06
Spiraled channels improve heat transfer between fluids JPL-694	B65-10291	02	<b>CHASSIS</b>		
Simplified circuit corrects faults in parallel binary information channels JPL-SC-090	B66-10261	01	Modular chassis simplifies packaging and interconnecting of circuit boards JPL-236A	B63-10174	01
Radial coolant channels fabricated by			Rack mount device quickly inserts or extracts chassis units MSC-244	B65-10385	05
			Insulator-holder protects transistors in dense electronic assemblies MSC-214	B65-10389	01
			Floating device aligns blind connections MSC-256	B66-10007	05
			<b>CHECKOUT EQUIPMENT</b>		
			Solid state thermostat has integral probe and circuitry		

## SUBJECT INDEX

## CIRCUIT

M-FS-434	B66-10193	01	MSC-549	B66-10312	03
System monitors discrete computer inputs			Gage of 6.5 per cent Si-Fe sheet is chemically reduced		
M-FS-1021	B66-10389	01	MSC-537	B66-10454	03
Antenna simulator permits preinstallation system checkout			Continuous internal channels formed in aluminum fusion welds		
GSFC-522	B66-10518	01	M-FS-2399	B67-10183	05
Automated tester permits precise calibration of pressure transducers from 0 to 1050 psi			Chemical milling solution reveals stress corrosion cracks in titanium alloy		
NUC-10067	B67-10263	01	LANGLEY-10077	B67-10322	03
Automatic telemetry checkout system			<b>CHEMICAL REACTION</b>		
M-FS-12580	B67-10402	01	Experiments shed new light on nickel-fluorine reactions		
<b>CHELATE COMPOUND</b>			ARG-10008	B67-10397	03
Reusable chelating resins concentrate metal ions from highly dilute solutions			Reaction of steam with molybdenum is studied		
JPL-758	B66-10451	03	ARG-295	B67-10502	03
<b>CHEMICAL ANALYSIS</b>			Quantum mechanical calculations of reactive scattering cross sections in bimolecular encounters		
Removable well in reaction flask facilitates carbon dioxide collection			M-FS-13594	B67-10527	03
ARC-47	B65-10316	03	<b>CHEMILUMINESCENCE</b>		
Instrument performs nondestructive chemical analysis, data can be telemetered			Porous glass makes effective substrate for ozone-sensing reagent		
JPL-SC-078	B65-10317	01	GSFC-388	B65-10364	03
Apparatus enables accurate determination of alkali oxides in alkali metals			<b>CHLORATE</b>		
LEWIS-256	B66-10296	03	Improved chlorate candle provides concentrated oxygen source		
Thermoelectric metal comparator determines composition of alloys and metals			MSC-1137	B67-10095	03
ARG-235	B67-10035	01	<b>CHLORDAROMATICS</b>		
Ion exchange determines iodine-131 concentration in aqueous samples			Process produces chlorinated aromatic isocyanate in high yield		
ARG-208	B67-10129	04	M-FS-1658	B66-10646	03
Status of ultrachemical analysis for semiconductors			<b>CHOPPER</b>		
M-FS-2254	B67-10138	03	Improved chopper circuit uses parallel transistors		
Alpha particle backscattering measurements used for chemical analysis of surfaces			M-FS-468	B66-10113	01
ARG-116	B67-10186	03	<b>CHROMATOGRAPHY</b>		
Analytical technique characterizes all trace contaminants in water			Reusable chelating resins concentrate metal ions from highly dilute solutions		
MSC-11032	B67-10243	03	JPL-758	B66-10451	03
<b>CHEMICAL COMPOUND</b>			Tritiated alumina serves as reagent for self-labeling analysis		
Crack detection method is safe in presence of liquid oxygen			ARG-209	B67-10315	03
M-FS-236	B65-10107	03	<b>CHROMIUM</b>		
<b>CHEMICAL EFFECT</b>			Coating protects magnesium-lithium alloys against corrosion		
Chemical regeneration of emitter surface increases thermionic diode life			M-FS-2446	B67-10149	03
LEWIS-17	B66-10435	02	<b>CHROMIUM OXIDE</b>		
<b>CHEMICAL EQUILIBRIUM</b>			Chromium oxide coatings improve thermal emissivity of alumina		
Computer program determines chemical composition of physical system at equilibrium			WOO-263	B66-10227	03
MSC-1119	B66-10670	01	<b>CIRCUIT</b>		
Computer program determines chemical equilibria in complex systems			Circuit switches latching relay in response to signals of different polarity		
LEWIS-281	B66-10671	01	WOO-055	B63-10508	01
<b>CHEMICAL MILLING</b>			Frequency-shift-keyer circuit improves pcm conversion for radio transmission		
Electroless nickel resist used in alkali-etching of aluminum			GSFC-80	B63-10511	01
GSFC-284	B65-10162	03	Computer circuit will fit on single silicon chip		
Reusable neoprene jacket protects parts for chemical milling			JPL-513	B63-10514	01
WOO-071	B65-10179	03	Simple circuit provides adjustable voltage with linear temperature variation		
Etching process mills pH 14-8 Mo alloy steel to precise tolerances			JPL-WOO-029	B63-10537	01
MSC-270	B66-10110	03	Transistorized trigger circuit is frequency-controllable		
Chemical milling solution produces smooth surface finish on aluminum			GSFC-111	B63-10553	01
			Simple circuit continuously monitors		

thermocouple sensor M-FS-61	B63-10567	01	Synchronized pulse generator needs no external power GSFC-274	B65-10072	01
Circuit controls transients in scr inverters GSFC-120	B63-10600	01	Light-sensitive potentiometer measures product of two variables GSFC-240	B65-10076	01
Monostable circuit with tunnel diode has fast recovery GSFC-132	B63-10603	01	Phase detector circuit synthesizes own reference signal M-FS-247	B65-10080	01
Temperature-sensitive network drives astable multivibrator GSFC-137	B63-10609	01	System selects framing rate for spectrograph camera LANGLEY-55	B65-10086	01
Circuit reliability boosted by soldering pins of disconnect plugs to sockets JPL-447	B64-10002	01	Simple circuit functions as frequency discriminator for PFM signals GSFC-267	B65-10102	01
Low-power transistorized circuit provides staircase waveform GSFC-48	B64-10007	01	Unijunction frequency divider is free of backward loading JPL-W00-010	B65-10112	01
Efficient circuit triggers high-current, high-voltage pulses MSC-14	B64-10024	01	Simplified electrometer has excellent operating characteristics JPL-413	B65-10125	01
Continuity tester screens out faulty socket connections JPL-596	B64-10065	01	Traveling-wave tube circuit simplifies microwave relay GSFC-299	B65-10127	01
Ring counter may be advanced or retarded by command signal GSFC-101	B64-10144	01	Piezoresistive gage tests pin-connector sockets JPL-675	B65-10128	01
Temperature-compensation circuit stabilizes performance of vidicons JPL-486	B64-10226	01	Simple circuit positions film frames in projector JPL-508	B65-10132	02
Circuit converts AM signals to FM for magnetic recording GSFC-227	B65-10001	01	Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01
Tunnel-diode circuit features zero-level clipping GSFC-241	B65-10002	01	High-gain amplifier has excellent stability and low power consumption GSFC-272	B65-10138	01
Screening technique makes reliable bond at room temperature M-FS-227	B65-10004	03	Auxiliary circuit enables automatic monitoring of EKG MSC-106	B65-10142	01
Circuit improvement produces monostable multivibrator with load-carrying capability GSFC-34A	B65-10011	01	Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01
Zener diode function generator requires no external reference voltage JPL-33	B65-10013	01	Rotor position sensor switches currents in brushless dc motors GSFC-315	B65-10151	01
Use of tear ring permits repair of sealed module circuitry M-FS-210	B65-10014	05	Circuit reduces distortion of FM modulator GSFC-257	B65-10152	01
Carbon arc ignition improved by simple auxiliary circuit MSC-103	B65-10018	01	Phase shift frequency synthesizer is efficient, small in size M-FS-250	B65-10169	01
Stepping motor drive circuit designed for low power drain GSFC-198	B65-10026	01	Pressure transducer system is force-balanced, has digital output M-FS-154	B65-10174	05
Ionization vacuum gage starts quickly, is unaffected by spurious currents JPL-304	B65-10036	02	Dc to ac converter operates efficiency at low input voltages GSFC-130	B65-10178	01
Pulse generator permits nondestructive testing of component breakdown voltage MSC-122	B65-10054	01	Oscillator circuit measures liquid level in tanks M-FS-245	B65-10209	01
FM oscillator uses tetrode transistor JPL-82	B65-10055	01	Voltage controlled oscillator is easily aligned, has low phase noise JPL-510	B65-10223	01
Vibrating-membrane electrometer has high conversion gain ARC-38	B65-10056	01	Simple BCD circuit accurately counts to 24 GSFC-317	B65-10225	01
Feedback oscillator functions as low-level pulse stretcher GSFC-261	B65-10069	01	Simple circuit produces high-speed, fixed duration pulses GSFC-285	B65-10228	01

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## CIRCUIT CONT

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Electrometer preamplifier has drift correction feedback JPL-SC-074	B65-10267	01	Circuit prevents overcharging of secondary cell batteries GSFC-454	B66-10492	01
Electronic ohmmeter provides direct digital output GSFC-363	B65-10274	01	Electronic circuit delivers pulse of high interval stability MSC-673	B66-10501	01
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Multiphase clock-pulse generator uses simplified circuitry M-FS-297	B65-10353	01	Collector/collector guard ring balancing circuit eliminates edge effects JPL-SC-143	B66-10563	01
Adhesive-backed terminal board eliminates mounting screws MSC-173	B65-10396	01	Electronic circuit provides accurate sensing and control of dc voltage NU-0089	B66-10591	01
Dual-voltage power supply has increased efficiency LEWIS-107A	B66-10002	01	Multipurpose instrumentation cable provides integral thermocouple circuit NU-0108	B67-10046	01
Computer circuit calculates cardiac output MSC-274	B66-10006	01	Solid-state time-to-pulse-height converter developed ARG-170	B67-10053	01
Circuit exhibits power efficiency greater than 75 percent MSC-254	B66-10034	01	Circuit multiplies pulse width modulation, exhibits linear transfer function HQ-56	B67-10055	01
Miniature bioelectric device accurately measures and telemeters temperature ARC-52	B66-10057	01	Control circuit ensures solar cell operation at maximum power GSFC-432	B67-10061	01
Electronic phase-locked-loop speed control system is stable JPL-SC-084	B66-10232	01	Modified univibrator compensates for output timing errors ARG-85	B67-10130	01
Simplified circuit corrects faults in parallel binary information channels JPL-SC-090	B66-10261	01	Electronic frequency discriminator M-FS-2434	B67-10151	01
Simple circuit provides reliable multiple signal average and reject capability NU-0069	B66-10282	01	Subminiature deflection circuit operates integrated sweep circuits in TV camera MSC-1263	B67-10155	01
Circuit protects regulated power supply against overload current GSFC-453	B66-10292	01	Electrometer amplifier operates over dynamic range of five orders of magnitude ARC-75	B67-10199	01
Circuit provides accurate four-quadrant multiplication WDO-272	B66-10331	01	Experimental coherent fractional frequency multiplier at S-band M-FS-2427	B67-10250	01
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Function generator eliminates necessity of series summation GSFC-214	B66-10351	01	Fast-response frequency-to-analog converter M-FS-709	B67-10257	01
Feedback loop compensates for rectifier nonlinearity M-FS-384	B66-10382	01	Sensitive bridge circuit measures conductance of low-conductivity electrolyte solutions ARG-147	B67-10294	01
Control circuit maintains unity power factor of reactive load MSC-192	B66-10431	01	Circuit provides overcurrent protection to push-pull amplifier MSC-12033	B67-10300	01
Remote preamplifier circuit maintains stability over wide temperature range WDO-278	B66-10432	01	Digital-to-analog converter operates from low level inputs JPL-907	B67-10357	01
Shaft encoder presents digital output JPL-SC-191	B66-10436	01	Multiple meter monitoring circuits served by single alarm MSC-10984	B67-10369	01
Semiconductors can be tested without removing them from circuitry M-FS-1163	B66-10447	01	Circuit automatically calibrates flowmeter against liquid-level gage reference		

M-FS-2194	B67-10376	01	CIRCUIT BOARD
Series transistors isolate amplifier from flyback voltage			
MSC-11023	B67-10468	01	
Improved circuit for measuring capacitive and inductive reactances			
M-FS-13083	B67-10513	01	
Circuit measures hysteresis loop areas at 30 Hz			
M-FS-13069	B67-10519	01	
Adaptive control circuit prevents amplifier saturation			
ERC-10026	B67-10648	02	
CIRCUIT BOARD			
Modular chassis simplifies packaging and interconnecting of circuit boards			
JPL-236A	B63-10174	01	
Handtool bends component leads accurately			
M-FS-308	B65-10181	05	
Handtool facilitates extraction of circuit modules			
LANGLEY-38	B65-10231	05	
Fixture aids soldering of electronic components on circuit board			
ARC-56	B66-10162	01	
Device serves as hinge and electrical connector for circuit boards			
M-FS-743	B66-10359	01	
Process produces accurate registry between circuit board prints			
LANGLEY-288	B66-10660	02	
Study made of anodized aluminum circuit boards			
M-FS-13580	B67-10425	01	
Aluminum heat sink enables power transistors to be mounted integrally with printed circuit board			
M-FS-13663	B67-10426	01	
Areas of irregular, discontinuous patterns rapidly and accurately measured			
GSFC-10184	B67-10674	01	
CIRCUIT PROTECTION			
Rugged microelectronic module package supports circuitry on heat sink			
MSC-81A	B66-10245	01	
Trisphere spark gap actuates overvoltage relay			
ARC-68	B66-10557	01	
Solid-state recoverable fuse functions as circuit breaker			
GSFC-560	B66-10691	01	
Fused diode provides visual indication of fuse condition			
KSC-67-16	B67-10230	01	
CIRCUIT RELIABILITY			
Logic circuit exhibits optimum performance			
LANGLEY-129	B65-10193	01	
Two-light circuit continuously monitors ac ground, phase, and neutral wires			
MSC-356	B66-10163	01	
Complementary monostable circuits achieve low power drain and high reliability			
GSFC-433	B66-10179	01	
Test and inspection for process control of monolithic circuits			
M-FS-13084	B67-10507	01	
			CIRCULAR CYLINDER
			A design procedure for the weight optimization of straight finned radiators
			GSFC-547
			B66-10618
			05
			Digital computer program predicts effects of local pressure transients on deformation and stresses in cylindrical ducts
			M-FS-13058
			B67-10631
			06
			CIRCULAR PLATE
			Equations provide tubular information on effects of uniform and variable loads on thin, flat, circular plates
			ARG-151
			B66-10601
			05
			CLAMP
			Novel clamps align large rocket cases, eliminate back-up bars
			M-FS-1
			B63-10376
			05
			Transistorized circuit clamps voltage with 0.1 percent error
			GSFC-196
			B65-10118
			01
			Self-aligning fixture used in lathe chuck jaw refacing
			FRC-21
			B65-10198
			05
			Electrical cable connector-clamp has smooth exterior surface
			MSC-154
			B65-10201
			05
			Remotely operated clamping tool has positive grip
			NU-0020
			B65-10254
			05
			Resilient clamp holds fuel cell stack through thermal cycle
			MSC-313
			B66-10035
			05
			Calibrated clamp facilitates pressure application
			MSC-298
			B66-10059
			05
			Fixture aids soldering of electronic components on circuit board
			ARC-56
			B66-10162
			01
			Lifting clamp positively grips structural shapes
			M-FS-593
			B66-10176
			05
			Cylindrical claw clamp has quick release feature
			M-FS-513
			B66-10213
			05
			Swiveling lathe jaw concept for holding irregular pieces
			M-FS-783
			B66-10321
			05
			Latching mechanism operates in limited access area
			MSC-230
			B66-10338
			05
			Micromanipulation tool is easily adapted to many uses
			JPL-129
			B67-10004
			05
			Tool facilitates installation of Marmon clamps
			M-FS-2039
			B67-10105
			05
			Clamp provides efficient connection for high-density currents
			M-FS-2417
			B67-10140
			01
			Cable clamp bolt fixture facilitates assembly in close quarters
			KSC-67-80
			B67-10244
			05
			CLEAN ROOM
			Cleanroom air sampler counts, categorizes, and records particle data
			M-FS-2221
			B67-10076
			01
			Fogging technique used to coat magnesium with plastic
			LEWIS-10316
			B67-10584
			03

## CLEANING

Stringent cleaning technique assures reliable epoxy bond  
GSFC-161 B64-10142 03

Portable tool cleans pipes and tubing  
MSC-238 B65-10375 05

Surfactant for dye-penetrant inspection is insensitive to liquid oxygen  
M-FS-475 B66-10131 03

Portable sandblaster cleans small areas  
MSC-523 B66-10242 05

Ultrasonic cleaning restores depth-type filters  
M-FS-540 B66-10298 03

Grit blasting nozzle fabricated from mild tool steel proves satisfactory  
M-FS-1420 B66-10597 05

Silver plating technique seals leaks in thin wall tubing joints  
NU-0090 B66-10703 05

Degreasing of titanium to minimize stress corrosion  
LEWIS-382 B67-10147 03

Liquid oxygen ducting cleaned by falling film method  
M-FS-11816 B67-10299 03

Fogging technique used to coat magnesium with plastic  
LEWIS-10316 B67-10584 03

## CLEAVAGE

Electronic modules easily separated from heat sink  
MSC-142 B65-10186 02

## CLOCK

Variable frequency magnetic multivibrator generates stable square-wave output  
GSFC-AE-21 B65-10124 01

Simple BCD circuit accurately counts to 24  
GSFC-317 B65-10225 01

## CLOSED CIRCUIT TELEVISION

Infrared television used to detect hydrogen fires  
M-FS-654 B66-10363 01

Closed circuit TV system monitors welding operations  
MSC-11002 B67-10162 01

Thermal neutron image intensifier tube provides brightly visible radiographic pattern  
ARG-120 B67-10296 02

## CLOSED LOOP SYSTEM

Photoresistance analog multiplier has wide range  
GSFC-360 B65-10287 01

Closed loop operation eliminates need for auxiliary gas in high pressure pumping station  
M-FS-893 B66-10408 05

## CLOSURE

Valve designed with elastic seat  
JPL-442 B65-10040 05

Inflatable O-ring seal would ease closing of hatch cover plate  
MSC-740 B66-10385 05

Actuator device schedules rate of valve closure  
M-FS-1556 B66-10686 05

Self-sealing closure enables access to

several fluid containers  
NPD-10123 B67-10207 04

## CLUTCH

Quick-acting clutch disengages idle drive motor  
GSFC-143 B64-10028 05

Diaphragm spring gives clutch over-center toggle effect  
GSFC-499 B66-10297 05

## COATING

Elastomers bonded to metal surfaces seal electrochemical cells  
GSFC-168 B64-10113 03

Coating method enables low-temperature brazing of stainless steel  
NU-0030 B65-10250 03

Special coatings control temperature of structures  
GSFC-444 B65-10337 03

Pigmented coating resists thermal shock  
JPL-SC-083 B65-10354 03

Nickel/tin coating protects threaded fasteners in corrosive environment  
MSC-253 B65-10398 03

Fluoride coatings make effective lubricants in molten sodium environment  
LEWIS-229 B66-10005 03

PTFE-aluminum films serve as neutral density filters  
LANGLEY-189 B66-10017 02

Optically driven switch turn-off time reduced by opaque coatings  
JPL-SC-107 B66-10141 01

Epoxy-coated containers easily opened by wire band  
M-FS-592 B66-10174 05

Rubber-coated bellows improves vibration damping in vacuum lines  
LEWIS-273 B66-10187 02

Chromium oxide coatings improve thermal emissivity of alumina  
W00-263 B66-10227 03

Valve seat pores sealed with thermosetting monomer  
M-FS-900 B66-10322 03

Film coating permits low-force scribing  
MSC-990 B66-10609 03

Mechanism facilitates coating of inner surfaces of metal cylinders  
GSFC-515 B66-10698 05

Abraded cadmium-plated cable connectors repaired by conversion coating  
M-FS-1424 B67-10014 03

Dispersion of borax in plastic is excellent fire-retardant heat insulator  
ARG-5 B67-10016 03

Liquid crystals detect voids in fiberglass laminates  
LEWIS-10104 B67-10286 03

Scribable coating for plastic films  
MSC-11194 B67-10409 03

Study made of anodized aluminum circuit boards  
M-FS-13580 B67-10425 01

A method of determining combustion gas flow  
M-FS-13757 B67-10455 03

Flame sprayed dielectric coatings improve heat dissipation in electronic packaging M-FS-13569	B67-10534	01	Collapsible truss structure is automatically expandable GSFC-265	B65-10126	05
Bacteriostatic conformal coating for electronic components GSFC-10007	B67-10599	03	Collar positions strip stock used to form coil on mandrel JPL-198	B65-10130	05
<b>COAXIAL CABLE</b>			Spiral heater coils hand-formed with fixture LEWIS-208	B65-10192	05
Modified RF coaxial connector ends vacuum chamber wiring problem GSFC-150	B64-10010	01	Coiled sheet metal strip opens into tubular configuration GSFC-425	B66-10009	03
Compact coaxial connector for printed circuit adds reliability MSC-57	B64-10016	01	Auxiliary coil controls temperature of RF induction heater GSFC-428	B66-10067	01
Cutter and stripper reduces coaxial cable connection time ARC-40	B65-10094	05	Flexible coiled spline securely joins mating cylinders W00-270	B66-10172	05
Lightweight coaxial cable connector reduces signal loss JPL-720	B65-10244	01	Heat exchanger tubes supported in high vibration environment M-FS-1401	B66-10567	05
Boron trifluoride nuclear detector preamplifier uses single-cable connection LEWIS-178	B65-10255	01	Environmental control system for cryogenic testing of tensile specimens NUC-10523	B67-10618	02
Junction connectors permit strategic placement of television cameras KSC-66-22	B66-10391	01	<b>COLD CATHODE</b>		
Plug-in connector socket accepts coaxial cable end ARG-9	B66-10478	01	Cold cathode ionization gauge has rigid metal housing GSFC-445	B66-10041	01
High frequency wide-band transformer uses coax to achieve high turn ratio and flat response ARG-107	B66-10600	01	<b>COLD DRAWING</b>		
Connector acts as quick coupling in coaxial cable application JPL-803	B66-10621	01	Copper-acrylic enamel serves as lubricant for cold drawing of refractory metals ARG-54	B66-10471	05
Current pulse amplifier transmits detector signals with minimum distortion and attenuation NUC-10055	B67-10347	01	<b>COLD PRESSING</b>		
Coaxial cable stripping device facilitates RF cabling fabrication NPO-10315	B67-10419	05	Integral ribs formed in metal panels by cold-press extrusion M-FS-230	B65-10141	05
Broadband choke suppresses spurious currents in antenna structure MSC-10013	B67-10675	01	<b>COLD TRAP</b>		
<b>COBALT ALLOY</b>			Cold trap increases sensitivity of gas chromatograph M-FS-1617	B66-10517	03
New cobalt alloys have high-temperature strength and long life in vacuum environments LEWIS-47	B63-10351	03	<b>COLD WORKING</b>		
Process yield Co-Fe alloys with superior high temperature magnetic properties LEWIS-333	B66-10535	03	Radial coolant channels fabricated by simplified method NU-0070	B66-10267	05
<b>CODING</b>			Excellent spring properties developed in two nickel alloys for use at cryogenic temperatures NUC-10084	B67-10349	03
Coded photographic proof paper could serve as convenient densitometer M-FS-13374	B67-10443	02	<b>COLLECTOR</b>		
<b>CODING SYSTEM</b>			Wide-aperture solar energy collector is light in weight JPL-SC-055	B65-10046	02
Improved digital TV encoding and decoding system MSC-11147	B67-10562	01	Plastic bags in evacuated chamber make lightweight gas sampling system FRC-31	B65-10264	01
<b>COIL</b>			Removable well in reaction flask facilitates carbon dioxide collection ARC-47	B65-10316	03
Improved magnetometer uses toroidal gating coil GSFC-249	B65-10103	01	Vapor grown silicon dioxide improves transistor base-collector junctions GSFC-389	B66-10091	01
			Air sampler collects and protects minute particles HQ-10037	B67-10661	01
			<b>COLLOID</b>		
			Magnetic fluid readily controlled in zero gravity environment LEWIS-126	B65-10335	03
			Colloidal suspension simulates linear dynamic pressure profile		



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W00-266	B66-10214	05	traveling-wave maser GSFC-292	B65-10165	01
<b>COLOR PERCEPTION</b>			Lightweight coaxial cable connector reduces signal loss	B65-10244	01
Slide rule-type color chart predicts reproduced photo tones	B66-10680	01	JPL-720		
<b>COLOR PHOTOGRAPHY</b>			Monitor assures availability and quality of communication channels	B67-10028	01
Device to color modulate a stationary light beam gives high intensity	B66-10476	01	KSC-66-38		
<b>COLORIMETRY</b>			Personal communication system combines high performance with miniaturization	B67-10119	01
Test strips detect different CO2 concentrations in closed compartments	B65-10390	03	MSC-720		
Automated urinalysis technique determines concentration of creatine and creatinine by colorimetry	B67-10245	04	Concept for automatic Doppler compensation in two-way communication systems	B67-10643	01
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<b>COMMUNICATIONS DEVICE</b>			Simple circuit produces high-speed, fixed duration pulses	B65-10228	01
Simple colorimetric method determines uranium in tissue	B67-10580	03	GSFC-285		
ARG-10039			Circuit maintains digital decision threshold at preset level	B65-10281	01
<b>COLUMN</b>			M-FS-331		
Extendible column can be stowed on drum	B65-10191	05	<b>COMMUNICATIONS SATELLITE</b>		
JPL-686			Omnidirectional antennas transmit and receive over large bandwidth	B66-10133	01
Cone and column solar energy concentrator	B67-10517	01	GSFC-436		
LANLEY-210			<b>COMMUTATOR</b>		
<b>COMBUSTION</b>			Brushless dc motor has high efficiency, long life	B66-10355	01
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FRC-31			Solid-state switch increases switching speed	B66-10430	01
Infrared television used to detect hydrogen fires	B66-10363	01	W00-298		
M-FS-654			Current steering commutator offers versatility	B67-10410	01
Hydrogen fire detection system features sharp discrimination	B66-10368	01	JPL-812		
M-FS-643			Computer memory access technique	B67-10585	01
Computer program determines chemical equilibria in complex systems	B66-10671	01	NPO-10201		
LEWIS-281			<b>COMPARATOR</b>		
Toroidal ring prevents gas ignition at vent stack outlet	B67-10098	05	FET comparator detects analog signal levels without loading analog device	B66-10224	01
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<b>COMBUSTION CHAMBER</b>			Thermoelectric metal comparator determines composition of alloys and metals	B67-10035	01
Combustion chamber inlet manifold separates vapor from liquid	B66-10052	05	ARG-235		
M-FS-531			Electronic frequency discriminator	B67-10151	01
Microminiature thermocouple monitors own installation	B66-10463	05	M-FS-2434		
M-FS-1111			Stable ac phase and amplitude comparator	B67-10459	01
Combustion chamber struts can be effectively transpiration cooled	B66-10643	03	M-FS-13086		
M-FS-1830			Simple first order data compression processor concept	B67-10553	01
<b>COMBUSTION INSTABILITY</b>			NPO-10338		
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M-FS-13789			Fastener provides cooling and compensates for thermal expansion	B65-10038	05
<b>COMBUSTION STABILITY</b>			NU-0003		
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M-FS-13757			Detector circuit compensates for vidicon beam current variations	B65-10212	01
<b>COMMAND MODULE</b>			GSFC-310		
Analytical technique characterizes all trace contaminants in water	B67-10243	03	Modified univibrator compensates for output timing errors	B67-10130	01
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Remote control electrical switching system has 1000-output capability	B65-10318	01	CINDA - Chrysler improved numerical differencing analyzer computer program	B67-10278	06
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<b>COMMUNICATION SYSTEM</b>			<b>COMPONENT RELIABILITY</b>		
Superconductor magnets used for stagger-tuning			Improved insertion-loss tester	B64-10080	01
			JPL-358		

- Analog-to-digital converter has increased reliability and reduced power consumption  
GSFC-246 B65-10194 01
- Interferometer construction assures parallelism of critical components  
JPL-704 B65-10292 02
- Semiautomatic device tests components with biaxial leads  
MSC-516 B66-10337 05
- Analytical technique permits comparison of reliability of alternate mechanical designs  
NUC-10065 B67-10261 06
- Stabilizing stainless steel components for cryogenic service  
M-FS-13127 B67-10377 05
- Study made of acoustical monitoring for mechanical checkout  
M-FS-13372 B67-10430 02
- Jet engine powers large, high-temperature wind tunnel  
M-FS-13544 B67-10621 02
- Development of dual solid cryogens for high reliability refrigeration system  
GSFC-10188 B67-10644 02
- Development of reliability prediction technique for semiconductor diodes  
GSFC-10231 B67-10651 06
- COMPOSITE MATERIAL**
- Aluminum/steel wire composite plates exhibit high tensile strength  
M-FS-401 B66-10262 05
- Tungsten fiber-reinforced copper composites form high strength electrical conductors  
LEWIS-338 B66-10572 03
- Composite weld rod corrects individual filler weaknesses  
M-FS-1923 B67-10107 05
- Aluminum-titanium hydride-boron carbide composite provides lightweight neutron shield material  
NUC-10069 B67-10265 03
- Study made of mechanics of deformation and fracture of fibrous composites  
HQ-10035 B67-10660 03
- COMPOSITE STRUCTURE**
- Composite seal reduces alkaline battery leakage  
GSFC-337 B65-10271 01
- Flexible coiled spline securely joins mating cylinders  
WOO-270 B66-10172 05
- Composite bulkhead fabrication development  
M-FS-1264 B66-10582 05
- Composite solar cell matrix is reliable, lightweight and flexible  
NPO-10821 B67-10503 01
- Nondestructive testing techniques used in analysis of honeycomb structure bond strength  
M-FS-1214 B67-10574 01
- COMPRESSIBILITY**
- Bellows joint absorbs torsional deflections in duct system  
M-FS-882 B66-10332 05
- COMPRESSIBLE FLOW**
- Computer program determines gas flow rates in piping systems  
M-FS-443 B66-10300 01
- COMPRESSIBLE FLUID**
- Coaxial capacitor used to determine fluid density  
LEWIS-232 B65-10296 02
- COMPRESSION**
- Resonant frequency can be adjusted on vibration mount  
JPL-SC-134 B66-10672 05
- Isostatic compression process converts polyaromatics into structural material  
JPL-892 B67-10168 03
- Improved compression molding process  
LANGLEY-10027 B67-10302 03
- Fluorocarbon seal replaces metal piston ring in low density gas environment  
LEWIS-10277 B67-10591 05
- COMPRESSOR BLADE**
- Wire material reduces compressor blade vibration  
LEWIS-357 B66-10666 03
- COMPUTATION**
- Disk calculator indicates legible lettering size for slide projection  
GSFC-409 B65-10339 05
- New technique for determination of cross-power spectral density with damped oscillators  
M-FS-14022 B67-10602 02
- COMPUTER**
- Computer determines high-frequency phase stability  
GSFC-113 B63-10555 01
- Improved wire memory matrix uses very little power  
JPL-SC-167 B65-10359 01
- Computer circuit calculates cardiac output  
MSC-274 B66-10006 01
- Triple Modular Redundancy /TMR/ computer operation improved  
MSC-831 B67-10085 01
- Logic realization of simple majority voting connectives  
JPL-727 B67-10511 06
- Phase plane displays detect incipient failure in servo system testing  
HQ-10018 B67-10662 01
- COMPUTER DESIGN**
- Modular chassis simplifies packaging and interconnecting of circuit boards  
JPL-236A B63-10174 01
- Veitch diagram plotter simplifies boolean functions  
JPL-385 B63-10241 05
- Transfluxor circuit amplifies sensing current for computer memories  
JPL-406 B63-10255 01
- Computer circuit will fit on single silicon chip  
JPL-513 B63-10514 01
- New sintering process adjusts magnetic value of ferrite cores  
GSFC-129 B63-10606 01
- Molded elastomer provides compact ferrite-core holder, simplifies assembly  
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- Computer memory access technique  
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Density trace made with computer printout  
GSFC-322 B65-10200 01

Uppercase and lowercase computer printout increases readability  
HQ-12 B65-10286 01

Delayed ripple counter simplifies square-root computation  
GSFC-398 B65-10343 01

Instrument calculates moments of inertia of complex plane figures  
MSC-628 B66-10306 01

Human transfer functions used to predict system performance parameters  
LANGLEY-203 B66-10379 01

System monitors discrete computer inputs  
M-FS-1021 B66-10389 01

Study compares methods for the numerical solution of ordinary differential equations  
M-FS-830 B66-10466 01

Computational procedure for finite difference solution of one-dimensional heat conduction problems reduces computer time  
MSC-1120 B66-10566 01

Computer/PERT technique monitors actual versus allocated costs  
LEWIS-260 B67-10025 01

Automatic telemetry checkout system  
M-FS-12580 B67-10402 01

## COMPUTER PROGRAM

Computer programs simplify optical system analysis  
GSFC-306 B65-10093 01

Fortran program flowchart is automatically produced  
M-FS-369 B66-10062 01

Computer program simplifies selection of structural steel columns  
NU-0044 B66-10097 01

Computer program determines gas flow rates in piping systems  
M-FS-443 B66-10300 01

New computer program solves wide variety of heat flow problems  
M-FS-421 B66-10404 01

Computer program performs flow analysis through turbines  
LEWIS-236 B66-10496 01

Computer program determines performance efficiency of remote measuring systems  
M-FS-1137 B66-10503 01

Subroutine allows easy computation in extended precision arithmetic  
M-FS-1136 B66-10504 01

Computer program determines inventory size  
M-FS-1135 B66-10506 01

Computer routine adds plotting capabilities to existing programs  
GSFC-490 B66-10511 01

Computer program performs statistical analysis for random processes  
M-FS-723 B66-10525 01

Computer programs perform spectral analyses of up to seven time series

M-FS-1133 B66-10539 01

Computer used to program numerically controlled milling machine  
M-FS-1608 B66-10541 01

Ultrasonic quality inspection of bonded honeycomb assemblies is automated  
MSC-859 B66-10544 01

Computer programs calculate potential and charge distributions in a plasma  
M-FS-871 B66-10553 01

Computer program simplifies transient and steady-state temperature prediction for complex body shapes  
MSC-989 B66-10619 01

Computer program determines chemical composition of physical system at equilibrium  
MSC-1119 B66-10670 01

Computer program determines chemical equilibria in complex systems  
LEWIS-281 B66-10671 01

Program computes single-point failures in critical system designs  
MSC-603 B67-10001 01

Computer program detects transient malfunctions in switching circuits  
MSC-604 B67-10002 01

Computer program simulates design, test, and analysis phases of sensitivity experiments  
M-FS-1496 B67-10077 01

Translator program converts computer printout into Braille language  
M-FS-2061 B67-10087 01

Polynomial manipulator AP-168  
MSC-1231 B67-10103 01

Computer program reduces calculation time of normal response functions  
M-FS-1517 B67-10108 01

Computer program calculates monotonic maximum likelihood estimates using method of reversals  
M-FS-1516 B67-10136 01

A power-spectral-density computer program  
NPO-10126 B67-10160 01

Study of dynamic response of elastic space stations  
NPO-10124 B67-10169 06

Space trajectories program for IBM 7090  
NPO-10125 B67-10172 06

Linear circuit analysis program for IBM 1620 Monitor II, 1311/1443 data processing system /CIRCS/  
NPO-10131 B67-10173 06

Computer program simulates physical systems by solving the simultaneous differential equations describing the systems  
NPO-10019 B67-10193 06

A modal combination computer program for dynamic analysis of structures  
NPO-10129 B67-10217 06

Calculation of resonance neutron absorption in two-region problems /the GAROL code/  
NUC-10045 B67-10223 06

Computer program calculates steady-state temperature distribution within plane or axisymmetric solids  
NUC-10049 B67-10224 06

## COMPUTER PROGRAM CONT

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Land landing couch dynamics computer program MSC-1210 B67-10233 06	manufacturing planning NUC-10073 B67-10348 06
Computer program simplifies design of rotating components of turbomachinery NUC-10046 B67-10235 06	Computer program for network synthesis by frequency response fit M-FS-12686 B67-10406 06
Computer program samples digital data for CRT display MSC-999 B67-10249 01	Earth orbit rendezvous evaluation program M-FS-13016 B67-10407 06
CINDA - Chrysler improved numerical differencing analyzer computer program M-FS-2298 B67-10278 06	Computer program generates averaged value data tapes M-FS-12728 B67-10411 06
Computer program for determination of natural frequencies of closed spherical sandwich shells MSC-1246 B67-10279 06	Computer program provides steady state analysis for liquid propellant propulsion systems MSC-10064 B67-10414 06
Master control data handling program uses automatic data input M-FS-2259 B67-10280 06	Computer program analyzes generalized environmental control and life support systems MSC-1157 B67-10415 06
Computer program predicts thermal and flow transients experienced in a reactor loss- of-flow accident NUC-10054 B67-10281 06	Computer program FPIP-REV calculates fission product inventory for U-235 fission NUC-10089 B67-10450 06
Computer program provides linear sampled- data analysis for high order systems M-FS-12821 B67-10287 06	Computer program MCAP-TOSS calculates steady-state fluid dynamics of coolant in parallel channels and temperature distribution in surrounding heat-generating solid NUC-10042 B67-10456 06
Computer program uses Monte Carlo techniques for statistical system performance analysis M-FS-2234 B67-10306 06	Computer program MCAP provides for steady state thermal and flow analysis of multiple parallel channels in heat generating solid NUC-10043 B67-10457 06
Computer program determines thermal environment and temperature history of lunar orbiting space vehicles M-FS-12916 B67-10307 06	Computer program conducts facilities utilization and occupancy survey NPD-10326 B67-10476 06
Computer program for mass optional solutions of some endpoint trajectory problems M-FS-12976 B67-10310 06	KOPE /Kalendar Oriented Program Efforts/ provides data for management decisions M-FS-12331 B67-10478 06
Computer program utilizes Fortran IV subroutines for contour plotting NPD-10127 B67-10323 06	Fortran IV program for two-impulse rendezvous analysis M-FS-13971 B67-10479 06
Multiple correlation computer program determines relationships between several independent and dependent variables M-FS-13024 B67-10327 06	Computer program calculates sonic-boom pressure signatures LANGLEY-10096 B67-10489 06
Computer optimization program finds values for several independent variables that minimize a dependent variable M-FS-13030 B67-10328 06	Computer program uses characteristics method for free-jet investigation LANGLEY-10117 B67-10490 06
Computer program resolves radiative, conductive, and convective heat transfer problems for variety of geometries M-FS-1910 B67-10329 06	Material fatigue data obtained by card- programmed hydraulic loading system LANGLEY-10042 B67-10491 03
Improved computer program for elastic analysis of highly redundant structural configurations M-FS-13087 B67-10330 06	Computer program reduces and provides profile plot of surface plate calibration data M-FS-13866 B67-10492 06
General purpose computer programs for numerically analyzing linear ac electrical and electronic circuits for steady-state conditions M-FS-13094 B67-10331 06	Assembly processor program converts symbolic programming language to machine language M-FS-13262 B67-10493 06
Computer subroutine ISUDS accurately solves large system of simultaneous linear algebraic equations NUC-10051 B67-10344 06	Computer program performs aerothermodynamic flight test data correlation MSC-10075 B67-10494 06
Computer program VARI-QUIR III provides solution of steady-state, multigroup, two- dimensional neutron diffusion equations NUC-10052 B67-10345 06	Multidimensional reaction kinetic ablation program /REKAP/ MSC-10079 B67-10495 06
Computerized parts list system coordinates engineering releases, parts control, and	Computer programs for antenna feed system design and analysis NPD-10359 B67-10504 06
	Program computes equilibrium normal shock

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## CONDUCTOR

and stagnation point solutions for arbitrary gas mixtures LANGLEY-10090	B67-10509	06	COMPUTER PROGRAMMING New computer system simplifies programming of mathematical equations M-FS-441	B66-10361	01
Computer program performs rectangular fitting stress analysis M-FS-13010	B67-10520	06	Self-starting procedure simplifies numerical integration ARC-50	B67-10013	01
General frequency response program calculates frequency response of system, open at any specified element M-FS-12817	B67-10521	06	Structural Analysis and Matrix Interpretive System /SAMIS/ NPO-10130	B67-10171	01
Computerized schedule effectiveness technique /SET/ determines present and future schedule position M-FS-13012	B67-10522	06	COMPUTER SIMULATION Computer simulation program is adaptable to industrial processes LEWIS-240	B66-10426	01
Analysis of dynamic systems with DAP4H computer program M-FS-13999	B67-10523	06	Video signal processing system uses gated current mode switches to perform high speed multiplication and digital-to-analog conversion MSC-781	B66-10429	01
DYANA - An advanced programming system for large classes of dynamic and equivalent systems B67-10524	06		Equivalent circuit for a field effect transistor established for computer simulation M-FS-1752	B66-10690	01
Program computes zero lift wave drag of entire aircraft LANGLEY-10079	B67-10530	06	Computer program simulates physical systems by solving the simultaneous differential equations describing the systems NPD-10019	B67-10193	06
Computer program provides improved longitudinal response analysis for axisymmetric launch vehicles LANGLEY-10093	B67-10531	06	Transient Analysis Generator /TAG/ simulates behavior of large class of electrical networks NPD-10031	B67-10319	06
N-SAP and G-SAP neutron and gamma ray albedo model scatter shield analysis program NUC-10126	B67-10536	06	Computer program performs rectangular fitting stress analysis M-FS-13010	B67-10520	06
SDC-DS computer code provides tool for design evaluation of homogeneous two-material nuclear shield NUC-10142	B67-10537	06	CONCRETE Post-stressed concrete foundation may reduce machinery vibration ARG-130	B67-10237	05
Computer program calculates peripheral water injection cooling of axisymmetric subsonic diffuser NUC-10541	B67-10543	06	CONDENSATION Crystal microbalance measures condensable molecular fluxes JPL-845	B67-10012	03
Computer program for optical systems ray tracing FRC-10017	B67-10549	06	CONDENSER Vapor condensation process produces slurry of magnesium particles in liquid hydrocarbons LEWIS-263	B66-10104	03
Computer program ETC improves computation of elastic transfer matrices of Legendre polynomials P/0/ and P/1/ NUC-10070	B67-10566	06	CONDUCTING MEDIUM Compound improves thermal interface between thermocouple and sensed surface NU-0028	B66-10121	02
Propellant tank pressurization analysis program M-FS-1506	B67-10625	06	Inductive system detects level of conducting fluids LEWIS-322	B66-10392	01
Computer program for video data processing system /VDPS/ NPD-10042	B67-10630	06	Composite solar cell matrix is reliable, lightweight and flexible NPD-10821	B67-10503	01
Digital computer program predicts effects of local pressure transients on deformation and stresses in cylindrical ducts M-FS-13058	B67-10631	06	CONDUCTIVITY Meter accurately measures flow of low-conductivity fluids JPL-0021	B63-10280	01
Digital program analyzes supersonic flow field within bell-shaped rocket nozzles M-FS-14292	B67-10664	06	CONDUCTIVITY METER Electronic circuitry used to automate paper chromatography JPL-840	B67-10201	01
Computer program calculates gamma ray source strengths of materials exposed to neutron fluxes NUC-10143	B67-10665	06	Sensitive bridge circuit measures conductance of low-conductivity electrolyte solutions ARG-147	B67-10294	01
Computer program calculates wing aerodynamic characteristics for fixed wings with dihedral and variable-sweep wings at subsonic speeds LANGLEY-10191	B67-10666	06	CONDUCTOR Plug-in connector socket accepts coaxial cable end		
Computer program /P1-GAS/ calculates the P-0 and P-1 transfer matrices for neutron moderation in a monatomic gas NUC-10141	B67-10678	06			

## CONE

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ARG-9	B66-10478	01	Lightweight coaxial cable connector reduces signal loss		
Logic circuitry used to automatically test shielded cables			JPL-720	B65-10244	01
HQ-60	B66-10659	01	Thermocouple-to-instrumentation connector features quick assembly		
Metal boot permits fabrication of hermetically sealed splices in metal sheathed instrumentation cables			NU-0022	B65-10246	05
NU-0083	B66-10704	05	Indexing device ensures proper mating of electrical connectors		
Adhesives for laminating polyimide insulated flat conductor cable			MSC-155	B65-10263	01
M-FS-12066	B67-10429	03	Feed-through connector withstands high temperatures in vacuum environment		
Protected, high-temperature connecting cable			GSFC-442	B65-10328	01
LEWIS-10149	B67-10461	01	Keyed plugs and sockets prevent improper connections		
CONE			MSC-231	B65-10381	01
Lathe attachment used to machine elliptical cones			Threaded split ring connector separates structural sections		
MSC-100	B65-10168	05	LANGLEY-145	B65-10383	05
Cone and column solar energy concentrator			Shrinkable sleeve eliminates shielding gap in RF cable		
LANGLEY-210	B67-10517	01	WOO-207	B65-10387	01
CONNECTOR			Floating device aligns blind connections		
Modular chassis simplifies packaging and interconnecting of circuit boards			MSC-256	B66-10007	05
JPL-236A	B63-10174	01	Single connector provides safety fuses for multiple lines		
Portable display paneling has wide use, easy take down and assembly			MSC-199	B66-10050	01
ARC-17	B63-10435	05	High-pressure, low temperature electrical connector makes no-leak seal		
Connector for thermocouple leads saves costly wire, makes reliable connectors			MSC-276	B66-10079	02
LANGLEY-26	B63-10529	01	Bismuth alloy potting seals aluminum connector in cryogenic application		
Plastic molds reduce cost of encapsulating electric cable connectors			WOO-260	B66-10138	03
M-FS-69	B63-10568	05	Rubber-coated bellows improves vibration damping in vacuum lines		
Circuit reliability boosted by soldering pins of disconnect plugs to sockets			LEWIS-273	B66-10187	02
JPL-447	B64-10002	01	Tool enables proper mating of accelerometer and cable connector		
Modified RF coaxial connector ends vacuum chamber wiring problem			M-FS-611	B66-10208	05
GSFC-150	B64-10010	01	Pressure-welded flange assembly provides leaktight seal at reduced bolt loads		
Compact coaxial connector for printed circuit adds reliability			M-FS-640	B66-10247	05
MSC-57	B64-10016	01	Diffusion bonding makes strong seal at flanged connector		
Continuity tester screens out faulty socket connections			M-FS-637	B66-10250	05
JPL-596	B64-10065	01	Polarizing keys prevent mismatch of connector plugs and receptacles		
Connector seals fluid lines at cryogenic temperatures and high vacuums			MSC-443	B66-10251	01
GSFC-253	B64-10327	05	Exclusive-or logic circuit has useful properties		
Gage measures electrical connector pin retention force			LANGLEY-214	B66-10272	01
JPL-SC-071	B65-10034	03	Device serves as hinge and electrical connector for circuit boards		
Feed-through has polyterminal feature			M-FS-743	B66-10359	01
M-FS-25	B65-10057	01	Junction connectors permit strategic placement of television cameras		
Cutter and stripper reduces coaxial cable connection time			KSC-66-22	B66-10391	01
ARC-40	B65-10094	05	Modified pliers facilitate coupling of bayonet-type connectors		
New nut and sleeve improve flared connections			M-FS-1344	B66-10417	05
M-FS-194	B65-10180	05	Connector acts as quick coupling in coaxial cable application		
Improved solderless connector is easily disconnected			JPL-803	B66-10621	01
JPL-SC-060	B65-10197	01	Process reduces secondary resonant emission in electronic components		
Electrical cable connector-clamp has smooth exterior surface			JPL-934	B66-10685	01
MSC-154	B65-10201	05	Abraded cadmium-plated cable connectors repaired by conversion coating		
Electrical probe ensures reliable contact in socket					
M-FS-315	B65-10215	01			

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## CONTINUOUS FUNCTION

M-FS-1424	B67-10014	03	JPL-320	B66-10085	01
Orbital tube flaring system produces tubing connectors with zero leakage			Epoxy-coated containers easily opened by wire band		
M-FS-2016	B67-10019	05	M-FS-592	B66-10174	05
Feed-through connector couples RF power into vacuum chamber			Fiberglass container shells form contamination-free storage units		
NU-0096	B67-10027	01	WOO-275	B66-10217	05
Edge-type connectors evaluated by electrical noise measurement			Special tool kit aids heavily garmented workers		
M-FS-2243	B67-10125	01	MSC-163	B66-10403	05
Clamp provides efficient connection for high-density currents			Seal-off assembly permits rapid evacuation of air from containers		
M-FS-2417	B67-10140	01	GSFC-513	B66-10446	05
Spherical joint connects axially misaligned flanges			Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys		
M-FS-2238	B67-10273	05	ARG-199	B66-10594	03
Protected, high-temperature connecting cable			An improved nuclear magnetic resonance spectrometer		
LEWIS-10149	B67-10461	01	JPL-762	B67-10234	01
Composite solar cell matrix is reliable, lightweight and flexible			Method prevents secondary radiation in radiographic inspection		
NPO-10821	B67-10503	01	M-FS-13383	B67-10391	02
Flat cable insulation stripping machine			<b>CONTAMINANT</b>		
M-FS-13776	B67-10581	05	Sensor detects hydrocarbon oil contaminants in fluid lines		
Reconnect mechanism			M-FS-522	B66-10068	01
M-FS-12968	B67-10670	05	Quartz crystals detect gas contaminants during vacuum chamber evacuation		
<b>CONSTRUCTION</b>			NPO-10144	B67-10205	01
Computer program simplifies selection of structural steel columns			Tool samples subsurface soil free of surface contaminants		
NU-0044	B66-10097	01	MSC-10988	B67-10473	05
Large capacitor performs as a distributed parameter pulse line			<b>CONTAMINATION</b>		
LEWIS-176	B66-10291	01	Magnetic field controls carbon arc tail flame		
Composite bulkhead fabrication development			MSC-139	B65-10108	01
M-FS-1264	B66-10582	05	Double gloves reduce contamination of dry box atmosphere		
Swing-out rail system separates overhead crane rails			LEWIS-211	B65-10117	03
NU-0094	B66-10713	05	Radioactive tracer system detects oil contaminants in fluid lines		
<b>CONTACT</b>			M-FS-512	B66-10090	03
Improved holder protects crystal during high acceleration and impact			Tool provides constant purge during tube welding		
JPL-463	B65-10037	05	M-FS-547	B66-10093	05
Technique eliminates high voltage arcing at electrode-insulator contact area			Insert sleeve prevents tube soldering contamination		
LEWIS-10133	B67-10470	01	MSC-552	B66-10238	05
<b>CONTACT LENS</b>			Union would facilitate joining of tubing, minimize braze contamination		
Thin transparent films formed from powdered glass			MSC-777	B66-10311	05
GSFC-352	B65-10217	03	Brazing retort manifold design concept may minimize air contamination and enhance uniform gas flow		
<b>CONTACT POTENTIAL</b>			M-FS-707	B66-10371	05
Electrometer has automatic zero bias control			Tungsten insulated susceptor cup for high temperature induction furnace eliminates contamination		
GSFC-350	B65-10242	01	LEWIS-283	B66-10538	03
Rugged pressed disk electrode has low contact potential			Apparatus for fabrication of americium-beryllium neutron sources prevents capsule contamination		
MSC-158	B65-10320	01	ARG-184	B67-10202	05
<b>CONTACT RESISTANCE</b>			Wear studies made of slip rings and gas bearing components		
Diffusion technique stabilizes resistor values			M-FS-12882	B67-10403	05
MSC-205	B66-10142	01	<b>CONTINUOUS FUNCTION</b>		
<b>CONTAINER</b>			Ball and socket joints provide accurate biaxial gimbal		
Lightweight magnesium-lithium alloys show promise					
M-FS-17	B63-10389	03			
Electrically heated diaphragm eliminates use of pyrotechnics					
MSC-241	B65-10400	01			
Seismometer designed for remote operation in random orientation					

## CONTINUOUS WAVE

## SUBJECT INDEX

JPL-658	B65-10205	05	source LEWIS-391	B67-10404	01
CONTINUOUS WAVE			CONTROL PANEL		
Continuous wave detector has wide frequency range			Steel test panel helps control additives in pyrophosphate copper plating		
M-FS-1849	B67-10386	01	LEWIS-10101	B67-10358	05
CONTINUOUS WAVE /CW/ RADAR			CONTROL SYSTEM		
FM/CW system measures aircraft attitude			Bidirectional torque filter eliminates backlash		
M-FS-276	B65-10290	01	GSFC-335	B65-10148	05
CONTOUR			Planetary camera control improves microfiche production		
Novel shock absorber features varying yield strengths			HQ-1	B65-10313	01
MSC-63A	B64-10138	03	Remote control electrical switching system has 1000-output capability		
Noncontacting vibration transducer has constant sensitivity			M-FS-380	B65-10318	01
LANGLEY-99	B65-10392	01	Control system maintains selected liquid level		
Computer program utilizes Fortran IV subroutines for contour plotting			M-FS-470	B66-10039	01
NPD-10127	B67-10323	06	System proportions fluid-flow in response to demand signals		
CONTROL DEVICE			GSFC-457	B66-10094	01
Knob linkage permits one-hand control of several operations			Electronic phase-locked-loop speed control system is stable		
MSC-30	B65-10022	05	JPL-SC-084	B66-10232	01
Simple control device senses solar position			Flow ring valve is simple, quick-acting		
JPL-638	B65-10061	01	M-FS-752	B66-10255	05
Pulsed plasma accelerator operates repetitively without complex controls			Linear signal noise summer accurately determines and controls S/N ratio		
LANGLEY-48	B65-10062	01	JPL-SC-152	B66-10433	01
Variable frequency magnetic multivibrator generates stable square-wave output			Rigid-body motion extracted from total motion of a flexible body		
GSFC-AE-21	B65-10124	01	ARC-63	B67-10081	05
Zener diode controls switching of large direct currents			Solid state circuit averages multiple signals and rejects those varying significantly from the average		
MSC-188	B65-10350	01	NUC-10066	B67-10262	01
Rack mount device quickly inserts or extracts chassis units			System precisely controls oscillation of vibrating mass		
MSC-244	B65-10385	05	M-FS-1875	B67-10276	01
Auxiliary coil controls temperature of RF induction heater			Vibrator elapsed time is automatically controlled		
GSFC-428	B66-10067	01	M-FS-2573	B67-10284	01
Control circuit maintains unity power factor of reactive load			Computer program provides linear sampled-data analysis for high order systems		
MSC-192	B66-10431	01	M-FS-12821	B67-10287	06
Automatic cryogenic liquid level controller is safe for use near combustible substances			Process controls introduction of selected impurities into semiconductor wafers		
LEWIS-195	B66-10482	01	GSFC-523	B67-10303	01
Fluid logic control circuit operates nutator actuator motor			Limit circuit prevents overdriving of operational amplifier		
LEWIS-294	B66-10593	05	NUC-10082	B67-10343	01
Gage accurately controls force for placing chips on substrates			Hydraulic system provides smooth control of large tracking and antenna drive systems at very low tracking rates		
M-FS-1941	B66-10675	01	NPD-10316	B67-10418	05
Elastic guides reduce hysteresis effect in Belleville spring package			Fire extinguisher control system provides reliable cold weather operation		
JPL-910	B67-10011	05	M-FS-13031	B67-10622	05
Variable-pulse switching circuit accurately controls solenoid-valve actuations			Nonreciprocal gain control for ring laser		
M-FS-1895	B67-10022	01	M-FS-14041	B67-10653	02
Improved fluid control circuit operates on low power input			Improved control system power unit for large parachutes		
LEWIS-325	B67-10042	01	MSC-12052	B67-10677	05
Heater control circuit provides both fast and proportional control			CONTROL VALVE		
M-FS-906	B67-10097	01	High-pressure regulating system prevents pressure surges		
Multiplexing control device enables handling of wide variations in sampling rates			JPL-231	B63-10170	05
M-FS-1871	B67-10150	01			
Control apparatus for spectral energy					



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# COOLING SYSTEM

Flow control valve is independent of pressure drop JPL-W00-039	B65-10121	05	nondissipative regulation GSFC-238	B64-10305	01
Improved fluid control valve extends diaphragm life JPL-345	B65-10147	05	Dc to ac converter operates efficiency at low input voltages GSFC-130	B65-10178	01
Fluid check valve has fail-safe feature JPL-0019	B65-10207	05	Efficient dc to dc converter eliminates large stray magnetic fields GSFC-463	B66-10376	01
Inexpensive check valve is installed in standard AN fittings JPL-2A	B65-10222	05	Low input voltage converter/regulator minimizes external disturbances GSFC-527	B66-10689	01
Ring valve responds to differential pressure changes W00-247	B66-10022	05	Solid-state time-to-pulse-height converter developed ARG-170	B67-10053	01
Pneumatic shutoff and time-delay valve operates at controlled rate M-FS-602	B66-10189	05	SiC/Si diode trigger circuit provides automatic range switching for log amplifier M-FS-1879	B67-10314	01
Segmented ball valve is easy to open and close W00-248	B66-10195	05	Solid state single-ended switching dc-to-dc converter M-FS-13598	B67-10558	01
Shock-operated valve would automatically protect fluid systems M-FS-801	B66-10335	05	Transistor **H** parameter conversion slide rule JPL-649	B67-10561	01
Diaphragm valve for corrosive and high temperature fluid flow control has unique features LEWIS-304	B66-10365	05	Scan rate converter for tape recording and playback of TV pictures NPD-10166	B67-10676	01
Automatic protective vent has fail-safe feature LANGLEY-218	B66-10369	05	<b>COOLANT</b>		
Rotary valve controls multiple hydraulic leveling cylinders M-FS-361	B66-10402	05	Integral coolant channels simply made by melt-out method M-FS-91	B63-10497	05
Electronic bidirectional valve circuit prevents crossover distortion and threshold effect MSC-193	B66-10420	01	Coldplate of pin fin design makes efficient heat exchanger MSC-1093	B67-10073	05
Miniature valve accurately controls small volume fluid flow ARG-66	B66-10473	05	Computer program MCAP-TOSS calculates steady-state fluid dynamics of coolant in parallel channels and temperature distribution in surrounding heat-generating solid NUC-10042	B67-10456	06
Spool valve cycles at controlled frequency MSC-143	B66-10495	05	High temperature thermocouple design provides gas cooling without increasing overall size of unit NUC-10515	B67-10497	01
In-tank shutoff valve is provided with maximum blast protection M-FS-1529	B66-10514	05	<b>COOLING</b>		
Study of vortex valve for medium temperature solid propellants LANGLEY-204	B66-10524	01	Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02
Monitoring circuit accurately measures movement of solenoid valve M-FS-1829	B66-10568	01	Boron nitride housing cools transistors W00-079	B65-10289	01
Fuel and oxidizer valve assembly employs single solenoid actuator MSC-1046	B66-10648	05	Welds chilled by liquid coolant manifold M-FS-679	B66-10354	05
Check valve installation in pilot operated relief valve prevents reverse pressurization M-FS-1925	B66-10655	05	Computer program calculates peripheral water injection cooling of axisymmetric subsonic diffuser NUC-10541	B67-10543	06
Valve effectively controls amount of contaminant in flow stream M-FS-1771	B66-10683	05	<b>COOLING SYSTEM</b>		
<b>CONVERSION</b>			Argon purge gas cooled by chill box M-FS-560	B66-10153	02
Fibers of newly developed refractory ceramics produced by improved process W00-169	B66-10196	03	Modular Porous Plate Sublimator /MPPS/ requires only water supply for coolant M-FS-1374	B66-10409	01
GMT/local-time conversion chart GSFC-10521	B67-10548	01	Water cooled anode increases life of high temperature arc lamp NPD-10180	B67-10247	02
<b>CONVERTER</b>			Computer program predicts thermal and flow transients experienced in a reactor loss-of-flow accident NUC-10054	B67-10281	06
Transistorized converter provides					

## COORDINATE SYSTEM

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## COORDINATE SYSTEM

Solar-angle sensor has no moving parts  
JPL-418 B63-10260 02

## COPPER

Adherent protective coatings plated on  
magnesium-lithium alloy  
M-FS-365 B65-10294 03

Copper foil provides uniform heat sink path  
MSC-262 B66-10004 02

Boron-deoxidized copper withstands brazing  
temperatures  
M-FS-762 B66-10273 03

Bypass rod transfers heat developed in  
thermionic diode  
JPL-SC-136 B66-10303 05

Copper wire plated with nickel and silver  
resists corrosion  
M-FS-761 B66-10421 03

Copper-acrylic enamel serves as lubricant  
for cold drawing of refractory metals  
ARG-54 B66-10471 05

Tungsten fiber-reinforced copper composites  
form high strength electrical  
conductors  
LEWIS-338 B66-10572 03

Nondestructive test method accurately sorts  
mixed bolts  
M-FS-1426 B66-10574 01

Plastic tubing protects flexible copper hose  
M-FS-772 B66-10588 05

Intergranular metal phase increases thermal  
shock resistance of ceramic coating  
M-FS-1862 B66-10651 03

Neutron activation analysis traces copper  
artifacts to geographical point of origin  
ARG-119 B67-10036 02

Correlation established between heat transfer  
and ultrasonic transmission properties of  
copper braze bonds  
ARG-247 B67-10037 02

Porous mandrels provide uniform  
deformation in hydrostatic powder  
metallurgy  
M-FS-1972 B67-10209 03

High-strength braze joints between copper  
and steel  
M-FS-2519 B67-10211 05

Adhesives for laminating polyimide  
insulated flat conductor cable  
M-FS-12066 B67-10429 03

Corrosion of aluminum alloys by chlorinated  
hydrocarbon/methanol mixtures  
MSC-11365 B67-10442 03

Copper and nickel adherently electroplated  
on titanium alloy  
M-FS-13952 B67-10532 03

Double copper sheath multiconductor  
instrumentation cable is durable and  
easily installed in high thermal or nuclear  
radiation area  
NUC-10007 B67-10538 01

## COPPER ALLOY

Coiled sheet metal strip opens into tubular  
configuration  
GSFC-425 B66-10009 03

Improved rolling element bearings provide  
low torque and small temperature rise in  
ultrahigh vacuum environment  
LEWIS-359 B66-10678 05

Study of crevice-galvanic corrosion of  
aluminum  
ARG-10013 B67-10583 03

## COPPER COMPOUND

Cuprous selenide and sulfide form improved  
photovoltaic barriers  
WOC-212 B66-10025 01

## COPPER SULFIDE

Crack detection method is safe in presence of  
liquid oxygen  
M-FS-236 B65-10107 03

## CORE

Improved carbon electrode reduces arc  
sputtering  
MSC-219 B66-10026 01

Efficient dc to dc converter eliminates  
large stray magnetic fields  
GSFC-463 B66-10376 01

Development of lunar drill to take core  
samples to 100-foot depths  
M-FS-13015 B67-10529 05

Ferromagnetic core valve gives rapid action  
on minimum energy  
LEWIS-10135 B67-10623 05

## CORK

Nylon bit removes cork insulation without  
damage to substrate  
MSC-381 B66-10152 05

Cork is used to make tooling patterns and  
molds  
MSC-425 B66-10328 05

## CORROSION

Corrosion of aluminum alloys by chlorinated  
hydrocarbon/methanol mixtures  
MSC-11365 B67-10442 03

## CORROSION PREVENTION

Carbon-arc rod holder has long life, reduces  
arc splatter  
MSC-144 B65-10095 03

Galvanic corrosion reduced in aluminum  
fabrications  
M-FS-272 B65-10140 03

Gallium alloy films investigated for use  
as boundary lubricants  
LEWIS-245 B66-10165 03

Soft-seal valve holds hazardous fluids  
safely  
LEWIS-275 B66-10216 05

Beryllium fluoride film protects beryllium  
against corrosion  
LEWIS-363 B67-10026 03

Variable reluctance switch avoids contact  
corrosion and contact bounce  
MSC-1178 B67-10137 01

Coating protects magnesium-lithium alloys  
against corrosion  
M-FS-2446 B67-10149 03

## CORROSION RESISTANCE

Removable preheater elements improve oxide  
induction furnace  
JPL-288 B63-10193 01

Filler device for handling hot corrosive  
materials  
MSC-85 B64-10166 03

Solder flux leaves corrosion-resistant  
coating on metal  
JPL-611 B64-10206 03

Wide-angle sensor measures radiant heat energy  
in corrosive atmospheres

## SUBJECT INDEX

## COUPLING

M-FS-228	B65-10019	05	Binary counter accumulates time by complementary preset	MSC-242	B65-10399	01	
Inexpensive electrical connector is moisture and corrosionproof	MSC-164	B65-10196	01	Queuing register uses fluid logic elements	M-FS-317	B66-10100	05
Nickel/tin coating protects threaded fasteners in corrosive environment	MSC-253	B65-10398	03	Ring counter circuit switches multiphase motor direction of rotation	JPL-SC-166	B66-10101	01
White primer permits a corrosion-resistant coating of minimum weight	M-FS-304	B66-10207	03	Low-power ring counter drives high-level loads	GSFC-431	B66-10106	01
Valve seat pores sealed with thermosetting monomer	M-FS-900	B66-10322	03	One-count memory circuit prevents machine mode interaction	ARG-90	B66-10559	01
Copper wire plated with nickel and silver resists corrosion	M-FS-761	B66-10421	03	Digital frequency counter permits readout without disturbing counting process	JPL-906	B66-10658	01
Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys	ARG-199	B66-10594	03	Strain gage circuitry provides fatigue testing machine with accurate cycle count	NU-0114	B67-10093	01
Treatment increases stress-corrosion resistance of aluminum alloys	M-FS-1840	B66-10595	05	COUNTERBALANCE SYSTEM			
Zirconium alloys with small amounts of iron and copper or nickel show improved corrosion resistance in superheated steam	ARG-226	B67-10050	03	Self-balancing beam permits safe, easy load handling under overhang	M-FS-84	B63-10571	05
Study made of corrosion resistance of stainless steel and nickel alloys in nuclear reactor superheaters	ARG-230	B67-10051	03	COUPLING			
Controlled ferrite content improves weldability of corrosion-resistant steel	M-FS-568	B67-10069	03	New coupling compensates for shaft misalignment	NU-0013	B65-10077	05
Study to minimize hydrogen embrittlement of ultrahigh-strength steels	M-FS-2455	B67-10141	03	Device disconnects several couplings simultaneously	JPL-226	B65-10163	05
Iron serves as diffusion barrier in thermally regenerative galvanic cell	ARG-29	B67-10189	03	Quick-disconnect coupling safe transfer of hazardous fluids	LEWIS-125	B65-10202	01
Study made of resistance of stainless steels to zinc-vapor corrosion	ARG-10055	B67-10582	03	Diaphragm eliminates leakage in cryogenic fluid duct coupling	W00-142	B65-10227	05
CORROSION TEST				Plugged hollow shaft makes fatigue-resistant shear pin	LANGLEY-195	B66-10077	05
Oxygen-hydrogen torch is a small-scale steam generator	NU-0042	B66-10120	03	Remotely controlled system couples and decouples large diameter pipes	NU-0062	B66-10276	05
Study made of procedures for externally loading and corrosion testing stress corrosion specimens	M-FS-12064	B67-10451	03	High pressure tube coupling requires no threads or flares	MSC-600	B66-10285	05
Study of corrosion of 1100 aluminum	ARG-10045	B67-10578	03	Diaphragm spring gives clutch over-center toggle effect	GSFC-499	B66-10297	05
Study of crevice-galvanic corrosion of aluminum	ARG-10013	B67-10583	03	Modified pliers facilitate coupling of bayonet-type connectors	M-FS-1344	B66-10417	05
COULOMETER				Rotational fluid coupling eliminates hose entanglements	MSC-312	B66-10585	05
Battery charge regulator is coulometer controlled	GSFC-561	B67-10446	01	Connector acts as quick coupling in coaxial cable application	JPL-803	B66-10621	01
COUNTER				Quick attach and release fluid coupling assembly is self-aligning, self-sealing	KSC-66-8	B66-10627	05
Ring counter may be advanced or retarded by command signal	GSFC-101	B64-10144	01	Device enables calibration of microphones at high sound pressure levels	M-FS-11980	B67-10336	01
Novel circuit combines pulse stretcher with nor gate	GSFC-187	B64-10150	01	Study of crevice-galvanic corrosion of aluminum	ARG-10013	B67-10583	03
Simple BCD circuit accurately counts to 24	GSFC-317	B65-10225	01				

<b>COVER</b>			<b>NPD-10149</b>	<b>B67-10245</b>	<b>04</b>		
Spray-on technique simplifies fabrication of complex thermal insulation blanket	M-FS-497	B66-10053	03	<b>CREATININE</b>			
Tool pre-tensions covers prior to lacing	MSC-631	B66-10301	05	Automated urinalysis technique determines concentration of creatine and creatinine by colorimetry	NPD-10149	B67-10245	04
Inflatable O-ring seal would ease closing of hatch cover plate	MSC-740	B66-10385	05	<b>CREEP RESISTANCE</b>			
Coaxial cable stripping device facilitates RF cabling fabrication	NPD-10315	B67-10419	05	Tantalum alloys resist creep deformation at elevated temperatures	LEWIS-350	B66-10558	03
Connector shorting cap provides pin alignment, inspection, and stray voltage protection	M-FS-13111	B67-10635	01	<b>CRITICAL LOADING</b>			
<b>CRACK</b>				Analysis of stability-critical orthotropic cylinders subjected to axial compression	M-FS-12869	B67-10375	03
Crack detection method is safe in presence of liquid oxygen	M-FS-236	B65-10107	03	<b>CROSS CORRELATION</b>			
Cracks in glass electrical connector headers removed by dry blasting with fine abrasive	LEWIS-381	B67-10148	03	Local measurements in turbulent flows through cross correlation of optical signals	M-FS-1268	B67-10030	01
Study of stress corrosion in aluminum alloys	M-FS-13906	B67-10533	03	<b>CROSS LINKING</b>			
Eddy current probe measures size of cracks in nonmetallic materials	M-FS-14059	B67-10645	03	Irradiation improves properties of an aromatic polyester	LANGLEY-115	B65-10164	03
<b>CRACK FORMATION</b>				<b>CROSSED FIELD</b>			
New brazing alloy eliminates metal-stress cracking	WOO-249	B65-10397	03	Improved design provides faster response time in photomultiplier	GSFC-451	B66-10526	01
Honeycomb seal backing ring increases turbopump disk life	M-FS-13303	B67-10607	05	<b>CRUCIBLE</b>			
<b>CRACK PROPAGATION</b>				Fabrication method produces high-grade alumina crucibles	M-FS-216	B65-10078	05
Crack growth measured on flat and curved surfaces at cryogenic temperatures	LEWIS-389	B67-10384	01	Crucible cast from beryllium oxide and refractory cement is impervious to flux and molten metal	ARG-22	B66-10527	03
<b>CRANE</b>				<b>CRYOGENIC EQUIPMENT</b>			
Speed-sensing device aids crane operators	WC-4	B64-10006	05	Cryogenic filter method produces super-pure helium and helium isotopes	JPL-374	B63-10235	03
Safety switch permits emergency bridge crane shutdown	M-FS-549	B66-10168	05	Composite, vacuum-jacketed tubing replaces bellows in cryogenic systems	LEWIS-67	B63-10368	05
Self-actuating grapple automatically engages and releases loads from overhead cranes	ARG-61	B66-10522	05	Cryogenic waveguide window is sealed with plastic foam	JPL-559	B63-10613	01
Swing-out rail system separates overhead crane rails	NU-0094	B66-10713	05	Sensitive low-pressure relief valve has positive seating against leakage	WOO-041	B64-10278	05
Square tubing reduces cost of telescoping bridge crane hoist	ARG-13	B67-10293	05	Automatic thermal switch accelerates cooling-down of cryogenic system	JPL-655	B65-10068	01
<b>CRANIUM</b>				Insulation accelerates rate of cooling with cryogenic fluid	MSC-161	B65-10240	02
Miniature piezoelectric triaxial accelerometer measures cranial accelerations	ARG-71	B66-10534	01	Bismuth alloy potting seals aluminum connector in cryogenic application	WOO-260	B66-10138	03
<b>CREATINE</b>				Densitometer system for liquid hydrogen has high accuracy, fast response	M-FS-909	B66-10438	01
Automated urinalysis technique determines concentration of creatine and creatinine by colorimetry				Teflon sheet permits valve and valve operator to move as a single unit in a cryogenic pipe line	NU-0077	B66-10702	05
				Improved cryogenic refrigeration system	JPL-731	B67-10128	02
				Cryogenic seal remains leaktight during thermal displacement	ARG-96	B67-10134	02
				Inexpensive cryogenic insulation replaces			

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## CRYOGENIC TEMPERATURE

vacuum jacketed line NUC-10061	B67-10264	02	Instrument continuously measures density of flowing fluids LEWIS-309	B67-10080	01
Jacketed cryogenic piping is stress relieved M-FS-985	B67-10308	05	Soft metal plating enables hard metal seal to operate successfully in low temperature, high pressure environment NUC-10083	B67-10350	03
Study made of dielectric properties of promising materials for cryogenic capacitors M-FS-13620	B67-10366	03	Concept for cryogenic liquid reclamation system NPO-10322	B67-10420	02
Temperature-sensed cryogenic bleed maintains liquid state in transfer line M-FS-12681	B67-10424	01	Feed-thru conduit minimizes heat pickup JPL-847	B67-10619	05
Dynamic valve seal is reliable at cryogenic temperatures M-FS-12987	B67-10526	05	CRYOGENIC GYROSCOPE Optical gyro pickoff operates at cryogenic temperatures M-FS-407	B66-10128	01
Development of dual solid cryogens for high reliability refrigeration system GSFC-10188	B67-10644	02	CRYOGENIC PROPELLANT Combustion chamber inlet manifold separates vapor from liquid M-FS-531	B66-10052	05
Solenoid valve design minimizes vibration and sliding wear problem M-FS-14079	B67-10667	05	Cryogenic fluid sampling device permits testing under hazardous conditions M-FS-1927	B66-10654	02
Cryogenic seal concept for static and dynamic conditions M-FS-12986	B67-10673	05	CRYOGENIC STORAGE Lightweight door seals cryogenic container against diaphragm type loading M-FS-476	B65-10402	05
CRYOGENIC FLUID Level of super-cold liquids automatically maintained by levelometer JPL-397	B63-10250	01	Insulation for cryogenic tanks has reduced thickness and weight M-FS-326	B66-10183	02
Liquid-level meter has no moving parts M-FS-3	B63-10378	03	CRYOGENIC TEMPERATURE Connector seals fluid lines at cryogenic temperatures and high vacuums GSFC-253	B64-10327	05
Inert gas spraying device aids in repair of hazardous systems LEWIS-88	B65-10115	05	Lightweight aluminum casting alloy is useful at cryogenic temperatures M-FS-267	B65-10092	03
Quick-disconnect coupling safe transfer of hazardous fluids LEWIS-125	B65-10202	01	Cryostat modified to aid rotating beam fatigue test M-FS-435	B66-10083	03
Diaphragm eliminates leakage in cryogenic fluid duct coupling WOO-142	B65-10227	05	Compound improves thermal interface between thermocouple and sensed surface NU-0028	B66-10121	02
High-pressure, low temperature electrical connector makes no-leak seal MSC-276	B66-10079	02	Improved adhesive for cryogenic applications cures at room temperature WOO-132	B66-10185	03
Portable power tool machines weld joints in field M-FS-258	B66-10145	05	O-rings with Mylar back-up provide high- pressure cryogenic seal M-FS-603	B66-10278	05
Cryogenic liquid transfer system reduces residual boiloff LEWIS-274	B66-10157	02	Bimetallic devices help maintain constant sealing forces down to cryogenic temperatures M-FS-800	B66-10325	02
Gas diffuser facilitates withdrawal of cryogenic liquids from tanks M-FS-915	B66-10342	05	Feed-thru flange is useful in vacuum applications to cryogenic temperatures JPL-846	B66-10615	02
Inexpensive insulation is effective for cryogenic transfer lines MSC-618	B66-10348	02	Cryogenic fatigue data developed for Inconel 718 M-FS-702	B67-10049	03
High pressure cryogenic liquid flow sight assembly provides streamlined flow for easy observation LEWIS-310	B66-10394	01	Excellent spring properties developed in two nickel alloys for use at cryogenic temperatures NUC-10084	B67-10349	03
Leak locator for vacuum jacketed pipelines eliminates need for removal of outer jacket M-FS-888	B66-10412	01	Magnesium-lithium alloys developed for low temperature use M-FS-1541	B67-10365	03
Automatic cryogenic liquid level controller is safe for use near combustible substances LEWIS-195	B66-10482	01	Crack growth measured on flat and curved surfaces at cryogenic temperatures LEWIS-389	B67-10384	01
Quick attach and release fluid coupling assembly is self-aligning, self-sealing KSC-66-8	B66-10627	05			

- Lead plated aluminum ring provides static high pressure seal for large diameter pressure vessel  
NUC-10008 B67-10539 05
- Test system accurately determines tensile properties of irradiated metals at cryogenic temperatures  
NUC-10521 B67-10617 02
- Environmental control system for cryogenic testing of tensile specimens  
NUC-10523 B67-10618 02
- CRYOGENICS**
- Aluminized fiberglass insulation conforms to curved surfaces  
M-FS-477 B66-10024 03
- Cryogenic cooling reduces high voltage arcing between electrodes operating in a vacuum  
ARG-109 B66-10499 02
- Stabilizing stainless steel components for cryogenic service  
M-FS-13127 B67-10377 05
- Handbook of cryogenic data in graphic form  
KSC-10009 B67-10610 02
- CRYOPUMPING**
- Cryopumping of hydrogen in vacuum chambers is aided by catalytic oxidation of hydrogen  
LEWIS-15 B63-10340 05
- Closed loop operation eliminates need for auxiliary gas in high pressure pumping station  
M-FS-893 B66-10408 05
- CRYOSTAT**
- Low-cost insulation system for cryostats eliminates need for a vacuum  
LEWIS-64 B63-10365 03
- Apparatus permits flexure testing of specimens at cryogenic temperatures  
M-FS-257 B65-10129 02
- Vacuum chamber provides improved insulation and support for cryostat  
M-FS-415 B65-10368 02
- Simple pump maintains liquid helium level in cryostat  
M-FS-1763 B67-10039 05
- Self-aligning rod prevents eccentric loading of tensile specimens  
NUC-10525 B67-10594 05
- Polystyrene cryostat facilitates testing tensile specimens under liquid nitrogen  
NUC-10522 B67-10613 02
- CRYOTRAPPING**
- Cryogenic trap valve has no moving parts  
M-FS-487 B66-10136 05
- CRYSTAL**
- Cesium iodide crystals fused to vacuum tube faceplates  
GSFC-67 B63-10476 03
- Improved holder protects crystal during high acceleration and impact  
JPL-463 B65-10037 05
- FM oscillator uses tetrode transistor  
JPL-82 B65-10055 01
- Crystal measures short-term, large-magnitude forces  
JPL-77 B65-10187 01
- Voltage controlled oscillator is easily aligned, has low phase noise  
JPL-510 B65-10223 01
- CRYSTALLOGRAPHY**
- Spherical model provides visual aid for cubic crystal study  
LEWIS-108 B65-10065 03
- Rotating filters permit wide range of optical pyrometry  
LANGLEY-33 B65-10100 02
- Neutron diffractometer allows both magnetic and crystallographic analyses  
ARG-191 B67-10131 02
- CUBIC CRYSTAL**
- Spherical model provides visual aid for cubic crystal study  
LEWIS-108 B65-10065 03
- CULTURE /BIOL/**
- Continuous microbial cultures maintained by electronically-controlled device  
ARG-177 B67-10556 04
- CURIE TEMPERATURE**
- Process yield Co-Fe alloys with superior high temperature magnetic properties  
LEWIS-333 B66-10535 03
- CURING**
- Improved adhesive for cryogenic applications cures at room temperature  
WOO-132 B66-10185 03
- Improved method facilitates debulking and curing of phenolic impregnated asbestos  
MSC-949 B66-10459 05
- Metallographic samples mounted with room-temperature, curable, polyester casting resins  
ARG-10025 B67-10484 03
- Solvent permits solid curing agents to be used at room temperatures  
M-FS-13434 B67-10593 03
- CURIUM 242**
- Alpha particle backscattering measurements used for chemical analysis of surfaces  
ARG-116 B67-10186 03
- Neutron irradiation of Am241 effectively produces curium  
ARG-10030 B67-10501 03
- CURRENT AMPLIFIER**
- New low level ac amplifier provides adjustable noise cancellation and automatic temperature compensation  
ARC-2 B63-10003 04
- Transfluxor circuit amplifies sensing current for computer memories  
JPL-406 B63-10255 01
- Tester periodically registers dc amplifier characteristics  
MSC-190 B66-10148 01
- Transistor circuit increases range of logarithmic current amplifier  
NU-0018 B66-10350 01
- Bipolar current driver for memory circuits  
GSFC-213 B66-10469 01
- Logarithmic current simulator generates electrical currents accurately between 10 to the minus 11 ampere to 10 to the minus 3 ampere  
NU-0087 B66-10706 01
- Current pulse amplifier transmits detector signals with minimum distortion and attenuation  
NUC-10055 B67-10347 01
- CURRENT DENSITY**
- Simple technique determines ac properties

SUBJECT INDEX

CYLINDER

of hard superconductive materials M-FS-1818	B66-10657	02	Hollow needle used to cut metal honeycomb structures MSC-486	B66-10244	05
<b>CURRENT DISTRIBUTION</b>			Modified soldering iron speeds cutting of synthetic materials M-FS-725	B66-10246	05
Simple circuit functions as frequency discriminator for PFM signals GSFC-267	B65-10102	01	Vibrator improves spark erosion cutting process NU-0071	B66-10333	05
Increased junction lead inductance ballasts high-frequency transistors GSFC-387	B65-10259	01	Versatile machine mills, saws light materials M-FS-827	B66-10364	05
Standard arc welders provide high amperage direct current source LANGLEY-267	B66-10441	01	Coaxial cable stripping device facilitates RF cabling fabrication NPQ-10315	B67-10419	05
<b>CURRENT STABILIZER</b>			Precision trimmer aids in preparing biomedical specimen blocks for ultrathin sectioning ARG-242	B67-10541	05
Electropneumatic rheostat regulates high current ARC-44	B65-10299	01	<b>CYANIDE</b>		
Broadband choke suppresses spurious currents in antenna structure MSC-10013	B67-10675	01	Simple colorimetric method determines uranium in tissue ARG-10039	B67-10580	03
<b>CURVED SURFACE</b>			<b>CYLINDER</b>		
Flexible honeycomb structure can bend to fit compound curves M-FS-13	B63-10385	05	Supercold technique duplicates magnetic field in second superconductor JPL-376	B63-10237	05
Lathe converted for grinding aspheric surfaces GSFC-115	B63-10556	05	Shaped superconductor cylinder retains intense magnetic field JPL-381	B63-10238	01
Device measures curved surface finish on gear teeth WOO-112	B65-10064	05	Simple mechanism combines positive locking and quick-release features WOO-4	B63-10420	05
Aluminized fiberglass insulation conforms to curved surfaces M-FS-477	B66-10024	03	Kinetic-energy absorber employs frictional force between mating cylinders LEWIS-75	B63-10442	05
Specimen holder design improves accuracy of X-ray powder analysis JPL-SC-165	B66-10075	02	Seal allows blind assembly and thermal expan- sion of components NU-0005	B65-10053	05
Alignment tool facilitates pin placement on irregular horizontal surfaces LANGLEY-219	B66-10410	05	Vacuum chamber provides improved insulation and support for cryostat M-FS-415	B65-10368	02
Crack growth measured on flat and curved surfaces at cryogenic temperatures LEWIS-389	B67-10384	01	Flexible coiled spline securely joins mating cylinders WOO-270	B66-10172	05
<b>CUTTING</b>			Cylindrical claw clamp has quick release feature M-FS-513	B66-10213	05
Cutter and stripper reduces coaxial cable connection time ARC-40	B65-10094	05	Rotary valve controls multiple hydraulic leveling cylinders M-FS-361	B66-10402	05
Threaded pilot insures cutting tool alignment M-FS-527	B66-10074	05	Positive displacement cylinder measures corrosive liquid volume MSC-1038	B66-10589	05
Pipe cutting tool is useful in limited space MSC-36	B66-10102	05	Mechanism facilitates coating of inner surfaces of metal cylinders GSFC-515	B66-10698	05
Rotating mandrel speeds assembly of plastic inflatables LANGLEY-155	B66-10137	05	Single-source mechanical loading system produces biaxial stresses in cylinders M-FS-12530	B67-10380	05
Portable power tool machines weld joints in field M-FS-258	B66-10145	05	Buckling strength of filament-wound cylinders under axial compression is investigated HQ-10032	B67-10659	03
Modified drill permits one-step drilling operation M-FS-559	B66-10169	05			
Tool post modification allows easy turret lathe cutting-tool alignment M-FS-581	B66-10191	05			
Adjustable cutting guide aligns and positions stacks of material MSC-321	B66-10210	05			
Adjustable knife cuts honeycomb material to specified depth MSC-475	B66-10237	05			

## CYLINDRICAL TANK

Study made of large amplitude fuel sloshing  
M-FS-12381 B67-10439 03

## CYTOLOGY

Cytology is advanced by studying effects  
of deuterium environment  
ARG-205 B67-10304 04

Effect of preparation procedures on  
intensity of radioautographic labeling is  
studied  
ARG-10032 B67-10500 04

Ultraviolet microscopy aids in cytological  
and biomedical research  
ARG-178 B67-10590 04

## D

## DAMAGE

Low-cost tool minimizes damage to O-rings  
during installation  
MSC-140 B65-10116 05

Improved poppet valve provides positive  
damageproof seal  
M-FS-293 B65-10346 05

Prediction of radiation damage effects in  
transistors  
GSFC-10021 B67-10606 01

Damages in rolling element bearings may be  
detected early  
HQ-10031 B67-10658 01

## DAMPER

Friction device damps linear motion of  
rotating shaft  
WOO-214 B66-10030 05

Concept for design of variable stiffness  
damper  
ARC-11225 B67-10483 05

## DAMPING

Frictional wedge shock mount is inexpensive,  
has good damping characteristics  
JPL-IT-1001 B63-10289 05

Shock absorber operates over wide range  
MSC-168 B65-10241 05

## DAMPING TESTING MACHINE

Diaphragm spring gives clutch over-center  
toggle effect  
GSFC-499 B66-10297 05

## DATA ACQUISITION

Automatic testing device facilitates noise  
checks and electronic calibrations  
LEWIS-10173 B67-10467 01

## DATA COMPRESSOR

A conceptual, parallel operating data  
compression processor  
NPO-10068 B67-10204 01

Simple first order data compression  
processor concept  
NPO-10338 B67-10553 01

## DATA CONVERSION

Assembly processor program converts  
symbolic programming language to machine  
language  
M-FS-13262 B67-10493 06

## DATA CORRELATION

Multiple correlation computer program  
determines relationships between several  
independent and dependent variables  
M-FS-13024 B67-10327 06

Computer program performs aerothermodynamic  
flight test data correlation  
MSC-10075 B67-10494 06

## DATA LINK

Solid state phase detector replaces bulky  
transformer circuit  
MSC-11007 B67-10253 01

## DATA PROCESSING

Transfluxor circuit amplifies sensing current  
for computer memories  
JPL-406 B63-10255 01

Computer program determines performance  
efficiency of remote measuring systems  
M-FS-1137 B66-10503 01

Digital computer processing of X-ray photos  
JPL-792 B67-10005 04

A simplified PERT system  
M-FS-2267 B67-10241 05

Study of random process theory aids digital  
data processing  
M-FS-1475 B67-10309 06

Conceptual nonorthogonal gyro configuration  
for guidance and navigation  
MSC-11363 B67-10433 01

## DATA PROCESSOR

A conceptual, parallel operating data  
compression processor  
NPO-10068 B67-10204 01

Video synchronization processor overcomes  
poor signal-to-noise ratio  
KSC-10002 B67-10515 01

Simple first order data compression  
processor concept  
NPO-10338 B67-10553 01

## DATA READOUT SYSTEM

Nonlinear feedback reduces analog-to-digital  
converter error  
ARC-46 B65-10277 01

Numerical data frame readout system used in  
testing telemetry systems  
GSFC-551 B67-10175 01

## DATA RECORDER

PCM magnetic tape system efficiently records  
and reproduces data  
GSFC-375 B65-10311 01

Run numbering system for use with data  
recorders  
M-FS-2557 B67-10215 01

## DATA REDUCTION

Polychart contour plotter enables data  
extrapolation from multiple plotting charts  
M-FS-37 B64-10406 05

Computer program samples digital data for  
CRT display  
MSC-999 B67-10249 01

Versatile analog pulse height computer  
performs real-time arithmetic operations  
ARG-10052 B67-10626 06

## DATA RETRIEVAL

Gapped toroid provides infinite resolution  
of delay-line pickup  
GSFC-370 B65-10258 01

Scan rate converter for tape recording and  
playback of TV pictures  
NPO-10166 B67-10676 01

## DATA STORAGE

Scan rate converter for tape recording and  
playback of TV pictures  
NPO-10166 B67-10676 01

## DATA TRANSMISSION

Instrument performs nondestructive chemical  
analysis, data can be telemetered



# SUBJECT INDEX

# DENSITY MEASUREMENT

JPL-SC-078	B65-10317	01	DEFORMATION	Polymer deformation gauge measures thickness change in tensile tests	JPL-745	B66-10147	01
Detection system ensures positive alarm activation in digital message loss	WOO-208	B66-10287	01	Study made of mechanics of deformation and fracture of fibrous composites	HQ-10035	B67-10660	03
DECELERATION				DEGASSING			
Kinetic-energy absorber employs frictional force between mating cylinders	LEWIS-75	B63-10442	05	Baking enables McLeod gauge to measure in ultrahigh vacuum range	GSFC-440	B65-10329	01
Novel shock absorber features varying yield strengths	MSC-63A	B64-10138	03	DEGENERATION			
Calculations enable optimum design of magnetic brake	LEWIS-251	B66-10073	05	Feedback loop compensates for rectifier nonlinearity	M-FS-384	B66-10382	01
Modified hydraulic braking system limits angular deceleration to safe values	GSFC-476	B66-10310	05	DEGRADATION			
Hoist is automatically stopped at low deceleration rate	M-FS-1639	B66-10545	05	Dot patterns provide reproducible flaw areas for study of adhesive bonds	M-FS-862	B66-10367	05
DECISION ELEMENT				Machining heavy plastic sections	M-FS-12720	B67-10381	03
Circuit maintains digital decision threshold at preset level	M-FS-331	B65-10281	01	DELAY LINE			
Binary sequence detector uses minimum number of decision elements	JPL-673	B66-10264	01	Gapped toroid provides infinite resolution of delay-line pickup	GSFC-370	B65-10258	01
DECISION MAKING				Highly stable microwave delay line	NPO-09828	B67-10642	01
System automatically provides dynamic launch decision criteria	M-FS-13063	B67-10363	01	DEMODULATOR			
DECODING				Point-source light sensor circuit is insensitive to background light	JPL-778	B66-10502	01
Unique frequency-shift-keyed demodulation system	GSFC-217	B67-10668	01	Unique frequency-shift-keyed demodulation system	GSFC-217	B67-10668	01
DECOMMUTATOR				DENSITOMETER			
Computer program generates averaged value data tapes	M-FS-12728	B67-10411	06	Modified contour projector makes excellent contour densitometer	LANGLEY-93	B65-10084	02
DECONTAMINATION				Densitometer system for liquid hydrogen has high accuracy, fast response	M-FS-909	B66-10438	01
Bacteriostatic conformal coating for electronic components	GSFC-10007	B67-10599	03	Liquid hydrogen densitometer utilizes open-ended microwave cavity	LEWIS-390	B67-10115	01
DEEP SPACE NETWORK /DSN/				Coded photographic proof paper could serve as convenient densitometer	M-FS-13374	B67-10443	02
Highly stable microwave delay line	NPO-09828	B67-10642	01	DENSITY MEASUREMENT			
DEFLECTION				Density trace made with computer printout	GSFC-322	B65-10200	01
Angular acceleration measured by deflection in sensing ring	MSC-250	B66-10105	01	Coaxial capacitor used to determine fluid density	LEWIS-232	B65-10296	02
Bellows joint absorbs torsional deflections in duct system	M-FS-882	B66-10332	05	Vibrating diaphragm measures high electrostatic field strengths	MSC-189	B65-10352	01
Spiral spring/strain gage combination accurately measures shock induced deflection	MSC-789	B66-10488	01	Three-dimensional wire-mesh capacitor system measures fluid density	WOO-194	B65-10379	01
Subminiature deflection circuit operates integrated sweep circuits in TV camera	MSC-1263	B67-10155	01	Instrument continuously measures density of flowing fluids	LEWIS-309	B67-10080	01
Electron beam deflected to determine focal point location	M-FS-14107	B67-10649	01	Radiation counting technique allows density measurement of metals in high-pressure - high-temperature environment	ARG-124	B67-10316	02
Telescope mount with azimuth-only primary	NPO-10468	B67-10671	02	Mathematical relation predicts achievable densities of compacted particles	ARG-10082	B67-10592	03
DEFLECTOR							
Electron beam standby absorber system	M-FS-14108	B67-10650	01				

## DEPENDENT VARIABLE

## SUBJECT INDEX

## DEPENDENT VARIABLE

Multiple correlation computer program determines relationships between several independent and dependent variables  
M-FS-13024 B67-10327 06

Computer optimization program finds values for several independent variables that minimize a dependent variable  
M-FS-13030 B67-10328 06

## DEPOSITION

Integral coolant channels simply made by melt-out method  
M-FS-91 B63-10497 05

Complex surfaces plated by thin-film deposition in one operation  
LEWIS-292 B67-10006 05

## DEPTH MEASUREMENT

Modified algesimeter provides accurate depth measurements  
MSC-616 B66-10647 04

## DESTRUCTIVE TESTING

Force controlled solenoid drives microweld tester  
WOO-125 B65-10182 01

Study made of destructive sectioning of complex structures for examination  
LEWIS-341 B66-10676 05

## DETECTION

Continuity tester screens out faulty socket connections  
JPL-596 B64-10065 01

Use of photographs speeds inspection of printed-circuit boards  
MSC-72 B64-10118 01

Transistor voltage comparator performs own sensing  
GSFC-228 B65-10028 01

Weld leaks rapidly and safely detected  
M-FS-362 B65-10265 01

Microorganisms detected by enzyme-catalyzed reaction  
JPL-782 B66-10117 04

Infrared television used to detect hydrogen fires  
M-FS-654 B66-10363 01

Hydrogen fire detection system features sharp discrimination  
M-FS-643 B66-10368 01

Surface-crack detection by microwave methods  
ARC-10009 B67-10482 01

Compilation of detection sensitivities in thermal-neutron activation  
ARG-10068 B67-10641 03

Damages in rolling element bearings may be detected early  
HQ-10031 B67-10658 01

## DETECTOR

Device detects unbonded areas in plastic laminates  
WOO-206 B65-10380 01

Hot-wire detector for chemically active materials used in gas chromatography  
MSC-269 B66-10139 03

Mounting facilitates removal and installation of flame-detector rods  
M-FS-555 B66-10150 05

Fatigue cracks detected and measured without test interruption  
LEWIS-266 B66-10178 02

Detection system ensures positive alarm activation in digital message loss  
WOO-208 B66-10287 01

Sniffer used as portable hydrogen leak detector  
M-FS-846 B66-10356 01

Solid state detectors monitor relay contacts  
JPL-785 B66-10396 01

Leak locator for vacuum jacketed pipelines eliminates need for removal of outer jacket  
M-FS-888 B66-10412 01

Detector measures power in 50 to 30,000 GHz radiation band  
ERC-26 B66-10581 01

Gas leak detector is simple and inexpensive  
M-FS-1206 B66-10669 01

Portable detector set discloses helium leak rates  
M-FS-1733 B67-10065 01

An improved soft X-ray photoionization detector  
GSFC-540 B67-10072 02

Thin film thermal detector  
JPL-943 B67-10505 01

## DETONATION WAVE

Development of detonation reaction engine  
M-FS-14020 B67-10652 01

## DEUTERIUM

Cytology is advanced by studying effects of deuterium environment  
ARG-205 B67-10304 04

## DEWAR SYSTEM

Cryostat modified to aid rotating beam fatigue test  
M-FS-435 B66-10083 03

## DIAL

Device facilitates centering of workpieces in lathe chuck  
M-FS-685 B66-10277 05

## DIAPHRAGM

Improved fluid control valve extends diaphragm life  
JPL-345 B65-10147 05

Diaphragm eliminates leakage in cryogenic fluid duct coupling  
WOO-142 B65-10227 05

Burst diaphragm protects vacuum vessel from internal pressure transients  
JPL-687 B65-10236 05

Titanium diaphragm makes excellent amplatron cathode support  
GSFC-394 B65-10298 01

Vibrating diaphragm measures high electrostatic field strengths  
MSC-189 B65-10352 01

Die and telescoping punch form convolutions in thin diaphragm  
JPL-SC-135 B65-10393 05

Electrically heated diaphragm eliminates use of pyrotechnics  
MSC-241 B65-10400 01

Acceleration-compensated pressure transducer has fast response  
LANGLEY-113 B66-10353 01

Diaphragm valve for corrosive and high temperature fluid flow control has unique features

## SUBJECT INDEX

## DIFFUSION ELECTRODE

LEWIS-304	B66-10365	05	DIFFERENTIAL ANALYZER		
Vanadium diaphragm electrode serves as hydrogen diffuser in lithium hydride cell			CINDA - Chrysler improved numerical differencing analyzer computer program		
ARG-10048	B67-10499	01	M-FS-2298	B67-10278	06
DIBORIDE			DIFFERENTIAL EQUATION		
Protective coating withstands high temperature in oxidizing atmosphere			Computer simulation program is adaptable to industrial processes		
M-FS-529	B66-10044	03	LEWIS-240	B66-10426	01
DIE			Study compares methods for the numerical solution of ordinary differential equations		
Guide for extrusion dies eliminates straightening operation			M-FS-830	B66-10466	01
LEWIS-152	B64-10014	05	Study made of application of stereoscopic display system to analog computer simulation		
Metal parts hydrosized by explosive force			M-FS-1263	B66-10590	01
M-FS-289	B65-10170	05	Self-starting procedure simplifies numerical integration		
Handtool bends component leads accurately			ARC-50	B67-10013	01
M-FS-308	B65-10181	05	Computer program simulates physical systems by solving the simultaneous differential equations describing the systems		
Fiberglass dies speed forming of large metal sheets			NPD-10019	B67-10193	06
M-FS-214	B65-10210	05	DIFFUSER		
Die and telescoping punch form convolutions in thin diaphragm			Gas diffuser facilitates withdrawal of cryogenic liquids from tanks		
JPL-SC-135	B65-10393	05	M-FS-915	B66-10342	05
Forming tool improves quality of tubing flares			DIFFUSION		
WOO-231	B66-10001	05	Fabrication method produces high-grade alumina crucibles		
Heated die facilitates tungsten forming			M-FS-216	B65-10078	05
LEWIS-25A	B66-10047	05	Vapor grown silicon dioxide improves transistor base-collector junctions		
Strippable grid facilitates removal of grid-surfaced conical workpiece from die			GSFC-389	B66-10091	01
M-FS-716	B66-10334	05	Static electricity of polymers reduced by treatment with iodine		
Hydraulic fluid serves as mandrel for small diameter refractory tube drawing			NPD-10062	B67-10132	03
ARG-44	B66-10523	05	DIFFUSION BONDING		
Precision metal molding			Thoriated nickel bonded by solid-state diffusion method		
M-FS-13305	B67-10423	05	LANGLEY-116	B65-10220	03
DIELECTRIC MATERIAL			Thermoelectric elements diffusion-bonded to tungsten electrodes		
Microparticle impact sensor measures energy directly			GSFC-346	B65-10309	01
GSFC-252	B65-10048	01	Brazing method produces solid-solution bond between refractory metals		
Dielectrometer design permits measurement in vacuum under irradiation			LEWIS-212	B65-10370	05
M-FS-359	B66-10401	01	Brazing process using Al-Si filler alloy reliably bonds aluminum parts		
Study made of dielectric properties of promising materials for cryogenic capacitors			MSC-448	B66-10241	05
M-FS-13620	B67-10366	03	Differential expansion provides pressure for diffusion bonding of large diameter rings		
Thin film thermal detector			M-FS-588	B66-10269	05
JPL-943	B67-10505	01	Silver plating ensures reliable diffusion bonding of dissimilar metals		
Flame sprayed dielectric coatings improve heat dissipation in electronic packaging			M-FS-1975	B67-10124	03
M-FS-13569	B67-10534	01	DIFFUSION EFFECT		
DIELECTRICS			Diffusion technique stabilizes resistor values		
Spherical electrode eliminates high-voltage breakdown			MSC-205	B66-10142	01
LEWIS-155	B65-10139	01	DIFFUSION ELECTRODE		
Precision capacitor has improved temperature and operational stability			Segmented electrode increases operating pressure of MHD accelerator		
ARG-189	B67-10313	01	LANGLEY-95	B65-10356	02
Dielectric prisms would improve performance of quasi-optical microwave components			Vapor diffusion electrode improves fuel cell operation		
ERC-10011	B67-10416	01	LEWIS-187	B66-10281	03
DIFFERENTIAL AMPLIFIER			Iron serves as diffusion barrier in thermally regenerative galvanic cell		
Solid state circuit switches ac load			ARG-29	B67-10189	03
JPL-798	B66-10465	01			
FM carrier deviation measured by differential probability method					
M-FS-2166	B67-10213	01			

## DIGITAL COMMAND SYSTEM

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## DIGITAL COMMAND SYSTEM

Digital system accurately controls velocity of electromechanical drive  
GSFC-287 B65-10096 01

Digitally controlled pulse-level discriminator operates over wide voltage range  
GSFC-324 B66-10129 01

## DIGITAL COMMUNICATIONS SYSTEM

Pn acquisition demodulator achieves automatic synchronization of a telemetry channel  
JPL-612 B66-10271 01

Numerical data frame readout system used in testing telemetry systems  
GSFC-551 B67-10175 01

## DIGITAL COMPUTER

Small digital recording head has parallel bit channels, minimizes cross talk  
JPL-0029 B63-10284 01

Logic redundancy improves digital system reliability  
JPL-SC-069 B65-10025 01

Instrument calibrates low gas-rate flowmeters  
MSC-134 B65-10137 01

Hybrid computer technique yields random signal probability distributions  
ARC-34 B65-10208 01

Computer program determines chemical composition of physical system at equilibrium  
MSC-1119 B66-10670 01

Digital computer processing of X-ray photos  
JPL-792 B67-10005 04

Study indicates fluid digital computation systems are feasible  
M-FS-520 B67-10181 01

Computer program simulates physical systems by solving the simultaneous differential equations describing the systems  
NPO-10019 B67-10193 06

Master control data handling program uses automatic data input  
M-FS-2259 B67-10280 06

General purpose computer programs for numerically analyzing linear ac electrical and electronic circuits for steady-state conditions  
M-FS-13094 B67-10331 06

Automatic design of optical systems by digital computer  
NPO-10265 B67-10632 06

X-Y plotter adapter developed for SDS-930 computer  
NPU-10220 B67-10654 06

Low cost SCR lamp driver indicates contents of digital computer registers  
GSFC-10221 B67-10656 01

## DIGITAL DATA

Interferometer combines laser light source and digital counting system  
MSC-151 B65-10161 01

Sensitive electrometer features digital output  
GSFC-288 B65-10206 01

Computer program samples digital data for CRT display  
MSC-999 B67-10249 01

Study of random process theory aids digital data processing  
M-FS-1475 B67-10309 06

Oscillator circuit operates as digitally controlled frequency synthesizer  
GSFC-570 B67-10447 01

Teleprinter uses thermal printing technique  
MSC-11327 B67-10572 01

Computer program for video data processing system /VDPS/  
NPO-10042 B67-10630 06

## DIGITAL SPACECRAFT TELEVISION

Improved television signal processing system  
NPO-10140 B67-10246 01

## DIGITAL TECHNIQUE

Binary system generates sidereal rate from standard solar rate  
GSFC-190 B64-10200 01

Digital cardiometer computes and displays heartbeat rate  
MSC-93 B64-10258 01

Electron-beam deflection controlled by digital signals  
GSFC-385 B65-10283 02

Shaft encoder presents digital output  
JPL-SC-191 B66-10436 01

Digital system provides superregulation of nanosecond amplifier-discriminator circuit  
ARG-61 B66-10500 01

Digital frequency counter permits readout without disturbing counting process  
JPL-906 B66-10658 01

Subroutines GEORGE and DRASTC simplify operation of automatic digital plotter  
NUC-10044 B67-10222 06

Vis-A-Plan /visualize a plan/ management technique provides performance-time scale  
KSC-10073 B67-10240 06

Digital voltage-controlled oscillator  
GSFC-512 B67-10449 01

Automatic testing device facilitates noise checks and electronic calibrations  
LEWIS-10173 B67-10467 01

Digital servo readout system increases recording accuracy of servo-balance scales  
NUC-10125 B67-10496 01

## DIGITAL-TO-ANALOG CONVERTER

Digital logic elements provide additional functions from analog input  
MSC-64 B64-10064 01

Transistorized circuit clamps voltage with 0.1 percent error  
GSFC-196 B65-10118 01

Pressure transducer system is force-balanced, has digital output  
M-FS-154 B65-10174 05

Variable word length encoder reduces TV bandwidth requirements  
LANGLEY-87 B65-10345 01

Video signal processing system uses gated current mode switches to perform high speed multiplication and digital-to-analog conversion  
MSC-781 B66-10429 01

Digital-to-analog converter operates from low level inputs  
JPL-907 B67-10357 01

Improved digital TV encoding and decoding system  
MSC-11147 B67-10562 01

# SUBJECT INDEX

# DIRECTIONAL CONTROL

## DIGITAL TRANSDUCER

Frequency correction device uses digital circuitry  
GSFC-268 B65-10307 01

## DIMENSIONAL STABILITY

Collapsible truss structure is automatically expandable  
GSFC-265 B65-10126 05

## DIODE

Simple circuit provides adjustable voltage with linear temperature variation  
JPL-W00-029 B63-10537 01

Mounting for diodes provides efficient heat sink  
M-FS-197 B64-10283 01

Modification increases light output of injection-luminescent diodes  
M-FS-192 B65-10006 01

Thermocompression bonding produces efficient surface-barrier diode  
JPL-SC-066 B65-10007 05

Optical arrangement increases useful light output of semiconductor diodes  
JPL-SC-064 B65-10020 05

Logarithmic amplifier uses field effect transistors  
JPL-509 B65-10145 01

Solid-state laser transmitter is amplitude modulated  
MSC-121 B65-10238 01

Added diodes increase output of balanced mixer circuit  
GSFC-354 B65-10276 01

Simple circuit provides reliable multiple signal average and reject capability  
NU-0069 B66-10282 01

Function generator eliminates necessity of series summation  
GSFC-214 B66-10351 01

Semiconductors can be tested without removing them from circuitry  
M-FS-1163 B66-10447 01

Pulse stretcher has improved dynamic range and linearity  
ARG-82 B66-10509 01

Computer program searches characteristic data of diodes and transistors  
GSFC-493 B66-10529 01

Laboratory pulse modulator uses minority carrier storage diodes  
M-FS-2442 B67-10226 01

Fused diode provides visual indication of fuse condition  
KSC-67-16 B67-10230 01

Experimental coherent fractional frequency multiplier at S-band  
M-FS-2427 B67-10250 01

Transistor biased amplifier minimizes diode discriminator threshold attenuation  
ARG-163 B67-10311 01

SiC/Si diode trigger circuit provides automatic range switching for log amplifier  
M-FS-1879 B67-10314 01

Computer memory access technique  
NPO-10201 B67-10585 01

Development of reliability prediction technique for semiconductor diodes  
GSFC-10231 B67-10651 06

Thermionic diode switching has high temperature application  
NPO-10404 B67-10672 01

## DIOD

Substituted silane-diol polymers have improved thermal stability  
M-FS-469 B66-10259 03

## DIOXIDE

IR-transmission glasses formed from oxides of bismuth and tellurium  
M-FS-279 B65-10190 03

## DIRECT CURRENT /DC/

Liquid switch is remotely operated by low dc voltage  
GSFC-119 B63-10599 01

High-pass RF coaxial filter rejects dc and low frequency signals  
GSFC-73 B64-10173 01

Variable load automatically tests dc power supplies  
GSFC-291 B65-10105 01

Rotor position sensor switches currents in brushless dc motors  
GSFC-315 B65-10151 01

Dc to ac converter operates efficiency at low input voltages  
GSFC-130 B65-10178 01

Inductor flyback characteristic gives voltage regulator fast response  
GSFC-361 B65-10257 01

Electropneumatic rheostat regulates high current  
ARC-44 B65-10299 01

Zener diode controls switching of large direct currents  
MSC-188 B65-10350 01

Dual-voltage power supply has increased efficiency  
LEWIS-107A B66-10002 01

Tester periodically registers dc amplifier characteristics  
MSC-190 B66-10148 01

Circuit protects regulated power supply against overload current  
GSFC-453 B66-10292 01

Brushless dc motor has high efficiency, long life  
GSFC-181 B66-10355 01

Efficient dc to dc converter eliminates large stray magnetic fields  
GSFC-463 B66-10376 01

Solid state circuit switches ac load  
JPL-798 B66-10465 01

Solid state circuit controls direction, speed, and braking of dc motor  
JPL-757 B66-10486 01

Opposed arcs permit deep weld penetration with only one pass  
M-FS-1696 B66-10513 05

Electronic circuit provides accurate sensing and control of dc voltage  
NU-0089 B66-10591 01

Solid state single-ended switching dc-to-dc converter  
M-FS-13598 B67-10558 01

## DIRECTIONAL CONTROL

System measures unidirectional forces, excludes extraneous forces

## DISCHARGE

## SUBJECT INDEX

LEWIS-170	B65-10154	05	Interferometer combines laser light source and digital counting system	MSC-151	B65-10161	01	
Magnetic-shift-register circuit controls step motor operations	GSFC-340	B65-10226	01	Hydraulic device provides accurate displacements to microinches	MSC-112	B65-10230	05
Solid state circuit controls direction, speed, and braking of dc motor	JPL-757	B66-10486	01	Switching mechanism senses angular acceleration	GSFC-462	B66-10158	01
DISCHARGE				Positive displacement cylinder measures corrosive liquid volume	MSC-1038	B66-10589	05
Auxiliary silver electrode eliminates two-step voltage discharge characteristic of silver-zinc cells	GSFC-169	B64-10114	01	Cryogenic seal remains leaktight during thermal displacement	ARG-96	B67-10134	02
DISCHARGE TUBE				DISPLAY SYSTEM			
Neon isotopes cancel errors in gas laser	M-FS-1476	B66-10583	02	Portable display paneling has wide use, easy take down and assembly	ARC-17	B63-10435	05
Uranium isotopes quantitatively determined by modified method of atomic absorption spectrophotometry	ARG-210	B67-10236	03	Illuminated display panel is easily changed	MSC-108	B65-10003	05
DISCONNECT DEVICE				Single projector accommodates slides of different size and format	GSFC-439	B66-10016	02
Device disconnects several couplings simultaneously	JPL-226	B65-10163	05	Chart case opens to form briefing easel	MSC-349	B66-10135	05
Improved tool easily removes brazed tube connectors	MSC-263	B66-10003	05	Legibility of electroluminescent instrument panels investigated	MSC-494	B66-10316	02
Lock-disconnect mechanism gives positive release to joined bodies	M-FS-2147	B67-10123	05	Video signal processing system uses gated current mode switches to perform high speed multiplication and digital-to-analog conversion	MSC-781	B66-10429	01
Line adapter provides quick disconnect under moderate side loading	M-FS-2159	B67-10256	05	Nixie tube display unit employs time-shared logic	ARG-117	B66-10512	01
Reconnect mechanism	M-FS-12968	B67-10670	05	Study made of application of stereoscopic display system to analog computer simulation	M-FS-1263	B66-10590	01
DISCONTINUITY				Numerical data frame readout system used in testing telemetry systems	GSFC-551	B67-10175	01
Calibrating ultrasonic test equipment for checking thin metal strip stock	NUC-10009	B67-10127	01	New electron microscope employs new video display technique	ARG-158	B67-10312	03
DISCRIMINATOR				X-Y plotter adapter developed for SDS-930 computer	NPD-10220	B67-10654	06
Simple circuit functions as frequency discriminator for PFM signals	GSFC-267	B65-10102	01	Phase plane displays detect incipient failure in servo system testing	HQ-10018	B67-10662	01
Unique frequency-shift-keyed demodulation system	GSFC-217	B67-10668	01	DISTILLATION APPARATUS			
DISK				Emergency solar still desalts seawater	MSC-135	B65-10214	03
Modified interelement spacing improves Yagi antenna array	LANGLEY-130	B65-10183	01	Liquid trap seals thermocouple leads	M-FS-688	B66-10212	05
Honeycomb seal backing ring increases turbopump disk life	M-FS-13303	B67-10607	05	DISTORTION			
Eddy current disk valve	LEWIS-10123	B67-10638	05	Application of distorted models in developing scaled structural models	M-FS-2540	B67-10321	05
DISPERSION				DISTRIBUTION FUNCTION			
Anodization process produces opaque, reflective coatings on aluminum	M-FS-348	B65-10336	03	Polychart contour plotter enables data extrapolation from multiple plotting charts	M-FS-37	B64-10406	05
DISPERSION HARDENING							
Tantalum alloys resist creep deformation at elevated temperatures	LEWIS-350	B66-10558	03				
DISPLACEMENT							
Seismic transducer measures small horizontal displacements	M-FS-81	B65-10029	05				
Transducer senses displacements of panels subjected to vibration	ARC-37	B65-10085	01				

### DUCTILITY

<b>DOOR</b>	Concealed hinge permits flush mounting of doors and hatches MSC-623	B66-10336	05	MSC-381	B66-10152	05
	Combination double door high-vacuum valve provides access to vacuum chamber JPL-849	B66-10697	05	Modified drill permits one-step drilling operation M-FS-559	B66-10169	05
	Simple motor drive system operates heavy hinged door NU-0093	B66-10712	05	Gear drive automatically indexes rotary table M-FS-753	B66-10383	05
	Swing-out rail system separates overhead crane rails NU-0094	B66-10713	05	Development of lunar drill to take core samples to 100-foot depths M-FS-13015	B67-10529	05
<b>DOPING</b>				<b>DRIVE</b>		
	Aluminum doping improves silicon solar cells LEWIS-206	B66-10181	02	Quick-acting clutch disengages idle drive motor GSFC-143	B64-10028	05
	Process controls introduction of selected impurities into semiconductor wafers GSFC-523	B67-10303	01	Bearing transmits rotary and axial motion LANGLEY-27	B64-10130	05
<b>DOPPLER EFFECT</b>				Threading hook facilitates safe recovery of heavy loads MSC-46	B64-10185	05
	Laser Doppler flowmeter measures gas velocity M-FS-1747	B66-10693	02	Apparatus alters position of objects to facilitate demagnetization GSFC-234	B64-10277	05
	Concept for automatic Doppler compensation in two-way communication systems GSFC-10213	B67-10643	01	Stepping motor drive circuit designed for low power drain GSFC-198	B65-10026	01
<b>DOSIMETER</b>				Hydraulic drive system prevents backlash JPL-371	B65-10351	05
	Practical new method of measuring thermal-neutron fluence NUC-10086	B67-10352	02	Modified power tool rapidly drives series torque bolts MSC-221	B66-10054	05
	Neutron detector simultaneously measures fluence and dose equivalent ARG-10071	B67-10597	02	Motion drive system is accurately controlled in the 1-micron range JPL-864	B66-10695	05
<b>DOSIMETRY</b>				Wideband, high efficiency optical modulator requires less than 10 watts drive power M-FS-12733	B67-10289	01
	Review of physics, instrumentation and dosimetry of radioactive isotopes ARG-10037	B67-10640	02			
<b>DRAFTING MACHINE</b>				Hydraulic system provides smooth control of large tracking and antenna drive systems at very low tracking rates NPO-10316	B67-10418	05
	Automated drafting system uses computer techniques M-FS-788	B66-10362	01			
<b>DRAG BALANCE</b>				<b>DROP</b>		
	Device measures fluid drag on test vehicles LANGLEY-34	B65-10195	01	Apparatus measures concentration of suspended droplets in gas streams LANGLEY-31	B64-10237	01
<b>DRAG MEASUREMENT</b>				<b>DROP TEST</b>		
	Device measures fluid drag on test vehicles LANGLEY-34	B65-10195	01	Spiral spring/strain gage combination accurately measures shock induced deflection MSC-789	B66-10488	01
<b>DRIFT</b>				<b>DUCT</b>		
	Tester periodically registers dc amplifier characteristics MSC-190	B66-10148	01	External linkage tie permits reduction in ducting system flange thickness M-FS-823	B66-10326	05
	Simplified method introduces drift fields into cells GSFC-572	B67-10102	03	Liquid oxygen ducting cleaned by falling film method M-FS-11816	B67-10299	03
<b>DRILL</b>				Flow liner extends operating life of high-angulation bellows M-FS-12023	B67-10512	05
	Rock bit requires no flushing medium to maintain drilling speed JPL-W00-031	B65-10109	05			
	Drill bit design assures clean holes in laminated materials W00-098	B65-10386	05	<b>DUCTED FLOW</b>		
	Hand drill adapter limits holes to desired depth MSC-346	B66-10123	05	Lightweight hinged bellows restraint has high load capacity W00-151	B65-10341	03
	Depth indicator and stop aid machining to precise tolerances M-FS-553	B66-10149	05	<b>DUCTILITY</b>		
	Nylon bit removes cork insulation without damage to substrate			Lower-cost tungsten-rhenium alloys LEWIS-332	B66-10528	03
				Silver-base ternary alloy proves superior for slip ring lead wires M-FS-1540	B66-10540	03

High-strength tungsten alloy with improved ductility LEWIS-10257	B67-10340	03	Handbooks describe eddy current techniques used in nondestructive testing of metal parts and components M-FS-13172	B67-10374	03
Study made of ductility limitations of aluminum-silicon alloys M-FS-12524	B67-10392	03	Eddy current disk valve LEWIS-10123	B67-10638	05
<b>DUMMY</b>			Eddy current probe measures size of cracks in nonmetallic materials M-FS-14059	B67-10645	03
Electronic dummy for acoustical testing MSC-206	B67-10298	01	<b>EDGE</b>		
<b>DUOPLASMATRON</b>			Upsetting butt edge increases weld-joint strength M-FS-175	B64-10164	05
A continuously operating source of vacuum ultraviolet below 500 angstrom GSFC-545	B66-10576	01	<b>EFFUSION</b>		
<b>DYE</b>			Thermodynamic properties of solid palladium-silver alloys and other alloys are investigated by torsion-effusion technique ARG-277	B67-10324	03
Porous glass makes effective substrate for ozone-sensing reagent GSFC-388	B65-10364	03	<b>EJECTOR</b>		
Test strips detect different CO <sub>2</sub> concentrations in closed compartments MSC-210	B65-10390	03	Air sampler collects and protects minute particles HQ-10037	B67-10661	01
Surfactant for dye-penetrant inspection is insensitive to liquid oxygen M-FS-475	B66-10131	03	<b>ELASTIC DEFORMATION</b>		
Sea dye marker provides visibility for 20 hours MSC-714	B66-10313	03	Testing device subjects elastic materials to biaxial deformations JPL-616	B65-10189	03
<b>DYNAMIC LOAD</b>			<b>ELASTIC PROPERTY</b>		
Pressure responsive seal handles static and dynamic loads GSFC-441	B65-10327	05	Valve designed with elastic seat JPL-442	B65-10040	05
Controlled release device prevents damage from dynamic stresses KSC-66-14	B66-10628	05	Lateral ring metal elastic wheel absorbs shock loading M-FS-1312	B66-10663	05
<b>DYNAMIC MODEL</b>			Computer program ETC improves computation of elastic transfer matrices of Legendre polynomials P/0/ and P/1/ NUC-10070	B67-10566	06
Application of distorted models in developing scaled structural models M-FS-2540	B67-10321	05	<b>ELASTIC SHEET</b>		
<b>DYNAMIC PROGRAMMING</b>			Impact- and puncture-resistant material protects parts from damage MSC-747	B66-10375	05
DYANA - An advanced programming system for large classes of dynamic and equivalent systems B67-10524	06		<b>ELASTICITY</b>		
<b>DYNAMIC RESPONSE</b>			Tungsten fiber-reinforced copper composites form high strength electrical conductors LEWIS-338	B66-10572	03
Study of dynamic response of elastic space stations NPD-10124	B67-10169	06	Improved computer program for elastic analysis of highly redundant structural configurations M-FS-13087	B67-10330	06
Digital computer program predicts effects of local pressure transients on deformation and stresses in cylindrical ducts M-FS-13058	B67-10631	06	<b>ELASTOMER</b>		
<b>DYNAMOMETER</b>			Elastic orifice automatically regulates gas bearings JPL-135	B63-10123	05
Air brake-dynamometer accurately measures torque LEWIS-163	B65-10312	05	Molded elastomer provides compact ferrite-core holder, simplifies assembly JPL-584	B64-10084	05
<b>DYNODE</b>			Elastomers bonded to metal surfaces seal electrochemical cells GSFC-168	B64-10113	03
Electron multiplier has improved performance and stability GSFC-546	B67-10060	01	Compact assembly generates plastic foam, inflates flotation bag LANGLEY-96	B65-10090	05
<b>E</b>			Silazane polymers show promise for high-temperature application M-FS-466	B66-10194	03
<b>EARDRUM</b>			Extensometer automatically measures elongation in elastomers M-FS-517	B66-10284	05
Electronic dummy for acoustical testing MSC-206	B67-10298	01	Silazane elastomer remains resilient at 400 deg C		
<b>ECHO</b>					
Study of yttrium iron garnet rods reveals new magnetostatic echo mode ERC-37	B67-10153	01			
<b>EDDY CURRENT</b>					
Diaphragm spring gives clutch over-center toggle effect GSFC-499	B66-10297	05			



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# ELECTRIC CURRENT

M-FS-1144	B66-10667	05	cable end ARG-9	B66-10478	01
Self-sealing closure enables access to several fluid containers NPO-10123	B67-10207	04	Cracks in glass electrical connector headers removed by dry blasting with fine abrasive LEWIS-381	B67-10148	03
ELBOW			Test device prevents weld joint damage by eliminating axial pin forces on unpotted modules LEWIS-10201	B67-10359	01
Stainless-steel elbows formed by spin forging M-FS-122	B63-10590	05	Connector shorting cap provides pin alignment, inspection, and stray voltage protection M-FS-13111	B67-10635	01
Spring loaded beaded cable makes efficient wire puller WOO-108	B65-10031	05	ELECTRIC CONTACT		
ELECTRIC ARC			Continuity tester screens out faulty socket connections JPL-596	B64-10065	01
Electric arc heater is self starting LANGLEY-208	B66-10230	03	Lightweight coaxial cable connector reduces signal loss JPL-720	B65-10244	01
Magnetically operated limit switch has improved reliability, minimizes arcing MSC-422	B66-10270	01	Device serves as hinge and electrical connector for circuit boards M-FS-743	B66-10359	01
Cryogenic cooling reduces high voltage arcing between electrodes operating in a vacuum ARG-109	B66-10499	02	Solid state detectors monitor relay contacts JPL-785	B66-10396	01
Control apparatus for spectral energy source LEWIS-391	B67-10404	01	System for etching thick aluminum layers minimizes bridging and undercutting M-FS-1366	B66-10400	03
Technique eliminates high voltage arcing at electrode-insulator contact area LEWIS-10133	B67-10470	01	Variable reluctance switch avoids contact corrosion and contact bounce MSC-1178	B67-10137	01
ELECTRIC CELL			Thin film process forms effective electrical contacts on semiconductor crystals M-FS-2343	B67-10142	01
Primary cell uses neither liquid nor fused electrolytes NPO-10001	B67-10275	01	ELECTRIC CONTROL		
ELECTRIC CONDUCTIVITY			Binary counter accumulates time by complementary preset MSC-242	B65-10399	01
Portable self-powered device detects internal flaws in tubular structures NU-0019	B66-10028	01	Electrically controlled optical latch and switch requires less current JPL-SC-111	B66-10414	01
Silver-base ternary alloy proves superior for slip ring lead wires M-FS-1540	B66-10540	03	ELECTRIC CURRENT		
Thermocouples electrically checked while connected to data system LANGLEY-182	B66-10623	01	Igniting system for mercury vapor lamps pro- tects transistorized sustaining supply JPL-421	B63-10262	01
Hydrated multivalent cations are new class of molten salt mixtures ARG-211	B67-10033	03	Pickup device reads pressures from ports in rotating mechanisms LEWIS-158	B65-10021	05
Static electricity of polymers reduced by treatment with iodine NPO-10062	B67-10132	03	Laser beam transmits electric power GSFC-293	B65-10158	01
ELECTRIC CONDUCTOR			Sensitive electrometer features digital output GSFC-288	B65-10206	01
Special tool seals conductors with combination of plastic sleeves M-FS-579	B66-10209	05	Electrical probe ensures reliable contact in socket M-FS-315	B65-10215	01
Electrically conductive fibers thermally isolate temperature sensor GSFC-456	B66-10349	01	Niobium thin films are superconductive in strong magnetic fields at low temperatures JPL-SC-174	B66-10122	02
Electrical cabling withstands severe environmental conditions M-FS-1585	B66-10427	01	Magnetically operated limit switch has improved reliability, minimizes arcing MSC-422	B66-10270	01
Tungsten fiber-reinforced copper composites form high strength electrical conductors LEWIS-338	B66-10572	03	Trisphere spark gap actuates overvoltage relay ARC-68	B66-10557	01
Tester automatically checks insulation of individual conductors in multiple-strand cables NUC-10068	B67-10260	01	Logarithmic current simulator generates electrical currents accurately between 10 to		
ELECTRIC CONNECTOR					
Inexpensive electrical connector is moisture and corrosionproof MSC-164	B65-10196	01			
Plug-in connector socket accepts coaxial					

## ELECTRIC DISCHARGE

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the minus 11 ampere to 10 to the minus 3 ampere NU-0087	B66-10706	01	Ceramic materials purified by experimental method LEWIS-225	B65-10270	03
Clamp provides efficient connection for high-density currents M-FS-2417	B67-10140	01	Mounting improves heat-sink contact with beryllia washer MSC-194	B66-10144	01
<b>ELECTRIC DISCHARGE</b> Traveling wire electrode increases productivity of electrical discharge machining /EDM/ equipment ARG-136	B67-10238	05	Mechanical properties of wire insulation automatically determined MSC-10983	B67-10370	01
Standard surface grinder for precision machining of thin-wall tubing ARG-10014	B67-10400	05	<b>ELECTRIC LEAD</b> Handtool bends component leads accurately M-FS-308	B65-10181	05
<b>ELECTRIC ENERGY</b> Camera shutter is actuated by electric signal ARC-20	B63-10560	05	Substituting gold for silver improves electrical connections M-FS-2390	B67-10228	03
New energy storage concept uses tapes LEWIS-239	B66-10098	02	Protected, high-temperature connecting cable LEWIS-10149	B67-10461	01
<b>ELECTRIC ENERGY STORAGE</b> Regenerative fuel cell combines high efficiency with low cost WOO-090	B65-10363	01	<b>ELECTRIC MEASUREMENT</b> Edge-type connectors evaluated by electrical noise measurement M-FS-2243	B67-10125	01
<b>ELECTRIC EQUIPMENT</b> Hot-air soldering technique prevents overheating of electrical components GSFC-91	B63-10536	01	<b>ELECTRIC MOTOR</b> Brushless dc motor uses electron beam switching tube as commutator GSFC-345	B65-10237	01
Inexpensive electrical connector is moisture and corrosionproof MSC-164	B65-10196	01	Electropneumatic transducer automatically limits motor current LEWIS-253	B66-10160	01
Electrical cable connector-clamp has smooth exterior surface MSC-154	B65-10201	05	Solid state circuit controls direction, speed, and braking of dc motor JPL-757	B66-10486	01
Electrical probe ensures reliable contact in socket M-FS-315	B65-10215	01	<b>ELECTRIC NETWORK</b> Transient Analysis Generator /TAG/ simulates behavior of large class of electrical networks NPO-10031	B67-10319	06
Keyed plugs and sockets prevent improper connections MSC-231	B65-10381	01	<b>ELECTRIC POTENTIAL</b> Density trace made with computer printout GSFC-322	B65-10200	01
Complementary system vaporizes subcooled liquid, improves transformer efficiency M-FS-550	B66-10045	02	Phase inverter provides variable reference push-pull output HQ-23	B66-10344	01
High-pressure, low temperature electrical connector makes no-leak seal MSC-276	B66-10079	02	Potassium plasma cell facilitates thermionic energy conversion process ARG-10010	B67-10399	01
Mounting improves heat-sink contact with beryllia washer MSC-194	B66-10144	01	<b>ELECTRIC POWER CONVERSION</b> High power dc/dc and dc/ac electrical power conversion techniques developed M-FS-13227	B67-10390	01
Polarizing keys prevent mismatch of connector plugs and receptacles MSC-443	B66-10251	01	Design for high-temperature /1800 deg F/ liquid metal pressure transducer LEWIS-10144	B67-10458	01
Low speed, long term tracking electric drive system has zero backlash NPO-10173	B67-10220	01	Converter provides constant electrical power at various output voltages GSFC-519	B67-10481	01
Electronic test instrument generates extremely small current signals ARG-276	B67-10318	01	<b>ELECTRIC PULSE</b> Pulse generator using transistors and silicon controlled rectifiers produces high current pulses with fast rise and fall times MSC-405	B66-10456	01
<b>ELECTRIC FIELD</b> Movable RF probe eliminates need for calibration in plasma accelerators LEWIS-10127	B67-10362	01	Electronic circuit delivers pulse of high interval stability MSC-673	B66-10501	01
<b>ELECTRIC INSULATION</b> Connector for thermocouple leads saves costly wire, makes reliable connectors LANGLEY-26	B63-10529	01	<b>ELECTRIC TERMINAL</b> Electronic bidirectional valve circuit prevents crossover distortion and threshold effect MSC-193	B66-10420	01
Continuity tester screens out faulty socket connections JPL-596	B64-10065	01			

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# ELECTRODE

## ELECTRIC WIRING

Circuit reliability boosted by soldering pins of disconnect plugs to sockets  
JPL-447 B64-10002 01

Copper wire plated with nickel and silver resists corrosion  
M-FS-761 B66-10421 03

Electrical continuity scanner facilitates identification of wires for soldering to connectors  
MSC-626 B66-10605 01

## ELECTRO-OPTICS

Liquid-level meter has no moving parts  
M-FS-3 B63-10378 03

Communication system uses modulated laser beam  
GSFC-377 B65-10333 01

## ELECTROCARDIOGRAM

Digital cardiometer computes and displays heartbeat rate  
MSC-93 B64-10258 01

Simulator produces physiological waveforms  
MSC-94 B65-10091 01

Auxiliary circuit enables automatic monitoring of EKG  
MSC-106 B65-10142 01

Digital-output cardiometer measures rapid changes in heartbeat rate  
MSC-133 B65-10143 01

Tiny biomedical amplifier combines high performance, low power drain  
ARC-41 B65-10203 01

Spray-on electrodes enable EKG monitoring of physically active subjects  
FRC-36 B66-10649 04

## ELECTROCARDIOGRAPHY

Inexpensive, stable circuit measures heart rate  
MSC-95 B65-10010 01

Integral skin electrode for electrocardiography is expendable  
MSC-299 B66-10118 04

## ELECTROCHEMICAL CELL

Elastomers bonded to metal surfaces seal electrochemical cells  
GSFC-168 B64-10113 03

Apparatus measures swelling of membranes in electrochemical cells  
GSFC-280 B65-10087 01

Rubber and alumina gaskets retain vacuum seal in high temperature EMF cell  
ARG-17 B66-10472 05

Primary cells utilize halogen-organic charge transfer complex  
JPL-926 B66-10682 02

Gas pressure in sealed electrochemical cells measured externally  
GSFC-10004 B67-10551 03

## ELECTROCHEMISTRY

Electrochemical milling removes burrs and solder from tubing ends  
M-FS-714 B66-10358 03

## ELECTRODE

Improved electrode gives high-quality biological recordings  
MSC-17 B64-10025 04

Auxiliary silver electrode eliminates two-step voltage discharge characteristic of silver-zinc cells  
GSFC-169 B64-10114 01

Modification increases light output of injection-luminescent diodes  
M-FS-192 B65-10006 01

Improved conductive paste secures biomedical electrodes  
MSC-107 B65-10015 03

Didymium compound improves nickel-cadmium cell  
GSFC-295 B65-10083 03

Spherical electrode eliminates high-voltage breakdown  
LEWIS-155 B65-10139 01

Electrostatically driven dynamic capacitor employs capacitive feedback  
JPL-771 B65-10293 01

Rugged pressed disk electrode has low contact potential  
MSC-158 B65-10320 01

Photosensors used to maintain welding electrode-to-joint alignment  
MSC-243 B65-10401 05

Reaction heat used in static water removal from fuel cells  
M-FS-532 B66-10013 01

Improved electrode paste provides reliable measurement of galvanic skin response  
MSC-146 B66-10049 04

Gelatin coated electrodes allow prolonged bioelectronic measurements  
MSC-153 B66-10088 01

Integral skin electrode for electrocardiography is expendable  
MSC-299 B66-10118 04

Cryogenic cooling reduces high voltage arcing between electrodes operating in a vacuum  
ARG-109 B66-10499 02

Computer programs calculate potential and charge distributions in a plasma  
M-FS-871 B66-10553 01

Collector/collector guard ring balancing circuit eliminates edge effects  
JPL-SC-143 B66-10563 01

Power arc welder touch-started with consumable electrode  
M-FS-1485 B66-10641 05

Spray-on electrodes enable EKG monitoring of physically active subjects  
FRC-36 B66-10649 04

Hermetically sealed cells protected from internal gas pressure  
GSFC-555 B66-10692 01

Traveling wire electrode increases productivity of electrical discharge machining /EDM/ equipment  
ARG-136 B67-10238 05

Primary cell uses neither liquid nor fused electrolytes  
NPO-10001 B67-10275 01

Lamp enables measurement of oxygen concentration in presence of water vapor  
MSC-10043 B67-10387 01

Fuel cell life improved by metallic sinter activation after electrode assembly  
MSC-10965 B67-10436 03

Technique eliminates high voltage arcing at electrode-insulator contact area  
LEWIS-10133 B67-10470 01

## ELECTRODEPOSITION

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Vanadium diaphragm electrode serves as hydrogen diffuser in lithium hydride cell ARG-10048	B67-10499	01
High-temperature /1100 degrees F/ capacitors operate without supplement cooling LEWIS-10324	B67-10550	01
<b>ELECTRODEPOSITION</b> Fresnel zone plate forms images at wavelengths below 1000 angstroms GSFC-231	B65-10171	02
<b>ELECTRODERMAL RESPONSE</b> Improved conductive paste secures biomedical electrodes MSC-107	B65-10015	03
<b>ELECTROENCEPHALOGRAPH /EEG/</b> Helmet system broadcasts electroencephalograms of wearer ARC-70	B66-10536	01
<b>ELECTROFORMING</b> Nickel solution prepared for precision electroforming WOO-070	B65-10303	03
Pressure vessels fabricated with high-strength wire and electroformed nickel M-FS-580	B66-10218	05
<b>ELECTROHYDRAULIC FORMING</b> High-energy-rate magnetohydraulic metal forming system M-FS-2142	B67-10126	02
<b>ELECTROLUMINESCENCE</b> Legibility of electroluminescent instrument panels investigated MSC-494	B66-10316	02
Plotter design simplifies determination of image sensor transfer characteristic NPO-10164	B67-10206	01
<b>ELECTROLUMINESCENT LAMP</b> Panels illuminated by edge-lighted lens technique MSC-871	B66-10507	02
<b>ELECTROLYTE</b> Gelatin coated electrodes allow prolonged bioelectronic measurements MSC-153	B66-10088	01
New energy storage concept uses tapes LEWIS-239	B66-10098	02
Electrochemical milling removes burrs and solder from tubing ends M-FS-714	B66-10358	03
New electrolyte may increase life of polarographic oxygen sensors MSC-1049	B67-10003	03
Primary cell uses neither liquid nor fused electrolytes NPO-10001	B67-10275	01
Sensitive bridge circuit measures conductance of low-conductivity electrolyte solutions ARG-147	B67-10294	01
<b>ELECTROLYTIC MACHINING</b> Improved technique for localizing electro-polishing features novel nozzles WOO-101	B64-10271	01
Electrolytic etching process provides effective bonding surface on stainless steel GSFC-484	B66-10299	03
<b>ELECTROLYTIC POLISHING</b> Study shows effect of surface preparations on improving thermionic emission JPL-SC-140	B66-10493	01
<b>ELECTROMAGNET</b> Magnetic field controls carbon arc tail flame MSC-139	B65-10108	01
Neutron diffractometer allows both magnetic and crystallographic analyses ARG-191	B67-10131	02
<b>ELECTROMAGNETIC CONTROL</b> Device calibrates vibration transducers at amplitudes up to 20g M-FS-86	B63-10572	01
<b>ELECTROMAGNETIC INSTRUMENT</b> Electromagnetic hammer removes weld distortions from aluminum tanks M-FS-287	B65-10342	05
High transients suppressed in electromagnetic devices KSC-66-13	B67-10031	01
Improved fluid control circuit operates on low power input LEWIS-325	B67-10042	01
Calibration technique for electromagnetic flowmeters LEWIS-10328	B67-10554	01
<b>ELECTROMAGNETIC MEASUREMENT</b> Meter accurately measures flow of low-conductivity fluids JPL-0021	B63-10280	01
<b>ELECTROMAGNETIC METHOD</b> Brazing joint quality tested electromagnetically M-FS-12795	B67-10333	01
<b>ELECTROMAGNETIC RADIATION</b> Detector measures power in 50 to 30,000 GHz radiation band ERC-26	B66-10581	01
<b>ELECTROMAGNETIC SHIELDING</b> Transducer measures temperature differentials in presence of strong electromagnetic fields ARC-27	B65-10089	01
<b>ELECTROMECHANICAL DEVICE</b> Stepping switch with simple actuator provides many contacts in small space JPL-122	B63-10118	01
Electromechanically operated camera shutter provides uniform exposure JPL-357	B63-10227	01
Knob linkage permits one-hand control of several operations MSC-30	B65-10022	05
Digital system accurately controls velocity of electromechanical drive GSFC-287	B65-10096	01
Device measures fluid drag on test vehicles LANGLEY-34	B65-10195	01
Circuit operates as sine function generator MSC-255	B66-10038	01
Electropneumatic transducer automatically limits motor current LEWIS-253	B66-10160	01
Residual magnetism holds solenoid armature in desired position LEWIS-343	B67-10038	01
Instrument continuously measures density of flowing fluids LEWIS-309	B67-10080	01
Power torque wrench concept for precision torque application M-FS-13546	B67-10547	05

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# ELECTRON TUBE

Rolamite - a new mechanical design concept SAN-10001	B67-10611	05	Electron beam welding of copper-MONEL facilitated by circular magnetic shields M-FS-569	B66-10215	05
<b>ELECTROMECHANICS</b> Variable-capacitance tachometer eliminates troublesome magnetic fields GSFC-435	B66-10126	01	Suppressor plate eliminates undesired arcing during electron beam welding M-FS-1126	B66-10357	05
<b>ELECTROMETER</b> Field-effect transistor improves electrometer amplifier ARC-36	B64-10143	01	Electron beam welder X-rays its own welds LEWIS-10111	B67-10216	02
Vibrating-membrane electrometer has high conversion gain ARC-38	B65-10056	01	<b>ELECTRON BOMBARDMENT</b> Multiple element soft X-ray source produces wide range of radiation GSFC-286	B65-10082	02
Simplified electrometer has excellent operating characteristics JPL-413	B65-10125	01	Electron bombardment improves vacuum chamber efficiency LEWIS-160	B65-10280	02
Sensitive electrometer features digital output GSFC-288	B65-10206	01	Electron beam parallel X-ray generator MSC-11022	B67-10372	02
Electrometer has automatic zero bias control GSFC-350	B65-10242	01	<b>ELECTRON DENSITY</b> Microwave technique measures plasma characteristics LANGLEY-134	B65-10122	02
Electrometer preamplifier has drift correction feedback JPL-SC-074	B65-10267	01	Concept for using laser beams to measure electron density in plasmas M-FS-965	B66-10645	01
Electrostatically driven dynamic capacitor employs capacitive feedback JPL-771	B65-10293	01	<b>ELECTRON EMISSION</b> Improved design provides faster response time in photomultiplier GSFC-451	B66-10526	01
Electrometer amplifier operates over dynamic range of five orders of magnitude ARC-75	B67-10199	01	Process reduces secondary resonant emission in electronic components JPL-934	B66-10685	01
<b>ELECTROMOTIVE FORCE</b> Metal sheath improves thermocouple using graphite in one leg NU-0011	B65-10051	01	<b>ELECTRON ENERGY</b> Multiaxial analyzer detects low-energy electrons GSFC-329	B65-10213	01
Rubber and alumina gaskets retain vacuum seal in high temperature EMF cell ARG-17	B66-10472	05	<b>ELECTRON FLUX</b> Multiaxial analyzer detects low-energy electrons GSFC-329	B65-10213	01
Thermoelectric metal comparator determines composition of alloys and metals ARG-235	B67-10035	01	<b>ELECTRON GUN</b> Electron bombardment improves vacuum chamber efficiency LEWIS-160	B65-10280	02
<b>ELECTROMYOGRAM</b> Tiny biomedical amplifier combines high performance, low power drain ARC-41	B65-10203	01	<b>ELECTRON MICROSCOPE</b> New electron microscope employs new video display technique ARG-158	B67-10312	03
<b>ELECTRON BEAM</b> Tantalum cathode improves electron-beam evaporation of tantalum JPL-W00-021	B65-10175	03	<b>ELECTRON MULTIPLIER</b> Multiaxial analyzer detects low-energy electrons GSFC-329	B65-10213	01
Electron-beam deflection controlled by digital signals GSFC-385	B65-10283	02	Electron multiplier has improved performance and stability GSFC-546	B67-10060	01
Electron beam seals outer surfaces of porous bodies M-FS-562	B66-10033	03	<b>ELECTRON PROBE</b> Standards for electron probe microanalysis of silicates prepared by convenient method GSFC-469	B66-10234	03
An improved method for testing performance of vidicons during vibration JPL-SC-113	B66-10442	01	<b>ELECTRON TUBE</b> Wire winding increases lifetime of oxide- coated cathodes LEWIS-154	B65-10032	03
Electron beam parallel X-ray generator MSC-11022	B67-10372	02	Brushless dc motor uses electron beam switching tube as commutator GSFC-345	B65-10237	01
Electron beam deflected to determine focal point location M-FS-14107	B67-10649	01	Titanium diaphragm makes excellent amplatron cathode support GSFC-394	B65-10298	01
Electron beam standby absorber system M-FS-14108	B67-10650	01	Thermionic scanner pinpoints work function		
<b>ELECTRON BEAM WELDING</b> Split glass tube assures quality in electron beam brazing M-FS-564	B66-10151	05			

## ELECTRONIC CONTROL

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of emitter surfaces JPL-SC-177	B66-10444	01	by electronically-controlled device ARG-177	B67-10556	04
<b>ELECTRONIC CONTROL</b>			<b>ELECTRONIC EQUIPMENT TESTING</b>		
Conceptual servo technique for controlling tape drivers M-FS-12955	B67-10595	01	Probe tests microweld strength WOO-118	B65-10111	05
<b>ELECTRONIC EQUIPMENT</b>			Piezoresistive gage tests pin-connector sockets JPL-675	B65-10128	01
Electronic assembly rack panels snap on and off GSFC-59	B64-10121	05	Novel probe simplifies electronic component testing GSFC-342	B65-10243	01
Wire mesh isolator protects sensitive electronic components GSFC-347	B65-10216	05	Basic suppression techniques are evaluated M-FS-867	B66-10449	01
Electronic ohmmeter provides direct digital output GSFC-363	B65-10274	01	<b>ELECTRONIC FILTER</b>		
Electron-beam deflection controlled by digital signals GSFC-385	B65-10283	02	Electronic filter discriminates between true and false reflections HQ-55	B67-10071	02
Boron nitride housing cools transistors WOO-079	B65-10289	01	<b>ELECTRONIC MODULE</b>		
Thin-film resistors used in functional electronic blocks GSFC-380	B65-10305	01	Use of tear ring permits repair of sealed module circuitry M-FS-210	B65-10014	05
Standoff tool speeds placement of friction-fit electrical terminals WOO-029	B65-10348	05	Electronic modules easily separated from heat sink MSC-142	B65-10186	02
Multiphase clock-pulse generator uses simplified circuitry M-FS-297	B65-10353	01	Handtool facilitates extraction of circuit modules LANGLEY-38	B65-10231	05
Insulator-holder protects transistors in dense electronic assemblies MSC-214	B65-10389	01	Packaging of electronic modules JPL-801	B66-10664	01
Adhesive-backed terminal board eliminates mounting screws MSC-173	B65-10396	01	Test device prevents weld joint damage by eliminating axial pin forces on unpotted modules LEWIS-10201	B67-10359	01
Floating device aligns blind connections MSC-256	B66-10007	05	Transducer measures embedment stresses in electronic modules M-FS-13486	B67-10367	01
Compact retractor protects cabling loops M-FS-561	B66-10018	05	<b>ELECTRONIC PACKAGING</b>		
Circuit operates as sine function generator MSC-255	B66-10038	01	Flame sprayed dielectric coatings improve heat dissipation in electronic packaging M-FS-13569	B67-10534	01
Capacitive system detects and locates fluid leaks M-FS-478	B66-10099	01	<b>ELECTRONIC RECORDING INSTRUMENT</b>		
Soldering tool heats workpieces and applies solder in one operation LEWIS-247	B66-10115	05	Technique for strip chart recorder time notation GSFC-473	B67-10196	01
Fixture aids soldering of electronic components on circuit board ARC-56	B66-10162	01	<b>ELECTRONIC STRUCTURE</b>		
Tool forms right angles in component leads M-FS-722	B66-10346	05	Screening technique makes reliable bond at room temperature M-FS-227	B65-10004	03
Coldplate of pin fin design makes efficient heat exchanger MSC-1093	B67-10073	05	Flat pack interconnection structure simplifies modular electronic assemblies JPL-819	B67-10560	01
Accuracy of laser measurements improved by pulse autocorrelator electronic system MSC-10033	B67-10338	01	<b>ELECTRONIC SWITCH</b>		
Continuous wave detector has wide frequency range M-FS-1849	B67-10386	01	Integrator can easily be set and reset with an electronic switch ARC-10002	B67-10135	01
Eutectic fuse provides current and thermal protection under high vibration M-FS-13664	B67-10535	01	Hybrid solid state switch replaces motor- driven power switch JPL-931	B67-10165	01
Continuous microbial cultures maintained			<b>ELECTRONIC TRANSDUCER</b>		
			Transducer measures embedment stresses in electronic modules M-FS-13486	B67-10367	01
			<b>ELECTRONICS</b>		
			Automatic testing device facilitates noise checks and electronic calibrations LEWIS-10173	B67-10467	01
			<b>ELECTROPLATING</b>		
			High purity electroforming yields superior metal models		

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## ENERGY DISSIPATION

ARC-6	B63-10007	05	determined by emission spectrography MSC-1193	B66-10701	03
Ellipsoidal optical reflectors reproduced by electroforming GSFC-92	B63-10547	05	<b>EMITTER</b> Two-stage emitter follower is temperature stabilized MSC-20	B63-10493	01
Metals plated on fluorocarbon polymers JPL-544	B63-10612	03	Vapor grown silicon dioxide improves transistor base-collector junctions GSFC-389	B66-10091	01
Nickel/tin coating protects threaded fasteners in corrosive environment MSC-253	B65-10398	03	Chemical regeneration of emitter surface increases thermionic diode life LEWIS-17	B66-10435	02
Hollow spherical rotors fabricated by electroplating JPL-SC-117	B66-10366	05	Double emitter suppressed carrier modulator uses commercially available components M-FS-2494	B67-10101	01
Electroplating eliminates gas leakage in brazed areas M-FS-923	B66-10415	05	<b>ENCAPSULATION</b> Connector for thermocouple leads saves costly wire, makes reliable connectors LANGLEY-26	B63-10529	01
Silver plating technique seals leaks in thin wall tubing joints NU-0090	B66-10703	05	Plastic molds reduce cost of encapsulating electric cable connectors M-FS-69	B63-10568	05
Silver plating ensures reliable diffusion bonding of dissimilar metals M-FS-1975	B67-10124	03	Encapsulation process sterilizes and preserves surgical instruments JPL-484	B64-10066	05
Copper and nickel adherently electroplated on titanium alloy M-FS-13952	B67-10532	03	RF inductor has high Q, is stable at higher temperatures JPL-1019	B67-10106	01
<b>ELECTROSTATIC CHARGING</b> Vibrating diaphragm measures high electrostatic field strengths MSC-189	B65-10352	01	Transducer measures embedment stresses in electronic modules M-FS-13486	B67-10367	01
Test instrumentation evaluates electrostatic hazards in fluid system M-FS-2277	B67-10145	01	<b>ENCODER</b> Variable word length encoder reduces TV bandwidth requirements LANGLEY-87	B65-10345	01
<b>ELECTROSTATIC INSTRUMENT</b> Dust particle injector for hypervelocity accelerators provides high charge-to-mass ratio GSFC-509	B66-10347	01	Pneumatic binary encoder replaces multiple solenoid system M-FS-665	B66-10374	01
<b>ELECTROSTATIC SHIELDING</b> Improved magnetometer uses toroidal gating coil GSFC-249	B65-10103	01	<b>ENERGY</b> Fresnel cup reflector directs maximum energy from light source JPL-424	B63-10263	03
Metal oxide silicon /MOS/ transistors protected from destructive damage by wire device ARC-65	B66-10419	01	Regenerative fuel cell combines high efficiency with low cost WOO-090	B65-10363	01
<b>ELLIPSOID</b> Fresnel cup reflector directs maximum energy from light source JPL-424	B63-10263	03	Fast-acting calorimeter measures heat output of plasma gun accelerator LEWIS-388	B67-10192	01
Ellipsoidal-mirror reflectometer accurately measures infrared reflectance of materials GSFC-566	B67-10444	01	<b>ENERGY ABSORPTION</b> Frictional wedge shock mount is inexpensive, has good damping characteristics JPL-IT-1001	B63-10289	05
<b>EMBRITTLMENT</b> New alloy brazes titanium to stainless steel MSC-102	B65-10060	05	Kinetic-energy absorber employs frictional force between mating cylinders LEWIS-75	B63-10442	05
Study to minimize hydrogen embrittlement of ultrahigh-strength steels M-FS-2455	B67-10141	03	Torus elements used in effective shock absorber WOO-114	B66-10318	05
<b>EMISSION</b> Emission tester for high-power vacuum tubes JPL-628	B64-10158	01	Electron beam standby absorber system M-FS-14108	B67-10650	01
Technique for measuring absorptance and emittance by using cyclic incident radiation LEWIS-321	B66-10630	02	<b>ENERGY CONVERSION</b> Laser beam transmits electric power GSFC-293	B65-10158	01
Review of physics, instrumentation and dosimetry of radioactive isotopes ARG-10037	B67-10640	02	Potassium plasma cell facilitates thermionic energy conversion process ARG-10010	B67-10399	01
<b>EMISSION SPECTRUM</b> Trace levels of metallic corrosion in water			<b>ENERGY DISSIPATION</b> Break-up of metal tube makes one-time shock		

## ENERGY LEVEL

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absorber, bars rebound LANGLEY-1A	B63-10304	05	MSC-11232	B67-10474	02
<b>ENERGY LEVEL</b>			<b>ENVIRONMENTAL CHAMBER</b>		
Solar X-ray spectrum reproduced in vacuum MSC-228	B67-10164	02	Double gloves reduce contamination of dry box atmosphere LEWIS-211	B65-10117	03
<b>ENERGY SOURCE</b>			Materials physically tested in variable- environment chamber JPL-789	B66-10130	01
Closed fluid system without moving parts controls temperature LEWIS-222	B65-10331	02	Portable lightweight cell provides controlled environment MSC-648	B66-10370	05
<b>ENERGY STORAGE DEVICE</b>			<b>ENVIRONMENTAL CONTROL</b>		
New energy storage concept uses tapes LEWIS-239	B66-10098	02	Self-contained clothing system provides protection against hazardous environments M-FS-536	B66-10201	05
Large capacitor performs as a distributed parameter pulse line LEWIS-176	B66-10291	01	Critical parts are stored and shipped in environmentally controlled reusable container M-FS-703	B66-10258	05
<b>ENGINE</b>			Computer program analyzes generalized environmental control and life support systems MSC-1157	B67-10415	06
Self-balancing beam permits safe, easy load handling under overhang M-FS-84	B63-10571	05	Environmental control system for cryogenic testing of tensile specimens NUC-10523	B67-10618	02
<b>ENGINE CONTROL</b>			<b>ENVIRONMENTAL TESTING</b>		
Fingertip current control facilitates use of arc welding gun MSC-289	B66-10092	05	System transmits mechanical vibration into hazardous environment NU-0025	B65-10248	05
<b>ENGINE COOLANT</b>			Multiple test chamber exposes materials to various environments MSC-179	B65-10268	01
Radial coolant channels fabricated by simplified method NU-0070	B66-10267	05	Environmental study of miniature slip rings M-FS-2443	B67-10210	05
<b>ENGINE DESIGN</b>			<b>ENZYME</b>		
Torque meter aids study of hysteresis motor rings M-FS-12219	B67-10412	01	Microorganisms detected by enzyme-catalyzed reaction JPL-782	B66-10117	04
<b>ENGINE PART</b>			<b>EPOXIDE</b>		
Ring counter circuit switches multiphase motor direction of rotation JPL-SC-166	B66-10101	01	Integral coolant channels simply made by melt- out method M-FS-91	B63-10497	05
Internal machining accomplished at constant radial M-FS-1573	B66-10546	05	<b>EPOXY RESIN</b>		
<b>ENGINE TESTING</b>			Integral coolant channels simply made by melt- out method M-FS-91	B63-10497	05
Rocket engine vibration accurately measured by photography M-FS-1916	B66-10652	02	Stringent cleaning technique assures reliable epoxy bond GSFC-161	B64-10142	03
<b>ENGINEERING DEVELOPMENT</b>			Screening technique makes reliable bond at room temperature M-FS-227	B65-10004	03
Modified contour projector makes excellent contour densitometer LANGLEY-93	B65-10084	02	Aluminum alloys protected against stress- corrosion cracking M-FS-235	B65-10172	03
<b>ENTROPY</b>			Epoxy-resin patterns speed shell-molding of aluminum parts M-FS-303	B65-10177	05
Thermodynamic properties of saturated liquid parahydrogen charted for important temperature range NUC-10018	B67-10346	03	Epoxy blanket protects milled part during explosive forming M-FS-307	B66-10029	03
<b>ENVIRONMENT</b>			Compound improves thermal interface between thermocouple and sensed surface NU-0028	B66-10121	02
Gallium useful bearing lubricant in high- vacuum environment LEWIS-12	B63-10337	03	Epoxy-coated containers easily opened by wire band M-FS-592	B66-10174	05
Improved molybdenum disulfide-silver motor brushes have extended life M-FS-64	B63-10479	03	Improved adhesive for cryogenic applications		
Miniature servo accelerometer is force- balanced JPL-155	B65-10340	01			
Instrumentation monitors transported material through variety of parameters M-FS-12938	B67-10545	01			
<b>ENVIRONMENT SIMULATION</b>					
Miniature piezoelectric triaxial accelerometer measures cranial accelerations AKC-71	B66-10534	01			
Method for X-ray study under extreme temperature and pressure conditions					



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# EVACUATION

cures at room temperature WOO-132	B66-10185	03	ESTER		
Photosensitive filler minimizes internal stresses in epoxy resins M-FS-1880	B67-10227	03	Synthesis of pure aromatic glycidyl esters for use as adhesives M-FS-12705	B67-10647	03
Technique eliminates high voltage arcing at electrode-insulator contact area LEWIS-10133	B67-10470	01	ETCHING		
Metallographic samples mounted with room-temperature, curable, polyester casting resins ARG-10025	B67-10484	03	Metals plated on fluorocarbon polymers JPL-544	B63-10612	03
Epoxy resins produce improved plastic scintillators ARG-241	B67-10596	03	Electroless nickel resist used in alkali-etching of aluminum GSFC-284	B65-10162	03
Synthesis of pure aromatic glycidyl esters for use as adhesives M-FS-12705	B67-10647	03	Fresnel zone plate forms images at wavelengths below 1000 angstroms GSFC-231	B65-10171	02
EQUILIBRIUM FLOW			Etching process mills pH 14-8 Mo alloy steel to precise tolerances MSC-270	B66-10110	03
Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	Chemical milling solution produces smooth surface finish on aluminum MSC-549	B66-10312	03
Program computes equilibrium normal shock and stagnation point solutions for arbitrary gas mixtures LANGLEY-10090	B67-10509	06	Nonhazardous acid etches weld samples M-FS-975	B66-10378	05
EQUIPMENT SPECIFICATIONS			System for etching thick aluminum layers minimizes bridging and undercutting M-FS-1366	B66-10400	03
Mylar film eliminates silk screening of equipment panels MSC-798	B66-10455	05	Study shows effect of surface preparations on improving thermionic emission JPL-SC-140	B66-10493	01
Integrated mobility measurement and notation system MSC-726	B67-10114	04	Acid spray technique mills aluminum alloy materials without immersion M-FS-12500	B67-10463	03
EROSION			ETHER		
Labyrinth-type valve seat increases valve life by decreasing fluid velocity M-FS-1051	B66-10424	05	Test monkeys anesthetized by routine procedure HQ-18	B65-10332	04
ERROR CORRECTING DEVICE			ETHYLENE COMPOUND		
Simplified circuit corrects faults in parallel binary information channels JPL-SC-090	B66-10261	01	Spectrophotometric technique quantitatively determines NaMBT inhibitor in ethylene glycol-water solutions MSC-11496	B67-10573	03
Blackbody cavity radiometer has rapid response JPL-521	B66-10679	01	ETHYLENE OXIDE		
Automatic channel switching device MSC-832	B67-10086	01	Encapsulation process sterilizes and preserves surgical instruments JPL-484	B64-10066	05
ERROR DETECTING CODE			EUTECTIC ALLOY		
Detection system ensures positive alarm activation in digital message loss WOO-208	B66-10287	01	Coating method enables low-temperature brazing of stainless steel NU-0030	B65-10250	03
Digital system detects binary code patterns containing errors GSFC-541	B66-10516	01	Vacuum chamber is remotely sealed by eutectic metal NU-0091	B67-10059	05
ERROR FUNCTION			Eutectic fuse provides current and thermal protection under high vibration M-FS-13664	B67-10535	01
Computer program for network synthesis by frequency response fit M-FS-12686	B67-10406	06	EVACUATION		
ERROR SIGNAL			Seal-off assembly permits rapid evacuation of air from containers GSFC-513	B66-10446	05
Circuit detects errors in address currents for magnetic core arrays M-FS-234	B65-10047	01	Emergency escape system uses self-braking mechanism on fixed cable KSC-66-44	B66-10575	05
Absolute frequency stabilization of laser oscillator against laser amplifier M-FS-2559	B67-10255	01	Emergency escape system protects personnel from explosion and fire KSC-66-12	B66-10634	05
ESCAPE			Quartz crystals detect gas contaminants during vacuum chamber evacuation NPD-10144	B67-10205	01
Emergency escape system uses self-braking mechanism on fixed cable KSC-66-44	B66-10575	05	Hand-operated plug insertion valve M-FS-12019	B67-10466	05

# EVAPORATION

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## EVAPORATION

Tantalum cathode improves electron-beam evaporation of tantalum  
JPL-W00-021 B65-10175 03

Evaporant feed device facilitates flash vapor deposition process in vacuum  
NPO-10232 B67-10320 03

## EXCITATION

Electrodeless discharge lamp is easily started, has high stability  
W00-030 B66-10015 01

## EXHAUST

Refractory thermal insulation for smooth metal surfaces  
M-FS-160 B64-10099 03

Magnetic field controls carbon arc tail flame  
MSC-139 B65-10108 01

## EXHAUST GAS

Plastic bags in evacuated chamber make lightweight gas sampling system  
FRC-31 B65-10264 01

Calculation of infrared spectral transmittances of inhomogeneous gases  
M-FS-1563 B66-10554 02

## EXHAUST JET

Probe samples components of rocket engine exhaust  
M-FS-485 B65-10384 03

## EXHAUST NOZZLE

Computer program uses characteristics method for free-jet investigation  
LANGLEY-10117 B67-10490 06

## EXOTHERMIC REACTION

Nitrogen dioxide produced by self-sustained pyrolysis of nitrous oxide  
LANGLEY-32 B65-10074 05

## EXPANDABLE STRUCTURE

Collapsible truss structure is automatically expandable  
GSFC-265 B65-10126 05

Expandable takeup reel facilitates paper tape removal  
W00-271 B66-10399 05

## EXPIRATION

Device induces lungs to maintain known constant pressure  
MSC-50 B64-10108 04

## EXPLOSION

Magnetic latches provide positive overpressure control  
NU-0057 B66-10279 05

## EXPLOSIVE

Explosives actuate nonmagnetic indexing device  
GSFC-237 B65-10017 05

## EXPLOSIVE DEVICE

Splice plate design assures structural separation by mild explosive  
MSC-137 B65-10166 05

Threaded split ring connector separates structural sections  
LANGLEY-145 B65-10383 05

Pulse technique provides more accurate checkout of exploding bridge wire device  
HQ-62 B66-10561 01

Study made of explosive cutting in simulated space environments  
M-FS-1597 B67-10040 01

Cracks in glass electrical connector headers removed by dry blasting with fine abrasive

LEWIS-381 B67-10148 03

Explosive-train initiated through solid bulkhead by pressure cartridge  
MSC-11395 B67-10589 03

## EXPLOSIVE FORMING

Metal parts hydrosized by explosive force  
M-FS-289 B65-10170 05

Explosive force of Primacord grid forms large sheet metal parts  
M-FS-316 B66-10014 05

Epoxy blanket protects milled part during explosive forming  
M-FS-307 B66-10029 03

Strippable grid facilitates removal of grid-surfaced conical workpiece from die  
M-FS-716 B66-10334 05

Study made to establish parameters and limitations of explosive welding  
M-FS-13006 B67-10393 05

High energy forming facility  
M-FS-14026 B67-10588 05

## EXPOSURE

Electromechanically operated camera shutter provides uniform exposure  
JPL-357 B63-10227 01

Study of corrosion of 1100 aluminum  
ARG-10045 B67-10578 03

## EXTENSOMETER

Extensometer automatically measures elongation in elastomers  
M-FS-517 B66-10284 05

## EXTRACTION

Tool permits damage-free removal of solar cell  
GSFC-467 B66-10219 05

Fluid-bed fluoride volatility process recovers uranium from spent uranium alloy fuels  
ARG-232 B67-10032 03

Effect of preparation procedures on intensity of radioautographic labeling is studied  
ARG-10032 B67-10500 04

Simple colorimetric method determines uranium in tissue  
ARG-10039 B67-10580 03

## EXTRUSION

Rapid billet loader aids extrusion of refractory metals  
LEWIS-50 B63-10354 05

Guide for extrusion dies eliminates straightening operation  
LEWIS-152 B64-10014 05

Integral ribs formed in metal panels by cold-press extrusion  
M-FS-230 B65-10141 05

Ductile mandrel and parting compound facilitate tube drawing  
ARG-43 B66-10571 05

Extrusion of small-diameter, thin-wall tungsten tubing  
LEWIS-335 B67-10355 05

## EYE

Optical projectors simulate human eyes to establish operator's field of view  
W00-250 B66-10010 02

## EYE MOVEMENT

Photoelectric sensor output controlled by eyeball movements

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## FATIGUE TEST

M-FS-274	B65-10079	01	Burnishing technique improves lubrication of threaded fasteners LEWIS-217	B65-10302	03
<b>F</b>					
<b>FACILITY</b>					
Computer program conducts facilities utilization and occupancy survey NPO-10326	B67-10476	06	Fastener distributes stress evenly from sandwich-panel-hung items MSC-236	B65-10358	05
<b>FACTORIAL DESIGN</b>					
Solenoid magnetic fields calculated from superposed semi-infinite solenoids LEWIS-184	B66-10490	01	Nickel/tin coating protects threaded fasteners in corrosive environment MSC-253	B65-10398	03
<b>FAILURE</b>					
Development of reliability prediction technique for semiconductor diodes GSFC-10231	B67-10651	06	Epoxy-coated containers easily opened by wire band M-FS-592	B66-10174	05
Phase plane displays detect incipient failure in servo system testing HQ-10018	B67-10662	01	Fastener provides for bolt misalignment and quick release of flange NU-0074	B66-10275	05
<b>FAILURE MODE</b>					
Analytical technique permits comparison of reliability of alternate mechanical designs NUC-10065	B67-10261	06	Tool pre-tensions covers prior to lacing MSC-631	B66-10301	05
Cut-through tester accurately measures insulation failure rates M-FS-12506	B67-10354	03	Flexible fastener effects airtight material closure JPL-684	B66-10304	05
<b>FAIRING</b>					
Pressure transducer 3/8-inch in size can be faired into surface WOO-065	B64-10021	05	Latching mechanism operates in limited access area MSC-230	B66-10338	05
<b>FARADAY ROTATION</b>					
Nonreciprocal gain control for ring laser M-FS-14041	B67-10653	02	Device serves as hinge and electrical connector for circuit boards M-FS-743	B66-10359	01
<b>FAST NEUTRON</b>					
A fast-neutron spectrometer of advanced design M-FS-1664	B66-10555	01	Study made to control depth of potting compound for honeycomb sandwich fasteners LEWIS-370	B66-10677	05
<b>FASTENER</b>					
V-slotted screw head and matching driving tool facilitate insertion and removal of screw fasteners FRC-16	B63-10023	05	Lock-disconnect mechanism gives positive release to joined bodies M-FS-2147	B67-10123	05
Heavy-duty staple remover operated by hand JPL-IT-1004	B63-10292	05	Line adapter provides quick disconnect under moderate side loading M-FS-2159	B67-10256	05
Buckle joins web straps quickly, adjusts easily LANGLEY-21	B64-10119	05	Combined attenuator and latch for cartridge powered actuator MSC-11242	B67-10488	05
Electronic assembly rack panels snap on and off GSFC-59	B64-10121	05	Power torque wrench concept for precision torque application M-FS-13546	B67-10547	05
Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05	Radiant heat source, vacuum bag, provide portable bonding oven MSC-11342	B67-10570	03
Threading hook facilitates safe recovery of heavy loads MSC-46	B64-10185	05	<b>FATIGUE</b>		
Fastener provides cooling and compensates for thermal expansion NU-0003	B65-10038	05	Apparatus facilitates pressure-testing of metal tubing LEWIS-174	B65-10131	05
Low-cost tool minimizes damage to O-rings during installation MSC-140	B65-10116	05	Plugged hollow shaft makes fatigue-resistant shear pin LANGLEY-195	B66-10077	05
Coiled spring makes self-locking device for threaded fasteners MSC-149	B65-10135	05	<b>FATIGUE LIFE</b>		
Galvanic corrosion reduced in aluminum fabrications M-FS-272	B65-10140	03	Control of component differential hardness increases bearing life LEWIS-190	B65-10251	05
Captive nut fastener securely joins brittle materials NU-0008	B65-10245	05	Fluid damping reduces bellows seal fatigue failures M-FS-565	B66-10249	05
			<b>FATIGUE TEST</b>		
			Cryostat modified to aid rotating beam fatigue test M-FS-435	B66-10083	03
			Fatigue cracks detected and measured without test interruption LEWIS-266	B66-10178	02
			Cryogenic fatigue data developed for Inconel 718 M-FS-702	B67-10049	03

## FATIGUE TESTING MACHINE

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Material fatigue data obtained by card-programmed hydraulic loading system LANGLEY-10042	B67-10491	03	System maintains constant penetration during fusion welding M-FS-937	B67-10091	01
Hydraulic servo system increases accuracy in fatigue testing LANGLEY-217	B67-10637	01	Signal generator converts direct current to multiphase supplies MSC-11043	B67-10368	01
<b>FATIGUE TESTING MACHINE</b> Apparatus permits flexure testing of specimens at cryogenic temperatures M-FS-257	B65-10129	02	General frequency response program calculates frequency response of system, open at any specified element M-FS-12817	B67-10521	06
Fatigue tester achieves true axial motion through flex plates and bars NU-0021	B66-10164	01	<b>FEEDING DEVICE</b> Tension is servo controlled in film advance system LANGLEY-54	B65-10075	05
Tester for study of rolling element bearings LEWIS-305	B67-10009	01	Modified power tool rapidly drives series torque bolts MSC-221	B66-10054	05
Strain gage circuitry provides fatigue testing machine with accurate cycle count NU-0114	B67-10093	01	Feed-through connector couples RF power into vacuum chamber NU-0096	B67-10027	01
<b>FEED SYSTEM</b> Gas pressure feeds film into camera at high speed ARG-97	B66-10474	02	Evaporant feed device facilitates flash vapor deposition process in vacuum NPO-10232	B67-10320	03
Welding torch and wire feed manipulator M-FS-13102	B67-10385	05	<b>FERRITE</b> Small digital recording head has parallel bit channels, minimizes cross talk JPL-0029	B63-10284	01
Computer programs for antenna feed system design and analysis NPO-10359	B67-10504	06	New sintering process adjusts magnetic value of ferrite cores GSFC-129	B63-10606	01
<b>FEEDBACK</b> Electrostatically driven dynamic capacitor employs capacitive feedback JPL-771	B65-10293	01	Molded elastomer provides compact ferrite-core holder, simplifies assembly JPL-584	B64-10084	05
Negative feedback system reduces pump oscillations M-FS-1852	B67-10064	05	Thin-film ferrites vapor deposited by one-step process in vacuum MSC-259	B66-10398	03
Voltage regulator/amplifier is self-regulated MSC-1240	B67-10156	01	Controlled ferrite content improves weldability of corrosion-resistant steel M-FS-568	B67-10069	03
<b>FEEDBACK AMPLIFIER</b> Voltage variable oscillator has high phase stability LANGLEY-123	B65-10204	01	<b>Ferroelectrics</b> Ferroelectric bolometer measures RF absolute power at submillimeter wavelengths GSFC-422	B66-10051	01
Low speed, long term tracking electric drive system has zero backlash NPO-10173	B67-10220	01	<b>Ferromagnetism</b> Ferromagnetic core valve gives rapid action on minimum energy LEWIS-10135	B67-10623	05
Limit circuit prevents overdriving of operational amplifier NUC-10082	B67-10343	01	<b>FIBER</b> Plastic plus stainless-steel fibers make resilient, impermeable material WOO-246	B65-10374	03
Light-controlled resistors provide quadrature signal rejection for high-gain servo systems WSD-340	B67-10552	01	Fibers of newly developed refractory ceramics produced by improved process WOO-169	B66-10196	03
<b>FEEDBACK CONTROL SYSTEM</b> Apparatus measures very small thrusts WOO-048	B64-10284	05	Study made of mechanics of deformation and fracture of fibrous composites HQ-10035	B67-10660	03
Feedback oscillator functions as low-level pulse stretcher GSFC-261	B65-10069	01	<b>FIELD EFFECT TRANSISTOR /FET/</b> Field-effect transistor improves electrometer amplifier ARC-36	B64-10143	01
Noncontacting vibration transducer has constant sensitivity LANGLEY-99	B65-10392	01	Field effect transistors used as voltage-controlled resistors M-FS-174	B64-10163	01
Quick-response servo amplifies small hydraulic pressure differences ARG-99	B66-10498	05	Logarithmic amplifier uses field effect transistors JPL-509	B65-10145	01
Digital system provides superregulation of nanosecond amplifier-discriminator circuit ARG-61	B66-10500	01	Field effect transistor presents high input impedance in ac amplifier		
Preregulator feedback circuit utilizes light actuated switch M-FS-1180	B66-10542	01			

## SUBJECT INDEX

## FINNED BODY

JPL-500	B65-10232	01	for several independent variables that minimize a dependent variable	M-FS-13030	B67-10328	06
Field-effect transistor replaces bulky transformer in analog-gate circuit	GSFC-351	B65-10284	01	FILM THICKNESS		
FET comparator detects analog signal levels without loading analog device	M-FS-503	B66-10224	01	White primer permits a corrosion-resistant coating of minimum weight	M-FS-304	B66-10207 03
Mosfet analog memory circuit achieves long duration signal storage	M-FS-860	B66-10603	01	Uniform reflective films deposited on large surfaces	GSFC-507	B66-10483 02
Equivalent circuit for a field effect transistor established for computer simulation	M-FS-1752	B66-10690	01	FILTER		
Field effect transistors improve buffer amplifier	M-FS-916	B67-10334	01	Modified filter prevents conduction of micro-wave signals along high-voltage power supply leads	JPL-63	B63-10091 01
Multiplexer uses insulated gate-field effect transistors	M-FS-13096	B67-10396	01	Filter for high-pressure gases has easy take-down, assembly	JPL-373	B63-10234 03
MOSFET improves performance of power supply regulator	GSFC-10022	B67-10569	01	Cryogenic filter method produces super-pure helium and helium isotopes	JPL-374	B63-10235 03
FILAMENT				Fine-particle filter prevents damage to vacuum pumps	LEWIS-106	B63-10489 05
Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss	LEWIS-39	B63-10342	01	High-pass RF coaxial filter rejects dc and low frequency signals	GSFC-73	B64-10173 01
Lamp automatically switches to new filament on burnout	M-FS-498	B66-10046	01	Rotating filters permit wide range of optical pyrometry	LANGLEY-33	B65-10100 02
FILAMENT WINDING				Process reduces pore diameters to produce superior filters	WOO-093	B66-10037 03
Fiberglass parts cured during filament winding eliminates oven, saves time	M-FS-14	B65-10088	03	Inexpensive infrared source improvised from flashlight	M-FS-494	B66-10096 02
Pressure vessels fabricated with high-strength wire and electroformed nickel	M-FS-580	B66-10218	05	Ultrasonic cleaning restores depth-type filters	M-FS-540	B66-10298 03
Buckling strength of filament-wound cylinders under axial compression is investigated	HQ-10032	B67-10659	03	Fiber length and orientation prevent migration in fluid filters	M-FS-541	B66-10319 05
FILLER				Composite filter steepens rejection slopes in microwave application	GSFC-480	B66-10393 01
Aluminum oxide filler prevents obstructions in tubing during welding	MSC-222	B66-10125	05	Valve effectively controls amount of contaminant in flow stream	M-FS-1771	B66-10683 05
Brazing process using Al-Si filler alloy reliably bonds aluminum parts	MSC-448	B66-10241	05	FILTRATION		
Photosensitive filler minimizes internal stresses in epoxy resins	M-FS-1880	B67-10227	03	Two techniques enable sampling of filtered and unfiltered molten metals	ARG-150	B67-10034 03
FILM				FINDER		
Tension is servo controlled in film advance system	LANGLEY-54	B65-10075	05	System locates randomly placed remote objects	LANGLEY-209	B66-10315 01
System selects framing rate for spectrograph camera	LANGLEY-55	B65-10086	01	FINITE DIFFERENCE METHOD		
Single-crystal semiconductor films grown on foreign substrates	WOO-076	B66-10225	01	Computational procedure for finite difference solution of one-dimensional heat conduction problems reduces computer time	MSC-1120	B66-10566 01
Film coating permits low-force scribing	MSC-990	B66-10609	03	FINNED BODY		
Adhesives for laminating polyimide insulated flat conductor cable	M-FS-12066	B67-10429	03	A design procedure for the weight optimization of straight finned radiators	GSFC-547	B66-10618 05
FILM COOLING				Study made of heat transfer and pressure drop through tubes with internal interrupted fins	LEWIS-10280	B67-10555 05
Computer optimization program finds values						

## FIRE

## SUBJECT INDEX

<b>FIRE</b>					
Emergency escape system protects personnel from explosion and fire			Radial coolant channels fabricated by simplified method		
KSC-66-12	B66-10634	05	NU-0070	B66-10267	05
<b>FIRE CONTROL</b>			Fastener provides for bolt misalignment and quick release of flange		
Dispersion of borax in plastic is excellent fire-retardant heat insulator			NU-0074	B66-10275	05
ARG-5	B67-10016	03	Remotely controlled system couples and decouples large diameter pipes		
<b>FIRE EXTINGUISHER</b>			NU-0062	B66-10276	05
Fire extinguisher control system provides reliable cold weather operation			External linkage tie permits reduction in ducting system flange thickness		
M-FS-13031	B67-10622	05	M-FS-823	B66-10326	05
<b>FIRST AID</b>			Feed-thru flange is useful in vacuum applications to cryogenic temperatures		
Buoyant Stokes litter assembly used for sea rescue operations			JPL-846	B66-10615	02
MSC-131	B66-10019	05	Spherical pipe joint delivers loads equally to mating flange		
<b>FISSION PRODUCT</b>			M-FS-807	B66-10665	05
Computer program FPIP-REV calculates fission product inventory for U-235 fission			Spherical joint connects axially misaligned flanges		
NUC-10089	B67-10450	06	M-FS-2238	B67-10273	05
<b>FITTING</b>			Static seal concept to accommodate seat tolerances		
Self sealing disconnect for tubing forms metal seal after breakaway			M-FS-1854	B67-10285	05
JPL-354	B63-10226	05	Development of helical seal for high temperature /2000 degrees F/ application		
Special pliers connect hose containing liquid under pressure			M-FS-13304	B67-10655	05
JPL-IT-1003	B63-10291	05	<b>FLARE</b>		
Inexpensive check valve is installed in standard AN fittings			Mechanical gauge accurately checks tubing flare, roundness, and concentricity		
JPL-2A	B65-10222	05	M-FS-1822	B66-10656	05
Strainer fits inside flared-tube fittings			<b>FLARED BODY</b>		
LANGLEY-180	B65-10388	05	Strainer fits inside flared-tube fittings		
O-ring tube fittings form leakproof seal in hydraulic systems			LANGLEY-180	B65-10388	05
M-FS-481	B66-10020	05	Forming tool improves quality of tubing flares		
Seal surfaces protected during assembly			WOO-231	B66-10001	05
NU-0067	B66-10266	05	Gage tests tube flares quickly and accurately		
Computer program performs rectangular fitting stress analysis			KSC-66-19	B66-10537	05
M-FS-13010	B67-10520	06	<b>FLAT LAYER</b>		
<b>FIXED-WING AIRCRAFT</b>			Improved method of edge coating flat ribbon wire		
Computer program calculates wing aerodynamic characteristics for fixed wings with dihedral and variable-sweep wings at subsonic speeds			M-FS-902	B66-10684	03
LANGLEY-10191	B67-10666	06	<b>FLAT PLATE</b>		
<b>FLAME</b>			Equations provide tubular information on effects of uniform and variable loads on thin, flat, circular plates		
Magnetic field controls carbon arc tail flame			ARG-151	B66-10601	05
MSC-139	B65-10108	01	<b>FLAT SURFACE</b>		
<b>FLAME HOLDER</b>			Sensitive level sensor made with spirit level, gives electrical output		
Mounting facilitates removal and installation of flame-detector rods			LANGLEY-49	B65-10067	01
M-FS-555	B66-10150	05	Flat cable insulation stripping machine		
<b>FLAME SPRAYING</b>			M-FS-13776	B67-10581	05
Metal flame spray coating protects electrical cables in extreme environment			<b>FLAW</b>		
NUC-10077	B67-10351	03	Apparatus facilitates pressure-testing of metal tubing		
Flame sprayed dielectric coatings improve heat dissipation in electronic packaging			LEWIS-174	B65-10131	05
M-FS-13569	B67-10534	01	<b>FLAW DETECTION</b>		
<b>FLANGE</b>			Crack detection method is safe in presence of liquid oxygen		
Flange on microwave antenna subreflector cuts ground noise			M-FS-236	B65-10107	03
JPL-362	B63-10229	01	Portable self-powered device detects internal flaws in tubular structures		
Pressure seal ring may be effective over wide temperature range			NU-0019	B66-10028	01
M-FS-486	B66-10211	05	Fatigue cracks detected and measured without test interruption		
Pressure-welded flange assembly provides leaktight seal at reduced bolt loads			LEWIS-266	B66-10178	02
M-FS-640	B66-10247	05			

# SUBJECT INDEX

# FLOW METER

Calibrating ultrasonic test equipment for checking thin metal strip stock NUC-10009	B67-10127	01	is easily moved M-FS-15	B63-10387	05
Liquid crystals detect voids in fiberglass laminates LEWIS-10104	B67-10286	03	<b>FLOW CHARACTERISTICS</b> Oil-smeared models aid wind tunnel measurements LANGLEY-4	B63-10311	03
Camera lens adapter magnifies image M-FS-11955	B67-10431	02	Probe measures characteristics of hot gas stream M-FS-240	B65-10133	02
Lamb waves increase sensitivity in nondestructive testing ARG-10009	B67-10605	02	Matching flow characteristics of standard shutoff valves eliminates need for custom fabricated valves M-FS-1069	B66-10416	05
<b>FLEXIBILITY</b> Flexible honeycomb structure can bend to fit compound curves M-FS-13	B63-10385	05	Pump simulator provides variable pressure-flow characteristics LEWIS-10122	B67-10453	05
Adhesive for vacuum environments resists shock and vibration MSC-56	B65-10016	03	Program computes equilibrium normal shock and stagnation point solutions for arbitrary gas mixtures LANGLEY-10090	B67-10509	06
Extendible column can be stowed on drum JPL-686	B65-10191	05	<b>FLOW FIELD</b> Computer program calculates wing aerodynamic characteristics for fixed wings with dihedral and variable-sweep wings at subsonic speeds LANGLEY-10191	B67-10666	06
Flexible protective coatings made from silicon-nitrogen materials M-FS-528	B66-10027	03	<b>FLOW GRAPH</b> Fortran program flowchart is automatically produced M-FS-369	B66-10062	01
Flexible drive allows blind machining and welding in hard-to-reach areas MSC-524	B66-10428	05	<b>FLOW MEASUREMENT</b> Fluid-pressure meter can be calibrated without removal from flow line M-FS-98	B63-10502	05
Metal tube can be folded for compact stowage, is self-erecting LEWIS-288	B66-10450	05	Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01
Lightweight, all-metal hose assembly has high flexibility and strength over wide range of temperature and pressure M-FS-1831	B66-10635	05	Wide-range instrument monitors flow rates of chemically active fluids MSC-186	B66-10205	01
<b>FLEXIBLE BODY</b> Hydraulically controlled flexible arm can bend in any direction KSC-66-20	B66-10626	05	Positive displacement cylinder measures corrosive liquid volume MSC-1038	B66-10589	05
Method for predicting frictional loss in metal bellows and flexible hose M-FS-883	B66-10662	05	Study of hot wire techniques in low density flows with high turbulence levels M-FS-1269	B66-10687	01
Rigid-body motion extracted from total motion of a flexible body ARC-63	B67-10081	05	Local measurements in turbulent flows through cross correlation of optical signals M-FS-1268	B67-10030	01
<b>FLEXURE</b> Lightweight universal joint transmits both torque and thrust JPL-375	B63-10236	05	Instrument continuously measures density of flowing fluids LEWIS-309	B67-10080	01
Flexure support system protects thermally and dynamically loaded models LANGLEY-39	B65-10042	05	Neutron detector simultaneously measures fluence and dose equivalent ARG-10071	B67-10597	02
<b>FLIGHT ALTITUDE</b> Sextant measures spacecraft altitude without gravitational reference MSC-200	B66-10143	02	<b>FLOW METER</b> Meter accurately measures flow of low-conductivity fluids JPL-0021	B63-10280	01
<b>FLIGHT TEST</b> Computer program performs aerothermodynamic flight test data correlation MSC-10075	B67-10494	06	Fluid-pressure meter can be calibrated without removal from flow line M-FS-98	B63-10502	05
<b>FLIP-FLIP</b> Binary counter uses fluid logic elements M-FS-323	B65-10377	01	Ball bearing used in design of rugged flow-meter LEWIS-159	B64-10170	05
Pneumatic binary encoder replaces multiple solenoid system M-FS-665	B66-10374	01	Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01
Bipolar current driver for memory circuits GSFC-213	B66-10469	01	Electromechanical flowmeter accurately monitors fluid flow GSFC-357	B65-10273	01
<b>FLOOR</b> Portable flooring protects finished surfaces,					

Improved strain-wire flowmeter has fast response time LEWIS-241	B65-10304	01	Temperature responsive valve withstands high impact loading NPO-10186	B67-10225	05
Volumetric system calibrates meters for large flow rates W00-130	B65-10323	05	Dual photochemical replenisher system reduces chemical losses KSC-67-111	B67-10485	02
Optical output enhances flowmeter accuracy M-FS-482	B65-10395	02	Butterfly valve with metal seals controls flow of hydrogen from cryogenic through high temperatures NUC-10034	B67-10567	05
Flowmeter measures low gas-flow rates M-FS-215	B66-10036	01	Ferromagnetic core valve gives rapid action on minimum energy LEWIS-10135	B67-10623	05
Segmented ball valve is easy to open and close W00-248	B66-10195	05	Solenoid hammer valve developed for quick-opening requirements LEWIS-10134	B67-10639	05
Bearing puller facilitates removal and replacement of bearing assemblies M-FS-1538	B66-10418	05	<b>FLOW STABILITY</b> System automatically supplies precise analytical samples of high-pressure gases M-FS-1814		
Flowmeter measures flow rates of high temperature fluids LEWIS-328	B66-10521	01	<b>FLOW VELOCITY</b> Device accurately measures and records low gas-flow rates M-FS-1077		
Laser Doppler flowmeter measures gas velocity M-FS-1747	B66-10693	02	Equation relates flow at free jet to flow downstream M-FS-13789	B67-10612	06
Low rate flow switch can be used for gas or liquid JPL-867	B66-10696	01	<b>FLUID</b> High-pressure regulating system prevents pressure surges JPL-231		
A theoretical model for determining turbine flowmeter sensitivity M-FS-1172	B67-10179	01	Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02
Automated microsyringe is highly accurate and reliable NPO-10142	B67-10203	01	Connector seals fluid lines at cryogenic temperatures and high vacuums GSFC-253	B64-10327	05
Circuit automatically calibrates flowmeter against liquid-level gage reference M-FS-2194	B67-10376	01	Improved fluid control valve extends diaphragm life JPL-345	B65-10147	05
Flowmeter determines mix ratio for viscous adhesives M-FS-2308	B67-10378	01	Closed fluid system without moving parts controls temperature LEWIS-222	B65-10331	02
Performance of turbine-type flowmeters in liquid hydrogen LEWIS-10137	B67-10506	01	Magnetic fluid readily controlled in zero gravity environment LEWIS-126	B65-10335	03
Calibration technique for electromagnetic flowmeters LEWIS-10328	B67-10554	01	Binary counter uses fluid logic elements M-FS-323	B65-10377	01
<b>FLOW REGULATOR</b>			Three-dimensional wire-mesh capacitor system measures fluid density W00-194	B65-10379	01
Flow control valve is independent of pressure drop JPL-W00-039	B65-10121	05	Electrically heated diaphragm eliminates use of pyrotechnics MSC-241	B65-10400	01
Electromechanical flowmeter accurately monitors fluid flow GSFC-357	B65-10273	01	Wide-range instrument monitors flow rates of chemically active fluids MSC-186	B66-10205	01
High-pressure, low temperature electrical connector makes no-leak seal MSC-276	B66-10079	02	Shock-operated valve would automatically protect fluid systems M-FS-801	B66-10335	05
System proportions fluid-flow in response to demand signals GSFC-457	B66-10094	01	Portable detector set discloses helium leak rates M-FS-1733	B67-10065	01
Concept for passive system to control gas flow independently of temperature M-FS-982	B66-10343	05	<b>FLUID AMPLIFIER</b> Queuing register uses fluid logic elements M-FS-317		
Concept of planetary gear system to control fluid mixture ratio M-FS-1785	B66-10477	05	Binary fluid amplifier solves stability and load problems		
Quick-response servo amplifies small hydraulic pressure differences ARG-99	B66-10498	05			
Internal machining accomplished at constant radii M-FS-1573	B66-10546	05			



SUBJECT INDEX				FOAMED MATERIAL	
ERC-15	B66-10177	01	ARG-217	B67-10133	03
Improved fluid control circuit operates on low power input			Xenon fluorides show potential as fluorinating agents		
LEWIS-325	B67-10042	01	ARG-113	B67-10185	03
Experimental scaling study of fluid amplifier elements			Experiments shed new light on nickel-fluorine reactions		
M-FS-1882	B67-10088	02	ARG-10008	B67-10397	03
Study indicates fluid digital computation systems are feasible			FLUORINE		
M-FS-520	B67-10181	01	Soft-seal valve holds hazardous fluids safely		
FLUID INJECTION			LEWIS-275	B66-10216	05
Study of vortex valve for medium temperature solid propellants			FLUORINE COMPOUND		
LANGLEY-204	B66-10524	01	Xenon forms stable compound with fluorine		
FLUID LOGIC			ARG-4	B66-10467	03
Review of research and development in fluid logic elements			FLUORO COMPOUND		
M-FS-420	B67-10438	01	Organic reactants rapidly produce plastic foam		
FLUID MECHANICS			LANGLEY-37	B65-10288	03
Stationary device produces homogeneous mixture of fluids			Corrosion of aluminum alloys by chlorinated hydrocarbon/methanol mixtures		
M-FS-525	B66-10570	05	MSC-11365	B67-10442	03
Fluid behavioral patterns found in subscale geysering study			FLUOROCARBON		
M-FS-13582	B67-10462	02	Metals plated on fluorocarbon polymers		
FLUID POWER			JPL-544	B63-10612	03
Fluid-pressure measurement apparatus uses short-length manometer tubes			Low-cost seal compensates for surface irregularities		
LEWIS-28	B65-10027	05	NU-0016	B65-10160	05
FLUID SWITCHING ELEMENT			Electronic modules easily separated from heat sink		
Liquid switch is remotely operated by low dc voltage			MSC-142	B65-10186	02
GSFC-119	B63-10599	01	Composite gaskets are compatible with liquid oxygen, resist compression set		
FLUID TRANSMISSION LINE			M-FS-455	B66-10395	03
Safety restrainer prevents whipping of ruptured high-pressure hose			Fluorocarbon seal replaces metal piston ring in low density gas environment		
LEWIS-99	B64-10348	05	LEWIS-10277	B67-10591	05
Radioactive tracer system detects oil contaminants in fluid lines			FLUX		
M-FS-512	B66-10090	03	Improved magnetometer uses toroidal gating coil		
Remotely controlled system couples and decouples large diameter pipes			GSFC-249	B65-10103	01
NU-0062	B66-10276	05	Aluminum core structures brazed without use of flux		
Metal tube can be folded for compact stowage, is self-erecting			M-FS-659	B66-10360	05
LEWIS-288	B66-10450	05	Ultrasonics permits brazing complex stainless steel assembly without flux		
Feed-thru conduit minimizes heat pickup			NU-0115	B67-10094	05
JPL-847	B67-10619	05	FLUX DENSITY		
FLUORESCENCE			Shaped superconductor cylinder retains intense magnetic field		
Oil-smeared models aid wind tunnel measurements			JPL-381	B63-10238	01
LANGLEY-4	B63-10311	03	Computer programs simplify optical system analysis		
Distant objects detected visually with optical filters			GSFC-306	B65-10093	01
LANGLEY-166	B65-10252	02	FOAM		
FLUORESCENT EMISSION			Organic reactants rapidly produce plastic foam		
Sensor detects hydrocarbon oil contaminants in fluid lines			LANGLEY-37	B65-10288	03
M-FS-522	B66-10068	01	FOAMED MATERIAL		
Sea dye marker provides visibility for 20 hours			Compact assembly generates plastic foam, inflates flotation bag		
MSC-714	B66-10313	03	LANGLEY-96	B65-10090	05
FLUORIDE			Soluble undercoating facilitates removal of foamed-in-place insulation		
Pure xenon hexafluoride prepared for thermal properties studies			LEWIS-193	B65-10344	03
ARG-10056	B67-10577	03	Mill profiler machines soft materials accurately		
FLUORINATION			M-FS-692	B66-10254	05
Xenon fluoride solutions effective as fluorinating agents			Improved thermal insulation materials made of foamed refractory oxides		
			M-FS-735	B66-10288	03

## FOCUS

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## FOCUS

Fresnel cup reflector directs maximum energy from light source JPL-424	B63-10263	03	dynamic analysis of structures NPO-10129	B67-10217	06
Light ray modulation controls optical system alignment GSFC-171	B65-10211	02	Subroutines GEORGE and DRASTC simplify operation of automatic digital plotter NUC-10044	B67-10222	06
Ballpoint probe gives optimum results in ultrasonic testing M-FS-13590	B67-10620	01	Computer program samples digital data for CRT display MSC-999	B67-10249	01
Electron beam deflected to determine focal point location M-FS-14107	B67-10649	01	Computer program utilizes Fortran IV subroutines for contour plotting NPO-10127	B67-10323	06
<b>FOG</b>			Saturn S-II Automatic Software System /SASS/ M-FS-1741	B67-10405	06
Fogging technique used to coat magnesium with plastic LEWIS-10316	B67-10584	03	Earth orbit rendezvous evaluation program M-FS-13016	B67-10407	06
<b>FOIL</b>			Computer program analyzes generalized environmental control and life support systems MSC-1157	B67-10415	06
Indium foil with beryllia washer improves transistor heat dissipation GSFC-42	B63-10033	01	Fortran IV program for two-impulse rendezvous analysis M-FS-13971	B67-10479	06
Ceramic-coated boat is chemically inert, provides good heat transfer LANGLEY-90	B65-10063	05	Computerized schedule effectiveness technique /SET/ determines present and future schedule position M-FS-13012	B67-10522	06
Large capacitor performs as a distributed parameter pulse line LEWIS-176	B66-10291	01	Analysis of dynamic systems with DAP4H computer program M-FS-13999	B67-10523	06
Foil radiometer accessory improves measurements M-FS-12684	B67-10448	01	Computer program /P1-GAS/ calculates the P-0 and P-1 transfer matrices for neutron moderation in a monatomic gas NUC-10141	B67-10678	06
<b>FOLDING STRUCTURE</b>			<b>FRACTURE</b>		
Interior servicing platform simplifies maintenance of storage tanks M-FS-1300	B66-10425	05	Pressure molding of powdered materials improved by rubber mold insert WOO-100	B64-10270	03
<b>FORCE</b>			Fatigue zones in metals identified by polarized light photography WOO-286	B67-10082	02
System measures unidirectional forces, excludes extraneous forces LEWIS-170	B65-10154	05	<b>FRACTURE MECHANICS</b>		
Transducer measures force in vacuum environment LEWIS-218	B66-10161	01	Study made of mechanics of deformation and fracture of fibrous composites HQ-10035	B67-10660	03
Hole saw drill attachment has zero force reaction MSC-543	B66-10604	05	<b>FRAGMENTATION</b>		
Gage accurately controls force for placing chips on substrates M-FS-1941	B66-10675	01	Break-up of metal tube makes one-time shock absorber, bars rebound LANGLEY-1A	B63-10304	05
<b>FORGING</b>			<b>FRAME</b>		
Upsetting butt edge increases weld-joint strength M-FS-175	B64-10164	05	Apparatus alters position of objects to facilitate demagnetization GSFC-234	B64-10277	05
<b>FORMING</b>			Simple circuit positions film frames in projector JPL-508	B65-10132	02
Angular glass tubing drawn from round tubing HQ-20	B65-10235	05	Computer program generates averaged value data tapes M-FS-12728	B67-10411	06
Rotating mandrel speeds assembly of plastic inflatables LANGLEY-155	B66-10137	05	<b>FREE ENERGY</b>		
<b>FORTRAN</b>			Computer program determines chemical composition of physical system at equilibrium MSC-1119	B66-10670	01
Fortran program flowchart is automatically produced M-FS-369	B66-10062	01	<b>FREE FALL</b>		
Computer program reduces calculation time of normal response functions M-FS-1517	B67-10108	01	Low level accelerometer test methods are investigated M-FS-908	B66-10510	01
Computer program calculates monotonic maximum likelihood estimates using method of reversals M-FS-1516	B67-10136	01			
A modal combination computer program for					

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# FREQUENCY REGULATOR

**FREE JET**  
Computer program uses characteristics method for free-jet investigation  
LANGLEY-10117 B67-10490 06

Equation relates flow at free jet to flow downstream  
M-FS-13789 B67-10612 06

**FREE STREAM**  
Averaging probe reduces static-pressure sensing errors  
LANGLEY-36 B65-10114 05

**FREE VIBRATION**  
Study of dynamic response of elastic space stations  
NPO-10124 B67-10169 06

**FREEZING**  
Fire extinguisher control system provides reliable cold weather operation  
M-FS-13031 B67-10622 05

**FREON**  
Freon provides heat transfer for solid CO2 calibration standard  
M-FS-644 B66-10257 02

Corrosion of aluminum alloys by chlorinated hydrocarbon/methanol mixtures  
MSC-11365 B67-10442 03

**FREQUENCY**  
Voltage generator sweeps oscillator frequency linearly with time  
M-FS-219 B64-10320 01

**FREQUENCY AMPLIFIER**  
Parametric up-converter increases flexibility of maser  
KSC-67-98 B67-10104 01

**FREQUENCY ANALYSIS**  
Oscilloscope used as X-Y plotter or two-dimensional analyzer  
LEWIS-311 B67-10269 01

Improved computer program for elastic analysis of highly redundant structural configurations  
M-FS-13087 B67-10330 06

**FREQUENCY CONTROL**  
Transistorized trigger circuit is frequency-controllable  
GSFC-111 B63-10553 01

FM oscillator uses tetrode transistor  
JPL-82 B65-10055 01

Variable frequency transistor inverters use multiple core transformers  
GSFC-183 B65-10119 01

Frequency offset in linear FM/CW transponder eliminates clutter  
M-FS-249 B65-10146 01

Frequency correction device uses digital circuitry  
GSFC-268 B65-10307 01

Digital voltage-controlled oscillator  
GSFC-512 B67-10449 01

**FREQUENCY CONVERSION**  
Frequency-shift-keyer circuit improves PCM conversion for radio transmission  
GSFC-80 B63-10511 01

Electronic ampere-hour integrator is accurate to one percent  
GSFC-203 B65-10308 01

Frequency discriminator with binary output eliminates tuned circuits  
M-FS-376 B65-10349 01

**FREQUENCY CONVERTER**  
Circuit converts AM signals to FM for magnetic recording  
GSFC-227 B65-10001 01

Traveling-wave tube circuit simplifies microwave relay  
GSFC-299 B65-10127 01

Fast-response frequency-to-analog converter  
M-FS-709 B67-10257 01

**FREQUENCY DIVIDER**  
Unijunction frequency divider is free of backward loading  
JPL-W00-010 B65-10112 01

Frequency divider is free of spurious outputs  
GSFC-308 B65-10334 01

Improved frequency divider employs transistor avalanche effect  
NPO-10008 B67-10575 01

**FREQUENCY MEASUREMENT**  
Small foamed polystyrene shield protects low-frequency microphones from wind noise  
M-FS-123 B63-10579 01

Nonresonant support facilitates vibration testing of structures  
M-FS-224 B65-10039 05

**FREQUENCY MODULATION**  
Tunnel-diode circuit features zero-level clipping  
GSFC-241 B65-10002 01

Voltage variable oscillator has high phase stability  
LANGLEY-123 B65-10204 01

FM/CW system measures aircraft attitude  
M-FS-276 B65-10290 01

FM carrier deviation measured by differential probability method  
M-FS-2166 B67-10213 01

**FREQUENCY MULTIPLIER**  
Phase detector circuit synthesizes own reference signal  
M-FS-247 B65-10080 01

Efficient millimeter wave /140 GHz/ diode for harmonic power generation  
HQ-61 B67-10166 01

Experimental coherent fractional frequency multiplier at S-band  
M-FS-2427 B67-10250 01

**FREQUENCY RANGE**  
Increased performance reliability obtained with dual /redundant/ oscillator system  
GSFC-36 B63-10027 01

Photoresistance analog multiplier has wide range  
GSFC-360 B65-10287 01

Solid-state switch increases switching speed  
W00-298 B66-10430 01

Continuous wave detector has wide frequency range  
M-FS-1849 B67-10386 01

**FREQUENCY REGULATOR**  
Hybrid circuit achieves pulse regeneration with low power drain  
GSFC-382 B65-10314 01

Design concepts using ring lasers for frequency stabilization  
M-FS-2448 B67-10143 01

Apparatus makes klystron operating frequency adjustable from remote point

## FREQUENCY RESPONSE

## SUBJECT INDEX

NPO-09831	B67-10514	01	JPL-SC-055	B65-10046	02
<b>FREQUENCY RESPONSE</b>			<b>FRICTION</b>		
Simple device produces accelerometer calibration pulse			Chain friction system gives positive, reversible drive		
M-FS-363	B65-10269	01	ARC-8	B63-10009	05
Device detects unbonded areas in plastic laminates			Kinetic-energy absorber employs frictional force between mating cylinders		
WOO-206	B65-10380	01	LEWIS-75	B63-10442	05
Damping technique gives accelerometer flat frequency response			Gate valve with ceramic-coated base operates at high temperatures		
M-FS-471	B66-10293	01	ARC-23	B63-10562	03
Voltage regulator/amplifier is self-regulated			Buckle joins web straps quickly, adjusts easily		
MSC-1240	B67-10156	01	LANGLEY-21	B64-10119	05
Computer program for network synthesis by frequency response fit			Friction device damps linear motion of rotating shaft		
M-FS-12686	B67-10406	06	WOO-214	B66-10030	05
General frequency response program calculates frequency response of system, open at any specified element			Friction brake cushions acceleration and vibration loads		
M-FS-12817	B67-10521	06	MSC-715	B66-10608	05
DYANA - An advanced programming system for large classes of dynamic and equivalent systems			<b>FRICTION COEFFICIENT</b>		
	B67-10524	06	Device measures static friction of magnetic tape		
Cardiotachometer with linear beat-to-beat frequency response			GSFC-10360	B67-10586	03
ARC-10033	B67-10598	01	<b>FRICTION-LOSS COEFFICIENT</b>		
<b>FREQUENCY SHIFT</b>			Method for predicting frictional loss in metal bellows and flexible hose		
Unique frequency-shift-keyed demodulation system			M-FS-883	B66-10662	05
GSFC-217	B67-10668	01	<b>FRICTION MEASUREMENT</b>		
<b>FREQUENCY-SHIFT KEYING</b>			Machine tests slow-speed sliding friction in high vacuum		
Frequency-shift-keyer circuit improves PCM conversion for radio transmission			M-FS-12341	B67-10379	05
GSFC-80	B63-10511	01	<b>FRICTION REDUCTION</b>		
<b>FREQUENCY STABILITY</b>			Bearing alloys with hexagonal crystal structures provide improved friction and wear characteristics		
Absolute frequency stabilization of laser oscillator against laser amplifier			LEWIS-320	B66-10373	03
M-FS-2559	B67-10255	01	Air bearing provides friction-free support for shaker system slip table		
<b>FREQUENCY STANDARD</b>			NU-0086	B66-10708	05
Hydrogen maser as a highly stable frequency reference			Rolamite - a new mechanical design concept		
M-FS-2437	B67-10146	01	SAN-10001	B67-10611	05
Highly stable microwave delay line			<b>FUEL</b>		
NPO-09828	B67-10642	01	Study made of large amplitude fuel sloshing		
<b>FREQUENCY SYNCHRONIZATION</b>			M-FS-12381	B67-10439	03
TV synchronization system features stability and noise immunity			<b>FUEL CELL</b>		
JPL-915	B67-10118	01	Fuel cell serves as oxygen level detector		
<b>FREQUENCY SYNTHESIS</b>			JPL-SC-072	B65-10066	01
Phase shift frequency synthesizer is efficient, small in size			Regenerative fuel cell combines high efficiency with low cost		
M-FS-250	B65-10169	01	WOO-090	B65-10363	01
Oscillator circuit operates as digitally controlled frequency synthesizer			Resilient clamp holds fuel cell stack through thermal cycle		
GSFC-570	B67-10447	01	MSC-313	B66-10035	05
<b>FREQUENCY TRANSLATION SYSTEM</b>			Vapor diffusion electrode improves fuel cell operation		
Optical superheterodyne receiver uses laser for local oscillator			LEWIS-187	B66-10281	03
M-FS-1605	B66-10584	01	Fluidic oscillator used as humidity sensor		
<b>FRESNEL DIFFRACTION</b>			LEWIS-340	B67-10063	05
Fresnel diffraction plates are simple and inexpensive			Fuel cell life improved by metallic sinter activation after electrode assembly welding		
M-FS-12731	B67-10297	02	MSC-10965	B67-10436	03
<b>FRESNEL REFLECTOR</b>			<b>FUEL CONSUMPTION</b>		
Fresnel cup reflector directs maximum energy from light source			Computer program for mass optimal solutions of some endpoint trajectory problems		
JPL-424	B63-10263	03	M-FS-12976	B67-10310	06
Wide-aperture solar energy collector is light in weight					

**FUEL CONTAMINATION**

Fiber length and orientation prevent migration in fluid filters  
M-FS-541 B66-10319 05

Valve effectively controls amount of contaminant in flow stream  
M-FS-1771 B66-10683 05

**FUEL FLOW**

Fuel and oxidizer valve assembly employs single solenoid actuator  
MSC-1046 B66-10648 05

Computer program predicts thermal and flow transients experienced in a reactor loss-of-flow accident  
NUC-10054 B67-10281 06

Ferromagnetic core valve gives rapid action on minimum energy  
LEWIS-10135 B67-10623 05

**FUEL PUMP**

Pressure probe compensates for dimensional tolerance variations  
LEWIS-302 B66-10599 01

**FUEL TANK**

Automatic fluid separator supplies own driving power  
WOO-085 B66-10008 02

In-tank shutoff valve is provided with maximum blast protection  
M-FS-1529 B66-10514 05

**FUNCTION GENERATOR**

Zener diode function generator requires no external reference voltage  
JPL-33 B65-10013 01

Function generator eliminates necessity of series summation  
GSFC-214 B66-10351 01

**FURNACE**

Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss  
LEWIS-39 B63-10342 01

Rapid billet loader aids extrusion of refractory metals  
LEWIS-50 B63-10354 05

Hydrogen-atmosphere induction furnace has increased temperature range  
LEWIS-153 B66-10055 05

Auxiliary coil controls temperature of RF induction heater  
GSFC-428 B66-10067 01

High-speed furnace uses infrared radiation for controlled brazing  
NU-0047 B66-10268 02

Tungsten insulated susceptor cup for high temperature induction furnace eliminates contamination  
LEWIS-283 B66-10538 03

Laboratory arc furnace features interchangeable hearths  
ARG-125 B67-10052 05

Radial furnace shows promise for growing straight boron carbide whiskers  
HQ-50 B67-10070 03

**FUSE**

Splice plate design assures structural separation by mild explosive  
MSC-137 B65-10166 05

Cam-operated limit switch features safe fuse replacement  
MSC-218 B65-10322 01

Single connector provides safety fuses for multiple lines  
MSC-199 B66-10050 01

Solid-state recoverable fuse functions as circuit breaker  
GSFC-560 B66-10691 01

Fused diode provides visual indication of fuse condition  
KSC-67-16 B67-10230 01

Eutectic fuse provides current and thermal protection under high vibration  
M-FS-13664 B67-10535 01

**FUSION**

Circuit reliability boosted by soldering pins of disconnect plugs to sockets  
JPL-447 B64-10002 01

**FUSION WELDING**

System maintains constant penetration during fusion welding  
M-FS-937 B67-10091 01

Continuous internal channels formed in aluminum fusion welds  
M-FS-2399 B67-10183 05

Workmanship standards for fusion welding  
NUC-10050 B67-10200 05

**G****G FORCE**

Miniature piezoelectric triaxial accelerometer measures cranial accelerations  
ARC-71 B66-10534 01

Design concept for pressure switch calibrator  
HQ-36 B66-10598 01

**GADOLINIUM**

Simplified technique demonstrates magnetic domain switching  
M-FS-13153 B67-10342 02

**GAIN**

Neon isotopes cancel errors in gas laser  
M-FS-1476 B66-10583 02

**GALLIUM**

Gallium useful bearing lubricant in high-vacuum environment  
LEWIS-12 B63-10337 03

**GALLIUM ALLOY**

Gallium alloy films investigated for use as boundary lubricants  
LEWIS-245 B66-10165 03

**GALLIUM ARSENIDE**

New method used to fabricate gallium arsenide photovoltaic device  
WOO-062 B64-10019 01

Economical fabrication process produces high-quality junction transistors  
JPL-SC-065 B64-10330 01

Thermocompression bonding produces efficient surface-barrier diode  
JPL-SC-066 B65-10007 05

Laser beam transmits electric power  
GSFC-293 B65-10158 01

Cuprous selenide and sulfide form improved photovoltaic barriers  
WOO-212 B66-10025 01

Efficient millimeter wave /140 GHz/ diode for harmonic power generation  
HQ-61 B67-10166 01

**GALVANIC CELL**

Device removes hydrogen gas from enclosed

## GALVANOMETER

## SUBJECT INDEX

spaces GSFC-495	B66-10340	03	bearing MSC-8	B64-10141	05
Iron serves as diffusion barrier in thermally regenerative galvanic cell ARG-29	B67-10189	03	A conceptual design for squeeze film bearings M-FS-573	B66-10226	05
<b>GALVANOMETER</b>			<b>GAS CHROMATOGRAPHY</b>		
Light-sensitive potentiometer measures product of two variables GSFC-240	B65-10076	01	Hot-wire detector for chemically active materials used in gas chromatography MSC-269	B66-10139	03
Use of color-coded sleeve shutters accelerates oscillograph channel selection KSC-10092	B67-10382	01	Subminiaturized gas chromatograph gives fast, efficient analysis JPL-735	B66-10182	01
<b>GAMMA RADIATION</b>			Cold trap increases sensitivity of gas chromatograph M-FS-1617	B66-10517	03
Mount makes liquid nitrogen-cooled gamma ray detector portable LEWIS-259	B66-10103	01	Gas chromatographic column enables analysis of propellant hydrazines MSC-1161	B66-10586	03
A fast-neutron spectrometer of advanced design M-FS-1664	B66-10555	01	Trace hydrazines in aqueous solutions accurately determined by gas chromatography MSC-11222	B67-10290	03
Low-energy gamma ray inspection of brazed aluminum joints MSC-1189	B67-10337	02	<b>GAS COOLING SYSTEM</b>		
<b>GAMMA RAY BEAM</b>			High-temperature, high-pressure spherical segment valve provides quick opening ARC-13	B63-10431	05
N-SAP and G-SAP neutron and gamma ray albedo model scatter shield analysis program NUC-10126	B67-10536	06	Improved cryogenic refrigeration system JPL-731	B67-10128	02
Computer program calculates gamma ray source strengths of materials exposed to neutron fluxes NUC-10143	B67-10665	06	<b>GAS DISCHARGE</b>		
<b>GAP</b>			Electrodeless discharge lamp is easily started, has high stability WOO-030	B66-10015	01
Shrinkable sleeve eliminates shielding gap in RF cable WOO-207	B65-10387	01	<b>GAS EVOLUTION</b>		
<b>GARNET</b>			Plated nickel wire mesh makes superior catalyst bed MSC-216	B65-10321	03
Simplified technique demonstrates magnetic domain switching M-FS-13153	B67-10342	02	<b>GAS EXPANSION</b>		
<b>GAS</b>			Volume-ratio calibration system for vacuum gages LEWIS-303	B66-10640	01
Filter for high-pressure gases has easy take- down, assembly JPL-373	B63-10234	03	Thermodynamic properties related to expansion of two-component gas MSC-1133	B67-10112	03
Pulsed plasma accelerator operates repetitively without complex controls LANGLEY-48	B65-10062	01	<b>GAS EXPLOSION</b>		
Inert gas spraying device aids in repair of hazardous systems LEWIS-8B	B65-10115	05	Test instrumentation evaluates electrostatic hazards in fluid system M-FS-2277	B67-10145	01
Device removes hydrogen gas from enclosed spaces GSFC-495	B66-10340	03	<b>GAS FLOW</b>		
Special treatment reduces helium permeation of glass in vacuum systems HQ-25	B66-10372	02	High-pressure regulating system prevents pressure surges JPL-231	B63-10170	05
<b>GAS ANALYZER</b>			Blade valve isolates compartment in pipe, opens to allow free flow JPL-585	B64-10188	05
Rapid helium-air analyzer can measure other binary gas mixtures LANGLEY-16	B63-10557	03	Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01
Subminiaturized gas chromatograph gives fast, efficient analysis JPL-735	B66-10182	01	Flowmeter measures low gas-flow rates M-FS-215	B66-10036	01
<b>GAS BEARING</b>			High temperature thermocouple operates in reduction atmosphere NU-0046	B66-10134	01
Elastic orifice automatically regulates gas bearings JPL-135	B63-10123	05	Dual regulator controls two gases from a single reference MSC-227	B66-10167	05
Modified gas bearing is adjustable to optimum stiffness ratio M-FS-145	B64-10050	05	Flow ring valve is simple, quick-acting M-FS-752	B66-10255	05
Pneumatic power is transmitted through air			Concept for passive system to control gas flow independently of temperature M-FS-982	B66-10343	05

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# GAS STREAM

Brazing retort manifold design concept may minimize air contamination and enhance uniform gas flow M-FS-707	B66-10371	05	M-FS-2437	B67-10146	01
Miniature valve accurately controls small volume fluid flow ARG-66	B66-10473	05	<b>GAS MIXTURE</b>		
Device accurately measures and records low gas-flow rates M-FS-1077	B66-10569	01	Rapid helium-air analyzer can measure other binary gas mixtures LANGLEY-16	B63-10557	03
Portable detector set discloses helium leak rates M-FS-1733	B67-10065	01	Xenon forms stable compound with fluorine ARG-4	B66-10467	03
Toroidal ring prevents gas ignition at vent stack outlet M-FS-2042	B67-10098	05	Program computes equilibrium normal shock and stagnation point solutions for arbitrary gas mixtures LANGLEY-10090	B67-10509	06
Quartz crystals detect gas contaminants during vacuum chamber evacuation NPO-10144	B67-10205	01	<b>GAS PRESSURE</b>		
A method of determining combustion gas flow M-FS-13757	B67-10455	03	Precision gage measures ultrahigh vacuum levels GSFC-114	B63-10597	01
Computer program uses characteristics method for free-jet investigation LANGLEY-10117	B67-10490	06	Device induces lungs to maintain known constant pressure MSC-50	B64-10108	04
High temperature thermocouple design provides gas cooling without increasing overall size of unit NUC-10515	B67-10497	01	Rod and dish cathode improves Penning-type vacuum gauge GSFC-447	B66-10082	01
Study made of heat transfer and pressure drop through tubes with internal interrupted fins LEWIS-10280	B67-10555	05	Solid-film lubricant is effective at high temperatures in vacuum LEWIS-228	B66-10087	03
Eddy current disk valve LEWIS-10123	B67-10638	05	Inflatable O-ring seal would ease closing of hatch cover plate MSC-740	B66-10385	05
<b>GAS GENERATOR</b>			Large diameter metal ring seal prevents gas leakage at 5000 psi M-FS-1064	B66-10422	05
Resilient bearing supports are gas controlled LEWIS-10109	B67-10364	05	Gas pressure feeds film into camera at high speed ARG-97	B66-10474	02
<b>GAS HEATING</b>			Modified McLeod pressure gage eliminates measurement errors ARC-62	B66-10481	01
Process reduces pore diameters to produce superior filters WOO-093	B66-10037	03	Gas leak detector is simple and inexpensive M-FS-1206	B66-10669	01
<b>GAS INJECTION</b>			Hermetically sealed cells protected from internal gas pressure GSFC-555	B66-10692	01
Gas-injection valve operates at high speed HQ-49	B66-10381	05	Effects of helium and nitrogen as pressurants in nitrogen tetroxide transfer MSC-924	B67-10083	03
Elimination of rocket engine asymmetric loads during tests at sea level M-FS-1730	B66-10674	05	Automatic transducer switching provides accurate wide range measurement of pressure differential NUC-10001	B67-10540	01
<b>GAS LASER</b>			Gas pressure in sealed electrochemical cells measured externally GSFC-10004	B67-10551	03
Neon isotopes cancel errors in gas laser M-FS-1476	B66-10583	02	<b>GAS SPECTROSCOPY</b>		
Laser Doppler flowmeter measures gas velocity M-FS-1747	B66-10693	02	A radiometer-pyrometer LEWIS-284	B66-10606	01
System enables more complete calibrations of dynamic-pressure transducers M-FS-2063	B67-10099	01	<b>GAS STREAM</b>		
<b>GAS-LIQUID INTERACTION</b>			Apparatus measures concentration of suspended droplets in gas streams LANGLEY-31	B64-10237	01
Mixer conditions temperature of liquified gas streams M-FS-1784	B66-10565	02	Probe measures characteristics of hot gas stream M-FS-240	B65-10133	02
<b>GAS LUBRICATED BEARING</b>			Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01
Slit feeds reduce unbalanced torques in gas-lubricated bearings JPL-264	B65-10099	05	Internal cooling increases range of immersion-type temperature probe LEWIS-171	B65-10157	02
<b>GAS MASER</b>					
Hydrogen maser as a highly stable frequency reference					

## GAS TRANSPORT

## SUBJECT INDEX

Computer program calculates peripheral water injection cooling of axisymmetric subsonic diffuser NUC-10541	B67-10543	06	change in tensile tests JPL-745	B66-10147	01
<b>GAS TRANSPORT</b> Irradiated gases transferred without contamination or dilution LEWIS-278	B67-10044	03	Thin-film gage measures low heat-transfer rates LANGLEY 205	B66-10180	01
<b>GAS TUBE</b> Simple device facilitates inert-gas welding of tubes M-FS-558	B66-10155	05	Gage tests tube flares quickly and accurately KSC-66-19	B66-10537	05
Automatic cryogenic liquid level controller is safe for use near combustible substances LEWIS-195	B66-10482	01	Mechanical gauge accurately checks tubing flare, roundness, and concentricity M-FS-1822	B66-10656	05
Grit blasting nozzle fabricated from mild tool steel proves satisfactory M-FS-1420	B66-10597	05	Gage accurately controls force for placing chips on substrates M-FS-1941	B66-10675	01
Silver plating technique seals leaks in thin wall tubing joints NU-0090	B66-10703	05	Holding fixture facilitates pipe thread gage measurements M-FS-2009	B67-10066	05
<b>GAS VALVE</b> Quick-closing valve is actuated by explosive discharge ARC-55	B66-10233	05	<b>GEAR</b> Chain friction system gives positive, reversible drive ARC-8	B63-10009	05
Pneumatic binary encoder replaces multiple solenoid system M-FS-665	B66-10374	01	Shock absorber protects motive components against overloads WOO-092	B65-10008	05
Gas-injection valve operates at high speed HQ-49	B66-10381	05	Bidirectional torque filter eliminates backlash GSFC-335	B65-10148	05
Modified McLeod pressure gage eliminates measurement errors ARC-62	B66-10481	01	Unique gear design provides self-lubrication JPL-SC-079	B65-10366	03
System automatically supplies precise analytical samples of high-pressure gases M-FS-1814	B67-10090	01	Run-in with chemical additive protects gear surface M-FS-548	B66-10069	05
<b>GAS WELDING</b> Simple device facilitates inert-gas welding of tubes M-FS-558	B66-10155	05	Gear drive automatically indexes rotary table M-FS-753	B66-10383	05
<b>GASEOUS DIFFUSION</b> Impurity diffusion process for silicon semiconductors is fast and precise GSFC-397	B65-10300	01	Concept of planetary gear system to control fluid mixture ratio M-FS-1785	B66-10477	05
<b>GASKET</b> Flexible plastic ring assembly makes durable shaft seal WOO-227	B65-10367	05	<b>GEAR TOOTH</b> Device measures curved surface finish on gear teeth WOO-112	B65-10064	05
Pressure seal ring may be effective over wide temperature range M-FS-486	B66-10211	05	Unique gear design provides self-lubrication JPL-SC-079	B65-10366	03
Composite gaskets are compatible with liquid oxygen, resist compression set M-FS-455	B66-10395	03	<b>GEL</b> Study of hydrogen slush-hydrogen gel utilization M-FS-13068	B67-10413	02
Rubber and alumina gaskets retain vacuum seal in high temperature EMF cell ARG-17	B66-10472	05	<b>GELATIN</b> Gelatin coated electrodes allow prolonged bioelectronic measurements MSC-153	B66-10088	01
Thin plastic sheet eliminates need for expensive plating M-FS-1896	B66-10681	03	<b>GENERATOR</b> Binary system generates sidereal rate from standard solar rate GSFC-190	B64-10200	01
<b>GASOLINE</b> Inert gas spraying device aids in repair of hazardous systems LEWIS-88	B65-10115	05	Voltage generator sweeps oscillator frequency linearly with time M-FS-219	B64-10320	01
<b>GAUGE</b> Level of super-cold liquids automatically maintained by levelometer JPL-397	B63-10250	01	Pressure transducers dynamically tested with sinusoidal pressure generator LEWIS-268	B66-10031	01
Polymer deformation gauge measures thickness			Circuit operates as sine function generator MSC-255	B66-10038	01
			Pulse generator using transistors and silicon controlled rectifiers produces high current pulses with fast rise and fall times MSC-405	B66-10456	01



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## GONIOMETER

High-reluctance rotor rings improve homopolar generator performance ARG-104	B66-10543	01	Borate glass efficiently transmits ultraviolet light ARG-91	B66-10475	03
Logarithmic current simulator generates electrical currents accurately between 10 to the minus 11 ampere to 10 to the minus 3 ampere NU-0087	B66-10706	01	Glass formulation has high coefficient of thermal expansion NU-0084	B66-10705	03
Plasma jet electrode has longer operating life NU-0098	B67-10024	02	GLASS FIBER Flexible curtain shields equipment from intense heat fluxes M-FS-48	B65-10044	03
Transient Analysis Generator /TAG/ simulates behavior of large class of electrical networks NPO-10031	B67-10319	06	Fiberglass parts cured during filament winding eliminates oven, saves time M-FS-14	B65-10088	03
Simple first order data compression processor concept NPO-10338	B67-10553	01	Fiberglass dies speed forming of large metal sheets M-FS-214	B65-10210	05
GEOGRAPHY Density trace made with computer printout GSFC-322	B65-10200	01	Aluminized fiberglass insulation conforms to curved surfaces M-FS-477	B66-10024	03
GEOMETRIC FACTOR Application of distorted models in developing scaled structural models M-FS-2540	B67-10321	05	Fiberglass container shells form contamination-free storage units WOO-275	B66-10217	05
GEOMETRY New backup-bar groove configuration improves heliarc welding of 2014-T6 aluminum MSC-806	B66-10443	05	Composite gaskets are compatible with liquid oxygen, resist compression set M-FS-455	B66-10395	03
Computer program resolves radiative, conductive, and convective heat transfer problems for variety of geometries M-FS-1910	B67-10329	06	Nonwoven glass fiber mat reinforces polyurethane adhesive M-FS-2309	B67-10113	03
GETTER Auxiliary titanium sublimation pump produces ultrahigh /10 to the minus 11 torr/ vacuum LANGLEY-212	B66-10388	02	Liquid crystals detect voids in fiberglass laminates LEWIS-10104	B67-10286	03
GIMBAL Ball and socket joints provide accurate biaxial gimbal JPL-658	B65-10205	05	GLOW DISCHARGE Glow discharge density sensor probe life is extended M-FS-1707	B67-10229	01
Device measures reaction engine thrust vector deviations JPL-SC-163	B66-10642	05	GLYCINE Synthesis of pure aromatic glycidyl esters for use as adhesives M-FS-12705	B67-10647	03
GIMBALED CONTROL Gimbaled-mirror scanning system capable of spiral pattern GSFC-10170	B67-10609	02	GOLD Submicron holes in thin films increase sampling range of mass spectrometers JPL-SC-097	B66-10380	03
GLASS IR-transmission glasses formed from oxides of bismuth and tellurium M-FS-279	B65-10190	03	Thin film process forms effective electrical contacts on semiconductor crystals M-FS-2343	B67-10142	01
Thin transparent films formed from powdered glass GSFC-352	B65-10217	03	Substituting gold for silver improves electrical connections M-FS-2390	B67-10228	03
Angular glass tubing drawn from round tubing HQ-20	B65-10235	05	Soft metal plating enables hard metal seal to operate successfully in low temperature, high pressure environment NUC-10083	B67-10350	03
Porous glass makes effective substrate for ozone-sensing reagent GSFC-388	B65-10364	03	GOLD ALLOY Thermocompression bonding produces efficient surface-barrier diode JPL-SC-066	B65-10007	05
Split glass tube assures quality in electron beam brazing M-FS-564	B66-10151	05	GOLD PLATE High-strength braze joints between copper and steel M-FS-2519	B67-10211	05
Fibers of newly developed refractory ceramics produced by improved process WOO-169	B66-10196	03	GONIOMETER Neutron diffractometer allows both magnetic and crystallographic analyses ARG-191	B67-10131	02
Special treatment reduces helium permeation of glass in vacuum systems HQ-25	B66-10372	02	Instrument accurately measures weld angle and offset M-FS-12849	B67-10563	05

<b>GRAIN</b>				Experiments to investigate particulate materials in reduced gravity fields		
Means for improving apparent resolution of television				M-FS-13308	B67-10394	02
ERC-65	B67-10152	01				
<b>GRAPH</b>				<b>GRAVITY</b>		
Simple scale interpolator facilitates reading of graphs				Miniature servo accelerometer is force-balanced		
LANGLEY-88	B65-10070	05		JPL-155	B65-10340	01
Simple scale interpolator facilitates reading of graphs				<b>GRAVITY CENTER</b>		
LEWIS-92	B66-10302	05		Telescope mount with azimuth-only primary	B67-10671	02
Automated drafting system uses computer techniques				NPO-10468		
M-FS-788	B66-10362	01		<b>GREASE</b>		
Thermodynamic properties of saturated liquid parahydrogen charted for important temperature range				Lightweight load support serves as vibration damper		
NUC-10018	B67-10346	03		JPL-661	B65-10144	05
Graphic visualization of program performance aids management review				Electronic modules easily separated from heat sink		
NUC-10011	B67-10568	06		MSC-142	B65-10186	02
Analytical drafting curves provide exact equations for plotted data				<b>GRID</b>		
LANGLEY-285	B67-10601	02		Fine-mesh screen made by simplified method		
Handbook of cryogenic data in graphic form				WOO-104	B64-10282	03
KSC-10009	B67-10610	02		Radiation detector-optical hanging device is of simplified construction		
X-Y plotter adapter developed for SDS-930 computer				GSFC-251	B64-10299	01
NPO-10220	B67-10654	06		Forming blocks speed production of strain gage grids		
<b>GRAPHIC ARTS</b>				LEWIS-182	B65-10009	05
Disk calculator indicates legible lettering size for slide projection				Wire bundle formed into grids with minute interstices		
GSFC-409	B65-10339	05		WOO-089	B65-10372	03
Modified procedure speeds camera copy layout for offset printing				Suppressor plate eliminates undesired arcing during electron beam welding		
GSFC-424	B65-10373	02		M-FS-1126	B66-10357	05
Offset lenses add versatility to phototypesetting machine				<b>GRINDING MACHINE</b>		
HQ-9	B66-10173	02		Lathe converted for grinding aspheric surfaces		
<b>GRAPHITE</b>				GSFC-115	B63-10556	05
Metal sheath improves thermocouple using graphite in one leg				Rotating holder permits accurate grinding of metallurgical microsamples		
NU-0011	B65-10051	01		LEWIS-131	B65-10262	05
Graphite element serves as radiant heat source				Multisurface fixture permits easy grinding of tool bit angles		
M-FS-105	B65-10218	01		M-FS-586	B66-10171	05
Refractory coating protects intricate graphite elements from high-temperature hydrogen				Metallographic holding fixture permits polishing of soft metals on vibratory lapping machine		
NU-0027	B66-10084	01		ARG-42	B66-10562	05
Primary cells utilize halogen-organic charge transfer complex				Standard surface grinder for precision machining of thin-wall tubing		
JPL-926	B66-10682	02		ARG-10014	B67-10400	05
Sensing disks for slug-type calorimeters have higher temperature stability				<b>GROOVE</b>		
M-FS-1867	B67-10161	01		New package for belleville spring permits rate change, easy disassembly		
<b>GRATING</b>				JPL-392	B63-10247	05
Simple optical system used to align spectrograph				Bench vise adapter grips tubing securely and safely		
LANGLEY-92	B65-10071	02		MSC-279	B66-10056	05
<b>GRAVITATIONAL EFFECT</b>				New backup-bar groove configuration improves heliarc welding of 2014-T6 aluminum		
Technique simulates effect of reduced gravity				MSC-806	B66-10443	05
LANGLEY-44	B64-10146	04		Static seal concept to accommodate seat tolerances		
Effect of welding position on porosity formation in aluminum alloy welds				M-FS-1854	B67-10285	05
M-FS-2318	B67-10177	05		<b>GROUND RESONANCE</b>		
<b>GRAVITATIONAL FIELD</b>				Flange on microwave antenna subreflector cuts ground noise		
Low level accelerometer test methods are investigated				JPL-362	B63-10229	01
M-FS-908	B66-10510	01		<b>GROUND STATION</b>		
				Automatic telemetry checkout system		
				M-FS-12580	B67-10402	01

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# HEART RATE

## GROWTH

Study made of relationship between growth and metabolism  
ARG-10046 B67-10604 04

## GUIDANCE

Earth orbit rendezvous evaluation program  
M-FS-13016 B67-10407 06

## GUN

Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application  
LANGLEY-6A B63-10318 03

Shoulder adapter steadies spot welding gun  
M-FS-321 B66-10076 05

## GYROSCOPE

Slit feeds reduce unbalanced torques in gas-lubricated bearings  
JPL-264 B65-10099 05

Conceptual nonorthogonal gyro configuration for guidance and navigation  
MSC-11363 B67-10433 01

# H

## HAFNIUM ALLOY

New tungsten alloy has high strength at elevated temperatures  
LEWIS-336 B66-10551 03

## HAFNIUM OXIDE

Protective coating withstands high temperature in oxidizing atmosphere  
M-FS-529 B66-10044 03

## HALIDE

Welding, bonding, and sealing of refractory metals by vapor deposition  
LEWIS-123 B67-10232 03

## HALOGEN

Primary cells utilize halogen-organic charge transfer complex  
JPL-926 B66-10682 02

## HALOGEN COMPOUND

Synthesis of various highly halogenated monomers and polymers  
M-FS-2143 B67-10100 03

## HAND

Standoff tool speeds placement of friction-fit electrical terminals  
WOO-029 B65-10348 05

## HANDBOOK

Pyrometry handbook describes practical aspects of surface temperature measurements of opaque materials  
LEWIS-349 B66-10520 01

Materials data handbooks prepared for aluminum alloys 2014, 2219, and 5456, and stainless steel alloy 301  
M-FS-1959 B67-10089 03

Materials data handbook, Inconel alloy 718  
M-FS-2348 B67-10282 03

Materials data handbook, aluminum alloy 7075  
M-FS-2349 B67-10301 03

Handbooks describe eddy current techniques used in nondestructive testing of metal parts and components  
M-FS-13172 B67-10374 03

Fluid properties handbook  
M-FS-13462 B67-10440 03

Handbook of cryogenic data in graphic form  
KSC-10009 B67-10610 02

## HANDLING EQUIPMENT

Filler device for handling hot corrosive materials  
MSC-85 B64-10166 03

Remotely operated clamping tool has positive grip  
NU-0020 B65-10254 05

Hollow plastic hoops protect thermocouple in storage and handling  
NU-0023 B65-10256 05

Dispenser leak-tests and sterilizes rubber gloves  
MSC-285 B66-10166 03

Body-fitted harness provides safe and easy component handling  
M-FS-533 B66-10202 05

Universal transloader moves delicate equipment without stress  
MSC-654 B66-10384 05

## HARDENING

Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application  
LANGLEY-6A B63-10318 03

Stringent cleaning technique assures reliable epoxy bond  
GSFC-161 B64-10142 03

## HARDWARE

Computer program determines chemical equilibria in complex systems  
LEWIS-281 B66-10671 01

## HARMONIC GENERATOR

Efficient millimeter wave /140 GHz/ diode for harmonic power generation  
HQ-61 B67-10166 01

## HARMONICS

Double emitter suppressed carrier modulator uses commercially available components  
M-FS-2494 B67-10101 01

## HASTELOY

Composite weld rod corrects individual filler weaknesses  
M-FS-1923 B67-10107 05

Weld procedure produces quality welds for thick sections of Hastelloy-X  
NUC-10048 B67-10195 05

## HAZARD

Low-cost insulation system for cryostats eliminates need for a vacuum  
LEWIS-64 B63-10365 03

Test instrumentation evaluates electrostatic hazards in fluid system  
M-FS-2277 B67-10145 01

## HEAD MOVEMENT

Improved head-controlled TV system produces high-quality remote image  
ARG-128 B67-10317 01

## HEART RATE

Digital cardiometer computes and displays heartbeat rate  
MSC-93 B64-10258 01

Inexpensive, stable circuit measures heart rate  
MSC-95 B65-10010 01

Digital-output cardiometer measures rapid changes in heartbeat rate  
MSC-133 B65-10143 01

Phonocardiograph system monitors heart sounds  
MSC-185 B66-10154 04

## HEAT

## SUBJECT INDEX

Cardiotachometer with linear beat-to-beat frequency response ARC-10033	B67-10598	01	HEAT GAIN Feed-thru conduit minimizes heat pickup JPL-847	B67-10619	05
HEAT Reaction heat used in static water removal from fuel cells M-FS-532	B66-10013	01	HEAT GENERATION Computer program MCAP-TOSS calculates steady-state fluid dynamics of coolant in parallel channels and temperature distribution in surrounding heat-generating solid NUC-10042	B67-10456	06
HEAT CONTENT Probe measures characteristics of hot gas stream M-FS-240	B65-10133	02	Computer program MCAP provides for steady state thermal and flow analysis of multiple parallel channels in heat generating solid NUC-10043	B67-10457	06
HEAT DISSIPATION Indium foil with beryllia washer improves transistor heat dissipation GSFC-42	B63-10033	01	HEAT REGULATION Solid state thermostat has integral probe and circuitry M-FS-434	B66-10193	01
Modular Porous Plate Sublimator /MPPS/ requires only water supply for coolant M-FS-1374	B66-10409	01	Temperature responsive valve withstands high impact loading NPO-10186	B67-10225	05
Flame sprayed dielectric coatings improve heat dissipation in electronic packaging M-FS-13569	B67-10534	01	HEAT RESISTANCE Removable preheater elements improve oxide induction furnace JPL-288	B63-10193	01
HEAT EFFECT Storage-stable foamable polyurethane is activated by heat LANGLEY-187	B66-10111	03	Thermally conductive metal wool-silicone rubber material can be used as shock and vibration damper JPL-321	B63-10207	03
Evaluation of high temperature stranded hookup wire M-FS-2478	B67-10122	03	Electrical cabling withstands severe environmental conditions M-FS-1585	B66-10427	01
HEAT EXCHANGER Cantilever springs maintain tension in thermally expanded wires LEWIS-136	B65-10149	05	Fixture tests bellows reliability through repetitive pressure/temperature cycling MSC-1176	B67-10111	01
Spiraled channels improve heat transfer between fluids JPL-694	B65-10291	02	HEAT SHIELD New method forms bond line free of voids LANGLEY-20	B63-10558	05
Heat exchanger tubes supported in high vibration environment M-FS-1401	B66-10567	05	Refractory thermal insulation for smooth metal surfaces M-FS-160	B64-10099	03
Rotational fluid coupling eliminates hose entanglements MSC-312	B66-10585	05	Modified thermocouple is effective from minus 250 deg to 5000 deg F MSC-420	B66-10461	01
Coldplate of pin fin design makes efficient heat exchanger MSC-1093	B67-10073	05	Heat flux sensor design reduces extraneous source effects MSC-400	B66-10531	01
HEAT FLOW New computer program solves wide variety of heat flow problems M-FS-421	B66-10404	01	Multidimensional reaction kinetic ablation program /REKAP/ MSC-10079	B67-10495	06
HEAT FLUX Graphite element serves as radiant heat source M-FS-105	B65-10218	01	HEAT SINK Indium foil with beryllia washer improves transistor heat dissipation GSFC-42	B63-10033	01
Air-cured ceramic coating insulates against high heat fluxes M-FS-150	B65-10357	03	Mounting for diodes provides efficient heat sink M-FS-197	B64-10283	01
Heat flux sensor design reduces extraneous source effects MSC-400	B66-10531	01	Automatic thermal switch accelerates cooling-down of cryogenic system JPL-655	B65-10068	01
Light-intensity modulator withstands high heat fluxes MSC-246	B66-10532	02	Refractory oxides evaluated for high-temperature use LANGLEY-121	B65-10167	03
Study of theory and application of long duration heat flux transducers M-FS-1265	B66-10614	01	Electronic modules easily separated from heat sink MSC-142	B65-10186	02
Computer program MCAP-TOSS calculates steady-state fluid dynamics of coolant in parallel channels and temperature distribution in surrounding heat-generating solid NUC-10042	B67-10456	06	Wire mesh isolator protects sensitive electronic components GSFC-347	B65-10216	05

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# HEATER

Boron nitride housing cools transistors WOO-079	B65-10289	01	temperatures M-FS-762	B66-10273	03
Copper foil provides uniform heat sink path MSC-262	B66-10004	02	Bypass rod transfers heat developed in thermionic diode JPL-SC-136	B66-10303	05
Mounting improves heat-sink contact with beryllia washer MSC-194	B66-10144	01	Computational procedure for finite difference solution of one-dimensional heat conduction problems reduces computer time MSC-1120	B66-10566	01
Jig protects transistors from heat while tinning leads MSC-515	B66-10240	05	Selective tube roughening increases heat transfer capability M-FS-599	B66-10610	05
Rugged microelectronic module package supports circuitry on heat sink MSC-81A	B66-10245	01	Study of theory and application of long duration heat flux transducers M-FS-1265	B66-10614	01
Reparable, high-density microelectronic module provides effective heat sink M-FS-13075	B67-10356	01	Computer program simplifies transient and steady-state temperature prediction for complex body shapes MSC-989	B66-10619	01
Aluminum heat sink enables power transistors to be mounted integrally with printed circuit board M-FS-13663	B67-10426	01	Low input voltage converter/regulator minimizes external disturbances GSFC-527	B66-10689	01
<b>HEAT SOURCE</b>			Correlation established between heat transfer and ultrasonic transmission properties of copper braze bonds ARG-247	B67-10037	02
Graphite element serves as radiant heat source M-FS-105	B65-10218	01	Clamp provides efficient connection for high-density currents M-FS-2417	B67-10140	01
High-speed furnace uses infrared radiation for controlled brazing NU-0047	B66-10268	02	Computer program resolves radiative, conductive, and convective heat transfer problems for variety of geometries M-FS-1910	B67-10329	06
High intensity radiation heat source is capable of sustained operation ARC-61	B66-10547	02	Study made of transfer of heat energy through metal joints in vacuum environment M-FS-12534	B67-10465	02
<b>HEAT TRANSFER</b>			Study made of heat transfer and pressure drop through tubes with internal interrupted fins LEWIS-10280	B67-10555	05
High purity electroforming yields superior metal models ARC-6	B63-10007	05	<b>HEAT TREATMENT</b>		
Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02	Heat treatment stabilizes welded aluminum jig and tool structures MSC-800	B66-10458	03
New method used to fabricate light-weight heat exchanger for rocket motor LEWIS-43	B63-10346	02	Treatment increases stress-corrosion resistance of aluminum alloys M-FS-1840	B66-10595	05
Simple transducer measures low heat-transfer rates JPL-466	B64-10122	01	Heat-treatment of metal parts facilitated by sand embedment M-FS-1543	B66-10616	03
Adhesive for vacuum environments resists shock and vibration MSC-56	B65-10016	03	Zirconium alloys with small amounts of iron and copper or nickel show improved corrosion resistance in superheated steam ARG-226	B67-10050	03
Thermistor connector assembly increases accuracy of measurements LANGLEY-62	B65-10045	01	Heat treatment study of aluminum casting alloy M45 M-FS-2397	B67-10159	03
Internal cooling increases range of immersion-type temperature probe LEWIS-171	B65-10157	02	Simplified method measures changes in tensile yield strength using least number of specimens NUC-10075	B67-10266	03
Insulation accelerates rate of cooling with cryogenic fluid MSC-161	B65-10240	02	Welding of AM350 and AM355 steel M-FS-2314	B67-10292	05
Vacuum chamber provides improved insulation and support for cryostat M-FS-415	B65-10368	02	Development of technology for hot-drape forming of large torus sections M-FS-12141	B67-10341	05
Mounting improves heat-sink contact with beryllia washer MSC-194	B66-10144	01	<b>HEATER</b>		
Thin-film gage measures low heat-transfer rates LANGLEY 205	B66-10180	01	Apparatus facilitates high-temperature tensile testing in vacuum		
Freon provides heat transfer for solid CO2 calibration standard M-FS-644	B66-10257	02			
Boron-deoxidized copper withstands brazing					

## HEATING

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LEWIS-42	B63-10345	03	In second superconductor JPL-376	B63-10237	05
Filler device for handling hot corrosive materials MSC-85	B64-10166	03	Low-cost insulation system for cryostats eliminates need for a vacuum LEWIS-64	B63-10365	03
Wire winding increases lifetime of oxide- coated cathodes LEWIS-154	B65-10032	03	Rapid helium-air analyzer can measure other binary gas mixtures LANGLEY-16	B63-10557	03
Efficient thin film heating element takes minimum space GSFC-289	B65-10123	01	Cold trap increases sensitivity of gas chromatograph M-FS-1617	B66-10517	03
Cantilever springs maintain tension in thermally expanded wires LEWIS-136	B65-10149	05	A fast-neutron spectrometer of advanced design M-FS-1664	B66-10555	01
Heater decomposes oil backstreaming from high-vacuum pumps GSFC-356	B65-10224	02	Resistor monitors transfer of liquid helium LANGLEY-229	B66-10580	01
Refractory coating protects intricate graphite elements from high-temperature hydrogen NU-0027	B66-10084	01	Portable detector set discloses helium leak rates M-FS-1733	B67-10065	01
Apparatus measures thermal conductivity of honeycomb-core panels LANGLEY-202	B66-10127	01	Effects of helium and nitrogen as pressurants in nitrogen tetroxide transfer MSC-924	B67-10083	03
Experimental investigation of megawatt dc arc heating of nitrogen LEWIS-313	B66-10508	02	Fixture facilitates helium leak testing of pipe welds M-FS-2167	B67-10178	05
Heater control circuit provides both fast and proportional control M-FS-906	B67-10097	01	Fluid properties handbook M-FS-13462	B67-10440	03
HEATING			HELMET		
Integral coolant channels simply made by melt- out method M-FS-91	B63-10497	05	Comfortable, lightweight safety helmet holds radio transmitter, receiver MSC-53	B64-10015	05
Heated die facilitates tungsten forming LEWIS-25A	B66-10047	05	One-piece transparent shell improves design of helmet assembly MSC-187	B66-10390	05
HEATING EQUIPMENT			Helmet system broadcasts electroencephalograms of wearer ARC-70	B66-10536	01
Refractory metal shielding /insulation/ increases operating range of induction furnace LEWIS-202	B65-10188	02	HEMOLYSIS		
Low power heating element provides thermal control during swaging operations M-FS-457	B66-10206	05	Blood oxygen saturation determined by transmission spectrophotometry of hemolyzed blood samples MSC-11018	B67-10252	04
HELICAL FLOW			Improved sample capsule for determination of oxygen in hemolyzed blood MSC-11017	B67-10408	04
Stationary device produces homogeneous mixture of fluids M-FS-525	B66-10570	05	HEPTANE		
HELICAL WINDING			Magnetic fluid readily controlled in zero gravity environment LEWIS-126	B65-10335	03
Helical tube separates nitrogen gas from liquid nitrogen JPL-398	B63-10251	05	HERMETIC SEAL		
Helical coaxial-resonator makes excellent RF filter GSFC-243	B65-10012	01	Device transmits rotary motion through hermetically sealed wall JPL-303	B63-10198	05
High frequency wide-band transformer uses coax to achieve high turn ratio and flat response ARG-107	B66-10600	01	Mouthpiece adapter for pipettes protects mouth from harmful liquids LANGLEY-47	B65-10043	03
Development of helical seal for high temperature /2000 degrees F/ application M-FS-13304	B67-10655	05	Critical parts are stored and shipped in environmentally controlled reusable container M-FS-703	B66-10258	05
HELICOPTER			Hermetically sealed cells protected from internal gas pressure GSFC-555	B66-10692	01
Scoop attachment makes helicopter recoveries easier and safer MSC-130	B65-10229	05	HELIUM		
HELIUM			Metal boot permits fabrication of hermetically sealed splices in metal sheathed instrumentation cables NU-0083	B66-10704	05
Cryogenic filter method produces super-pure helium and helium isotopes JPL-374	B63-10235	03	Glass formulation has high coefficient of thermal expansion		
Supercold technique duplicates magnetic field					

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## HIGH TEMPERATURE MATERIAL

NU-0084	B66-10705	03	Gate valve with ceramic-coated base operates at high temperatures	B63-10562	03
<b>HETERODYNE</b>			<b>HIGH TEMPERATURE ALLOY</b>		
Laser communication system is insensitive to atmospherically induced noise	B67-10587	01	Nickel-base superalloys developed for high-temperature applications	B66-10222	03
GSFC-10396			LEWIS-226		
<b>HIGH ALTITUDE BALLOON PROGRAM</b>			Nonhazardous acid etches weld samples	B66-10378	05
An improved magnetic tape recorder	B67-10646	01	M-FS-975		
GSFC-08259			<b>HIGH TEMPERATURE ENVIRONMENT</b>		
<b>HIGH EFFICIENCY</b>			New cobalt alloys have high-temperature strength and long life in vacuum environments	B63-10351	03
Highly efficient square-wave oscillator operator at high power levels	B63-10554	01	LEWIS-47		
GSFC-112			Fastener provides cooling and compensates for thermal expansion	B65-10038	05
<b>HIGH ENERGY ELECTRON</b>			NU-0003		
Radiation used to temperature compensate semiconductor strain gages	B66-10186	02	Refractory oxides evaluated for high-temperature use	B65-10167	03
LANGLEY-207			LANGLEY-121		
<b>HIGH EXPLOSIVE</b>			Refractory coating protects intricate graphite elements from high-temperature hydrogen	B66-10084	01
Explosive force of Primacord grid forms large sheet metal parts	B66-10014	05	NU-0027		
M-FS-316			High temperature thermocouple operates in reduction atmosphere	B66-10134	01
High energy forming facility	B67-10588	05	NU-0046		
M-FS-14026			Gallium alloy films investigated for use as boundary lubricants	B66-10165	03
<b>HIGH FREQUENCY</b>			LEWIS-245		
Computer determines high-frequency phase stability	B63-10555	01	Bearing alloys with hexagonal crystal structures provide improved friction and wear characteristics	B66-10373	03
GSFC-113			LEWIS-320		
Increased junction lead inductance ballasts high-frequency transistors	B65-10259	01	Radiation counting technique allows density measurement of metals in high-pressure - high-temperature environment	B67-10316	02
GSFC-387			ARG-124		
<b>HIGH POWER</b>			Protected, high-temperature connecting cable	B67-10461	01
Highly efficient square-wave oscillator operator at high power levels	B63-10554	01	LEWIS-10149		
GSFC-112			Development of helical seal for high temperature /2000 degrees F/ application	B67-10655	05
<b>HIGH PRESSURE</b>			M-FS-13304		
High-pressure regulating system prevents pressure surges	B63-10170	05	<b>HIGH TEMPERATURE GAS</b>		
JPL-231			Self-balancing line-reversal pyrometer automatically measures gas temperatures	B67-10268	01
High-temperature, high-pressure spherical segment valve provides quick opening	B63-10431	05	LEWIS-348		
ARC-13			<b>HIGH TEMPERATURE LUBRICANT</b>		
Pneumatic power is transmitted through air bearing	B64-10141	05	Solid-film lubricant is effective at high temperatures in vacuum	B66-10087	03
MSC-8			LEWIS-228		
<b>HIGH SPEED</b>			<b>HIGH TEMPERATURE MATERIAL</b>		
Ohmmeter senses depletion of lubricant in journal bearings	B64-10042	01	Rapid billet loader aids extrusion of refractory metals	B63-10354	05
LEWIS-37			LEWIS-50		
<b>HIGH SPEED CAMERA</b>			Silazane polymers show promise for high-temperature application	B66-10194	03
Rocket engine vibration accurately measured by photography	B66-10652	02	M-FS-466		
M-FS-1916			Flowmeter measures flow rates of high temperature fluids	B66-10521	01
<b>HIGH STRENGTH ALLOY</b>			LEWIS-328		
New cobalt alloys have high-temperature strength and long life in vacuum environments	B63-10351	03	Newly developed foam ceramic body shows promise as thermal insulation material at 3000 deg F	B67-10441	03
LEWIS-47			M-FS-11968		
<b>HIGH STRENGTH STEEL</b>			High temperature thermocouple design provides gas cooling without increasing overall size of unit	B67-10497	01
Study to minimize hydrogen embrittlement of ultrahigh-strength steels	B67-10141	03	NUC-10515		
M-FS-2455			High-temperature /1100 degrees F/ capacitors operate without supplement cooling		
<b>HIGH TEMPERATURE</b>					
Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss	B63-10342	01			
LEWIS-39					
Apparatus facilitates high-temperature tensile testing in vacuum	B63-10345	03			
LEWIS-42					
High-temperature, high-pressure spherical segment valve provides quick opening	B63-10431	05			
ARC-13					

LEWIS-10324	B67-10550	01	Tool post modification allows easy turret lathe cutting-tool alignment	M-FS-581	B66-10191	05	
HIGH TEMPERATURE RESEARCH							
Modified thermocouple is effective from minus 250 deg to 5000 deg F	MSC-420	B66-10461	01	Fixed vacuum plate clamps styrofoam for machining	M-FS-683	B66-10283	05
Tungsten insulated susceptor cup for high temperature induction furnace eliminates contamination	LEWIS-283	B66-10538	03	Swiveling lathe jaw concept for holding irregular pieces	M-FS-783	B66-10321	05
HIGH VACUUM							
Gallium useful bearing lubricant in high-vacuum environment	LEWIS-12	B63-10337	03	Inflatable holding fixture permits X-rays to be taken of inner weld areas	M-FS-856	B66-10327	03
Improved molybdenum disulfide-silver motor brushes have extended life	M-FS-64	B63-10479	03	Inspection of fine wires simplified by capillary tube wire holder	MSC-358	B66-10329	05
Instrument accurately measures extremely low air densities	M-FS-193	B65-10221	01	Versatile machine mills, saws light materials	M-FS-827	B66-10364	05
Polytetrafluoroethylene lubricates ball bearings in vacuum environment	M-FS-379	B66-10081	03	Special tool kit aids heavily garmented workers	MSC-163	B66-10403	05
Rod and dish cathode improves Penning-type vacuum gauge	GSFC-447	B66-10082	01	Flexible drive allows blind machining and welding in hard-to-reach areas	MSC-524	B66-10428	05
Solid-film lubricant is effective at high temperatures in vacuum	LEWIS-228	B66-10087	03	Heat-treatment of metal parts facilitated by sand embedment	M-FS-1543	B66-10616	03
Feed-thru flange is useful in vacuum applications to cryogenic temperatures	JPL-846	B66-10615	02	Holding fixture facilitates pipe thread gage measurements	M-FS-2009	B67-10066	05
Combination double door high-vacuum valve provides access to vacuum chamber	JPL-849	B66-10697	05	Cable clamp bolt fixture facilitates assembly in close quarters	KSC-67-80	B67-10244	05
HIGH VOLTAGE							
Modified filter prevents conduction of micro-wave signals along high-voltage power supply leads	JPL-63	B63-10091	01	Rock anchors restore broken swamp anchors economically	WLP-10004	B67-10498	05
HINGE							
Concealed hinge permits flush mounting of doors and hatches	MSC-623	B66-10336	05	HOLE DISTRIBUTION			
Device serves as hinge and electrical connector for circuit boards	M-FS-743	B66-10359	01	Gear drive automatically indexes rotary table	M-FS-753	B66-10383	05
Adjustable hinge permits movement of knee in plaster cast	M-FS-1756	B67-10056	04	HOMOGENEITY			
HOLDER							
Molded elastomer provides compact ferrite-core holder, simplifies assembly	JPL-584	B64-10084	05	Stationary device produces homogeneous mixture of fluids	M-FS-525	B66-10570	05
Improved holder protects crystal during high acceleration and impact	JPL-463	B65-10037	05	HONEYCOMB			
Carbon-arc rod holder has long life, reduces arc splatter	MSC-144	B65-10095	03	Apparatus permits flexure testing of specimens at cryogenic temperatures	M-FS-257	B65-10129	02
Insulator-holder protects transistors in dense electronic assemblies	MSC-214	B65-10389	01	Adjustable knife cuts honeycomb material to specified depth	MSC-475	B66-10237	05
Specimen holder design improves accuracy of X-ray powder analysis	JPL-SC-165	B66-10075	02	Hollow needle used to cut metal honeycomb structures	MSC-486	B66-10244	05
Multisurface fixture permits easy grinding of tool bit angles	M-FS-586	B66-10171	05	Ultrasonic quality inspection of bonded honeycomb assemblies is automated	MSC-859	B66-10544	01
				Study made to control depth of potting compound for honeycomb sandwich fasteners	LEWIS-370	B66-10677	05
				Detection of entrapped moisture in honeycomb sandwich structures	MSC-1103	B67-10116	01
				Heavy-gage bonded honeycomb sandwich as primary load-bearing structure	M-FS-12060	B67-10427	05
				Nondestructive testing techniques used in analysis of honeycomb structure bond strength	M-FS-1214	B67-10574	01



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# HYDRAULIC SYSTEM

Honeycomb seal backing ring increases turbopump disk life M-FS-13303	B67-10607	05	LANGLEY-44	B64-10146	04
<b>HONEYCOMB CORE</b>			Human transfer functions used to predict system performance parameters LANGLEY-203	B66-10379	01
Flexible honeycomb structure can bend to fit compound curves M-FS-13	B63-10385	05	Modified algessimeter provides accurate depth measurements MSC-616	B66-10647	04
Apparatus measures thermal conductivity of honeycomb-core panels LANGLEY-202	B66-10127	01	<b>HUMIDITY MEASUREMENT</b>		
Insulation for cryogenic tanks has reduced thickness and weight M-FS-326	B66-10183	02	Fluidic oscillator used as humidity sensor LEWIS-340	B67-10063	05
Aluminum core structures brazed without use of flux M-FS-659	B66-10360	05	<b>HYBRID COMPUTER</b>		
<b>HORIZON SENSING</b>			Hybrid computer technique yields random signal probability distributions ARC-34	B65-10208	01
Sextant measures spacecraft altitude without gravitational reference MSC-200	B66-10143	02	<b>HYDRAULIC ACTUATOR</b>		
<b>HORN ANTENNA</b>			Device disconnects several couplings simultaneously JPL-226	B65-10163	05
Novel horn antenna reduces side lobes, improves radiation pattern JPL-425	B63-10264	01	<b>HYDRAULIC CONTROL</b>		
Shortened horn-reflector antenna GSFC-502	B67-10017	01	Hydraulically controlled flexible arm can bend in any direction KSC-66-20	B66-10626	05
<b>HOT FORMING</b>			<b>HYDRAULIC EQUIPMENT</b>		
Development of technology for hot-drape forming of large torus sections M-FS-12141	B67-10341	05	Upsetting butt edge increases weld-joint strength M-FS-175	B64-10164	05
<b>HOT GAS</b>			Hydraulic device provides accurate displacements to microinches MSC-112	B65-10230	05
Probe measures characteristics of hot gas stream M-FS-240	B65-10133	02	Shock absorber operates over wide range MSC-168	B65-10241	05
A method of determining combustion gas flow M-FS-13757	B67-10455	03	Rotary valve controls multiple hydraulic leveling cylinders M-FS-361	B66-10402	05
Computer program calculates peripheral water injection cooling of axisymmetric subsonic diffuser NUC-10541	B67-10543	06	<b>HYDRAULIC FLUID</b>		
<b>HOT WIRE</b>			Hydraulic fluid serves as mandrel for small diameter refractory tube drawing ARG-44	B66-10523	05
Hot-wire detector for chemically active materials used in gas chromatography MSC-269	B66-10139	03	Test instrumentation evaluates electrostatic hazards in fluid system M-FS-2277	B67-10145	01
<b>HOT-WIRE ANEMOMETER</b>			<b>HYDRAULIC SYSTEM</b>		
Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02	New nut and sleeve improve flared connections M-FS-194	B65-10180	05
<b>HOT-WIRE TURBULENCE MEASURING APPARATUS</b>			Hydraulic drive system prevents backlash JPL-371	B65-10351	05
Study of hot wire techniques in low density flows with high turbulence levels M-FS-1269	B66-10687	01	O-ring tube fittings form leakproof seal in hydraulic systems M-FS-481	B66-10020	05
<b>HUMAN BODY</b>			Modified hydraulic braking system limits angular deceleration to safe values GSFC-476	B66-10310	05
Novel shock absorber features varying yield strengths MSC-63A	B64-10138	03	Quick-response servo amplifies small hydraulic pressure differences ARG-99	B66-10498	05
<b>HUMAN ENGINEERING</b>			High-energy-rate magnetohydraulic metal forming system M-FS-2142	B67-10126	02
Electronic dummy for acoustical testing MSC-206	B67-10298	01	Pressure levels and pulsation frequencies can be varied on high pressure/frequency testing device LEWIS-10205	B67-10360	05
<b>HUMAN FACTOR</b>			Hydraulic system provides smooth control of large tracking and antenna drive systems at very low tracking rates NPD-10316	B67-10418	05
Body-fitted harness provides safe and easy component handling M-FS-533	B66-10202	05	Material fatigue data obtained by card-programmed hydraulic loading system		
<b>HUMAN PERFORMANCE</b>					
Spray-on electrodes enable EKG monitoring of physically active subjects FRC-36	B66-10649	04			
<b>HUMAN REACTION</b>					
Technique simulates effect of reduced gravity					

## HYDRAZINE

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LANGLEY-10042	B67-10491	03	Fluid properties handbook M-FS-13462	B67-10440	03
Accumulator isolator prevents malfunctioning of faulty hydraulic system M-FS-1415	B67-10528	05	Vanadium diaphragm electrode serves as hydrogen diffuser in lithium hydride cell ARG-10048	B67-10499	01
Hydraulic servo system increases accuracy in fatigue testing LANGLEY-217	B67-10637	01	Reaction of steam with molybdenum is studied ARG-295	B67-10502	03
<b>HYDRAZINE</b>			Computer program calculates peripheral water injection cooling of axisymmetric subsonic diffuser NUC-10541	B67-10543	06
Solder flux leaves corrosion-resistant coating on metal JPL-611	B64-10206	03	Butterfly valve with metal seals controls flow of hydrogen from cryogenic through high temperatures NUC-10034	B67-10567	05
Gas chromatographic column enables analysis of propellant hydrazines MSC-1161	B66-10586	03	<b>HYDROGEN FLUORIDE</b>		
Addition of solid oxidizer increases liquid fuel specific impulse JPL-861	B67-10058	03	Xenon fluoride solutions effective as fluorinating agents ARG-217	B67-10133	03
Trace hydrazines in aqueous solutions accurately determined by gas chromatography MSC-11222	B67-10290	03	<b>HYDROGEN PEROXIDE</b>		
<b>HYDROCARBON</b>			Plated nickel wire mesh makes superior catalyst bed MSC-216	B65-10321	03
Vapor condensation process produces slurry of magnesium particles in liquid hydrocarbons LEWIS-263	B66-10104	03	<b>HYDROSTATIC PRESSURE</b>		
<b>HYDROFLUORIC ACID</b>			Nonresonant support facilitates vibration testing of structures M-FS-224	B65-10039	05
Copper and nickel adherently electroplated on titanium alloy M-FS-13952	B67-10532	03	<b>HYDROX FUEL CELL</b>		
<b>HYDROGEN</b>			Reaction heat used in static water removal from fuel cells M-FS-532	B66-10013	01
Cryopumping of hydrogen in vacuum chambers is aided by catalytic oxidation of hydrogen LEWIS-15	B63-10340	05	<b>HYSTERESIS</b>		
Miniature oxygen-hydrogen cutting torch constructed from hypodermic needle JPL-545	B63-10517	05	New package for belleville spring permits rate change, easy disassembly JPL-392	B63-10247	05
Process reduces pore diameters to produce superior filters W00-093	B66-10037	03	Diaphragm spring gives clutch over-center toggle effect GSFC-499	B66-10297	05
Hydrogen-atmosphere induction furnace has increased temperature range LEWIS-153	B66-10055	05	Elastic guides reduce hysteresis effect in Belleville spring package JPL-910	B67-10011	05
Refractory coating protects intricate graphite elements from high-temperature hydrogen NU-0027	B66-10084	01	Circuit increases capability of hysteresis synchronous motor MSC-1080	B67-10084	01
Oxygen-hydrogen torch is a small-scale steam generator NU-0042	B66-10120	03	Torque meter aids study of hysteresis motor rings M-FS-12219	B67-10412	01
Device removes hydrogen gas from enclosed spaces GSFC-495	B66-10340	03	Circuit measures hysteresis loop areas at 30 Hz M-FS-13069	B67-10519	01
Sniffer used as portable hydrogen leak detector M-FS-846	B66-10356	01	<b>I-BEAM</b>		
Infrared television used to detect hydrogen fires M-FS-654	B66-10363	01	Self-balancing beam permits safe, easy load handling under overhang M-FS-84	B63-10571	05
Hydrogen fire detection system features sharp discrimination M-FS-643	B66-10368	01	<b>IBM 1620 COMPUTER</b>		
Purification train produces ultrapure hydrogen gas M-FS-1913	B67-10078	03	Linear circuit analysis program for IBM 1620 Monitor II, 1311/1443 data processing system /CIRCS/ NPD-10131	B67-10173	06
Study made of Raney nickel technology M-FS-2054	B67-10208	03	Computer program simulates physical systems by solving the simultaneous differential equations describing the systems NPD-10019	B67-10193	06
Study of hydrogen slush-hydrogen gel utilization M-FS-13068	B67-10413	02	<b>IBM 7090 COMPUTER</b>		
			Space trajectories program for IBM 7090 NPD-10125	B67-10172	06
			Linear circuit analysis program for IBM		

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# IMPACT ACCELERATION

1620 Monitor II, 1311/1443 data processing system /CIRCS/ NPO-10131	B67-10173	06	MSC-871	B66-10507	02
<b>IBM 7094 COMPUTER</b>			<b>IMAGE</b>		
Computer routine adds plotting capabilities to existing programs GSFC-490	B66-10511	01	Setting of angles on machine tools speeded by magnetic protractor ARC-5	B63-10006	01
A modal combination computer program for dynamic analysis of structures NPO-10129	B67-10217	06	Built-in templates speed up process for making accurate models LANGLEY-23	B63-10526	05
Computer program analyzes generalized environmental control and life support systems MSC-1157	B67-10415	06	Fresnel zone plate forms images at wavelengths below 1000 angstroms GSFC-231	B65-10171	02
<b>IDEAL GAS</b>			<b>IMAGE CONVERTER</b>		
Computer program determines gas flow rates in piping systems M-FS-443	B66-10300	01	Electron-beam deflection controlled by digital signals GSFC-385	B65-10283	02
<b>IDENTIFICATION</b>			New television camera eliminates vidicon tube M-FS-472	B66-10112	01
Simple, nondestructive test identifies metals MSC-525	B66-10305	03	<b>IMAGE INTENSIFIER</b>		
Chart system simplifies identification of complex design assemblies MSC-752	B66-10460	05	Aerial-image enables diagrams and animation to be inserted in motion pictures ARG-165	B67-10398	02
Electrical continuity scanner facilitates identification of wires for soldering to connectors MSC-626	B66-10605	01	Camera lens adapter magnifies image M-FS-11955	B67-10431	02
Process produces accurate registry between circuit board prints LANGLEY-288	B66-10660	02	<b>IMAGE ORTHICON TUBE</b>		
Run numbering system for use with data recorders M-FS-2557	B67-10215	01	Design concept for improved photo-scan tube JPL-818	B67-10157	01
<b>IGNITER</b>			Electronic shutter gates image orthicon on and off HQ-96	B67-10270	01
Igniting system for mercury vapor lamps protects transistorized sustaining supply JPL-421	B63-10262	01	<b>IMAGE TRANSDUCER</b>		
Study made of Raney nickel technology M-FS-2054	B67-10208	03	Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03
<b>IGNITION SYSTEM</b>			<b>IMAGE TUBE</b>		
Igniting system for mercury vapor lamps protects transistorized sustaining supply JPL-421	B63-10262	01	Thermal neutron image intensifier tube provides brightly visible radiographic pattern ARG-120	B67-10296	02
Circuit controls transients in scr inverters GSFC-120	B63-10600	01	<b>IMAGE VELOCITY SENSOR</b>		
Carbon arc ignition improved by simple auxiliary circuit MSC-103	B65-10018	01	Plotter design simplifies determination of image sensor transfer characteristic NPO-10164	B67-10206	01
Power arc welder touch-started with consumable electrode M-FS-1485	B66-10641	05	<b>IMAGING TECHNIQUE</b>		
Cold solid propellant motor has stop-restart capability JPL-836	B66-10673	03	Electromechanically operated camera shutter provides uniform exposure JPL-357	B63-10227	01
<b>IGNITRON</b>			Optical device enables small detector to see large field of view WOO-253	B66-10263	02
Compact SCR trigger circuit for ignitron switch operates efficiently M-FS-371	B65-10347	01	<b>IMBEDDING</b>		
<b>ILLUMINATION</b>			Pressure transducer 3/8-inch in size can be faired into surface WOO-065	B64-10021	05
Illuminated display panel is easily changed MSC-108	B65-10003	05	Accurate depth control provided for thermocouple junction locations LANGLEY-289	B66-10632	01
Circular, explosion-proof lamp provides uniform illumination MSC-382	B66-10156	02	<b>IMMERSION</b>		
Panels illuminated by edge-lighted lens technique			Wedge immersed thermistor bolometer measures infrared radiation GSFC-443	B65-10330	02
			<b>IMPACT</b>		
			Ultra-sensitive transducer advances micro-measurement range ARC-26	B64-10004	01
			<b>IMPACT ACCELERATION</b>		
			Improved holder protects crystal during high acceleration and impact JPL-463	B65-10037	05

# IMPACT DECELERATION

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## IMPACT DECELERATION

Kinetic-energy absorber employs frictional force between mating cylinders  
LEWIS-75 B63-10442 05

## IMPACT LOAD

Temperature responsive valve withstands high impact loading  
NPO-10186 B67-10225 05

## IMPACT PRESSURE

A piezo-bar pressure probe  
LEWIS-393 B67-10259 01

## IMPACT SENSITIVITY

Damages in rolling element bearings may be detected early  
HQ-10031 B67-10658 01

## IMPACT TOLERANCE

Land landing couch dynamics computer program  
MSC-1210 B67-10233 06

High impact pressure regulator withstands impacts of over 15,000 g  
NPO-10175 B67-10274 01

## IMPACTOR

Air sampler collects and protects minute particles  
HQ-10037 B67-10661 01

## IMPEDANCE

High-pass RF coaxial filter rejects dc and low frequency signals  
GSFC-73 B64-10173 01

Transistor biased amplifier minimizes diode discriminator threshold attenuation  
ARG-163 B67-10311 01

Analog buffer isolates high impedance source from low impedance load  
M-FS-13481 B67-10544 01

## IMPEDANCE MEASUREMENT

Technique for measuring magnetic tape interlayer adhesion  
NPO-10011 B67-10417 03

## IMPINGEMENT

Improved technique for localizing electro-polishing features novel nozzles  
WOO-101 B64-10271 01

## IMPURITY

Impurity diffusion process for silicon semiconductors is fast and precise  
GSFC-397 B65-10300 01

Simplified method introduces drift fields into cells  
GSFC-572 B67-10102 03

## IN-FLIGHT MONITORING

Rectilinear display gives acceleration load factor and velocity information  
MSC-1045 B67-10248 01

## INCLINATION

Averaging probe reduces static-pressure sensing errors  
LANGLEY-36 B65-10114 05

## INCONEL

Wire material reduces compressor blade vibration  
LEWIS-357 B66-10666 03

Cryogenic fatigue data developed for Inconel 718  
M-FS-702 B67-10049 03

Undercoat prevents blistering of silver plating at elevated temperatures  
M-FS-2049 B67-10096 05

Materials data handbook, Inconel alloy 718  
M-FS-2348 B67-10282 03

## INDEPENDENT VARIABLE

Multiple correlation computer program determines relationships between several independent and dependent variables  
M-FS-13024 B67-10327 06

Computer optimization program finds values for several independent variables that minimize a dependent variable  
M-FS-13030 B67-10328 06

Transistor \*\*H\*\* parameter conversion slide rule  
JPL-649 B67-10561 01

## INDICATOR

Speed-sensing device aids crane operators  
WS-4 B64-10006 05

Coaxial capacitor used to determine fluid density  
LEWIS-232 B65-10296 02

Test strips detect different CO2 concentrations in closed compartments  
MSC-210 B65-10390 03

Depth indicator and stop aid machining to precise tolerances  
M-FS-553 B66-10149 05

Torque wrench allows readings from inaccessible locations  
M-FS-598 B66-10204 05

Device facilitates centering of workpieces in lathe chuck  
M-FS-685 B66-10277 05

Low cost SCR lamp driver indicates contents of digital computer registers  
GSFC-10221 B67-10656 01

## INDIUM

Indium foil with beryllia washer improves transistor heat dissipation  
GSFC-42 B63-10033 01

## INDUCTANCE

Simple circuit produces high-speed, fixed duration pulses  
GSFC-285 B65-10228 01

Increased junction lead inductance ballasts high-frequency transistors  
GSFC-387 B65-10259 01

Improved circuit for measuring capacitive and inductive reactances  
M-FS-13083 B67-10513 01

## INDUCTION HEATING EQUIPMENT

Removable preheater elements improve oxide induction furnace  
JPL-288 B63-10193 01

Refractory metal shielding /insulation/ increases operating range of induction furnace  
LEWIS-202 B65-10188 02

Hydrogen-atmosphere induction furnace has increased temperature range  
LEWIS-153 B66-10055 05

Auxiliary coil controls temperature of RF induction heater  
GSFC-428 B66-10067 01

## INDUCTION SYSTEM

Inductive system detects level of conducting fluids  
LEWIS-322 B66-10392 01

Switching-type regulator circuit has increased efficiency  
MSC-1063 B67-10190 01

## INDUCTOR

Inductor flyback characteristic gives voltage

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# INHOMOGENEITY

regulator fast response  
GSFC-361 B65-10257 01

RF inductor has high Q, is stable at  
higher temperatures  
JPL-1019 B67-10106 01

**INDUSTRIAL SAFETY**  
Emergency escape system protects personnel  
from explosion and fire  
KSC-66-12 B66-10634 05

Safety yoke would protect construction  
workers from falling  
KSC-10075 B67-10445 05

**INDUSTRY**  
Computer simulation program is adaptable to  
industrial processes  
LEWIS-240 B66-10426 01

**INERT ATMOSPHERE**  
Thoriated nickel bonded by solid-state  
diffusion method  
LANGLEY-116 B65-10220 03

Refractory metals welded or brazed with  
tungsten inert gas equipment  
LEWIS-219 B65-10319 05

Inert-gas welding and brazing enclosure  
fabricated from sheet plastic  
LEWIS-220 B65-10338 05

**INERT GAS**  
Novel clamps align large rocket cases,  
eliminate back-up bars  
M-FS-1 B63-10376 05

Welding procedure improves quality of welds,  
offers other advantages  
M-FS-32 B64-10309 01

**INERTIA MOMENT**  
Device enables measurement of moments of  
inertia about three axes  
GSFC-49 B65-10176 05

Automatic system determines moments of  
inertia of asymmetrical objects  
M-FS-1769 B66-10636 01

**INERTIAL REFERENCE SYSTEM**  
Conceptual nonorthogonal gyro configuration  
for guidance and navigation  
MSC-11363 B67-10433 01

**INFLATABLE DEVICE**  
Buoyant Stokes litter assembly used for sea  
rescue operations  
MSC-131 B66-10019 05

Self-inflating lifevest stores in small  
package  
MSC-5A B66-10184 04

Flexible fastener effects airtight material  
closure  
JPL-684 B66-10304 05

Inflatable holding fixture permits X-rays to  
be taken of inner weld areas  
M-FS-856 B66-10327 03

Inflatable O-ring seal would ease closing of  
hatch cover plate  
MSC-740 B66-10385 05

**INFLATABLE STRUCTURE**  
New inflatable liferaft is nontippable  
MSC-4A B64-10001 05

Rotating mandrel speeds assembly of plastic  
inflatables  
LANGLEY-155 B66-10137 05

Portable lightweight cell provides controlled  
environment  
MSC-648 B66-10370 05

**INFORMATION PROCESSING**  
Superconductor magnets used for stagger-tuning  
traveling-wave maser  
GSFC-292 B65-10165 01

**INFORMATION RETRIEVAL**  
Opaque microfiche masthead permits easy  
reading  
HQ-7 B65-10306 01

Computer program searches characteristic  
data of diodes and transistors  
GSFC-493 B66-10529 01

**INFRARED DETECTOR**  
Infrared radiometer  
M-FS-13373 B67-10422 01

Development of dual solid cryogens for  
high reliability refrigeration system  
GSFC-10188 B67-10644 02

**INFRARED FILTER**  
PTFE-aluminum films serve as neutral  
density filters  
LANGLEY-189 B66-10017 02

**INFRARED INSTRUMENT**  
Infrared television used to detect hydrogen  
fires  
M-FS-654 B66-10363 01

**INFRARED RADIATION**  
IR-transmission glasses formed from oxides of  
bismuth and tellurium  
M-FS-279 B65-10190 03

Infrared shield facilitates optical pyrometer  
measurements  
LANGLEY-133 B65-10272 02

Wedge immersed thermistor bolometer measures  
infrared radiation  
GSFC-443 B65-10330 02

Inexpensive infrared source improvised from  
flashlight  
M-FS-494 B66-10096 02

High-speed furnace uses infrared radiation  
for controlled brazing  
NU-0047 B66-10268 02

Gimbaled-mirror scanning system capable  
of spiral pattern  
GSFC-10170 B67-10609 02

**INFRARED REFLECTION**  
Ellipsoidal-mirror reflectometer accurately  
measures infrared reflectance of materials  
GSFC-566 B67-10444 01

**INFRARED SCANNER**  
IR vidicon scanner monitors many test  
points  
M-FS-1937 B67-10277 01

**INFRARED SPECTRUM**  
Study made of far infrared spectra of  
silicate minerals  
M-FS-1811 B67-10075 02

**INFRARED TRACKING**  
Point-source detection system rejects  
spatially extended radiation sources  
GSFC-486 B66-10622 01

**INHIBITOR**  
Spectrophotometric technique quantitatively  
determines NaMBT inhibitor in ethylene  
glycol-water solutions  
MSC-11496 B67-10573 03

**INHOMOGENEITY**  
Calculation of infrared spectral  
transmittances of inhomogeneous gases  
M-FS-1563 B66-10554 02

## INJECTION

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## INJECTION

Filler device for handling hot corrosive materials  
MSC-85 B64-10166 03

Economical fabrication process produces high-quality junction transistors  
JPL-SC-065 B64-10330 01

## INJECTOR

Dust particle injector for hypervelocity accelerators provides high charge-to-mass ratio  
GSFC-509 B66-10347 01

## INLET

Packless valve with all-metal seal handles wide temperature, pressure range  
JPL-361 B63-10228 05

Filter for high-pressure gases has easy take-down, assembly  
JPL-373 B63-10234 03

Fluid-pressure meter can be calibrated without removal from flow line  
M-FS-98 B63-10502 05

## INORGANIC COATING

Anodization process produces opaque, reflective coatings on aluminum  
M-FS-348 B65-10336 03

## INORGANIC COMPOUND

Inorganic paint is durable, fireproof, easy to apply  
GSFC-366 B65-10156 03

## INPUT

Veitch diagram plotter simplifies boolean functions  
JPL-385 B63-10241 05

Double-throw microwave device switches two lines quickly  
JPL-410 B63-10258 01

Computer circuit will fit on single silicon chip  
JPL-513 B63-10514 01

Transistorized converter provides nondissipative regulation  
GSFC-238 B64-10305 01

Stepping motor drive circuit designed for low power drain  
GSFC-196 B65-10026 01

Transistor voltage comparator performs own sensing  
GSFC-228 B65-10028 01

Photoelectric semiconductor switch operates with low level inputs  
JPL-SC-068 B65-10033 01

Automatic gain control circuit handles wide input range  
MSC-166 B66-10089 01

Electropneumatic transducer automatically limits motor current  
LEWIS-253 B66-10160 01

Offset lenses add versatility to phototypesetting machine  
HQ-9 B66-10173 02

Master control data handling program uses automatic data input  
M-FS-2259 B67-10280 06

Computer program calculates gamma ray source strengths of materials exposed to neutron fluxes  
NUC-10143 B67-10665 06

## INSERT

Gate valve with ceramic-coated base operates at high temperatures  
ARC-23 B63-10562 03

Expandable insert serves as screw anchor  
MSC-301 B66-10132 05

Insert sleeve prevents tube soldering contamination  
MSC-552 B66-10238 05

Study made to control depth of potting compound for honeycomb sandwich fasteners  
LEWIS-370 B66-10677 05

Aerial-image enables diagrams and animation to be inserted in motion pictures  
ARG-165 B67-10398 02

## INSERTION

Improved insertion-loss tester  
JPL-358 B64-10080 01

## INSPECTION

Use of photographs speeds inspection of printed-circuit boards  
MSC-72 B64-10118 01

Crack detection method is safe in presence of liquid oxygen  
M-FS-236 B65-10107 03

Ultrasonic recording scanner used for nondestructive weld inspection  
M-FS-284 B66-10220 01

Ultrasonic quality inspection of bonded honeycomb assemblies is automated  
MSC-859 B66-10544 01

System enables dimensional inspection of very large structures  
M-FS-2477 B67-10214 05

Low-energy gamma ray inspection of brazed aluminum joints  
MSC-1189 B67-10337 02

Test and inspection for process control of monolithic circuits  
M-FS-13084 B67-10507 01

Plastic shoe facilitates ultrasonic inspection of thin wall metal tubing  
NUC-10010 B67-10542 02

Mechanizes X-ray inspection system for large tanks  
M-FS-12867 B67-10564 02

Connector shorting cap provides pin alignment, inspection, and stray voltage protection  
M-FS-13111 B67-10635 01

## INSTABILITY

Analysis of stability-critical orthotropic cylinders subjected to axial compression  
M-FS-12869 B67-10375 03

## INSTALLATION

Low-cost tool minimizes damage to O-rings during installation  
MSC-140 B65-10116 05

Microminiature thermocouple monitors own installation  
M-FS-1111 B66-10463 05

Thermocouples easily installed in hard-to-get-to places  
M-FS-1946 B66-10653 01

## INSTRUCTION

Subroutines GEORGE and DRASTC simplify operation of automatic digital plotter  
NUC-10044 B67-10222 06

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## INTEGRATOR

Fresnel diffraction plates are simple and inexpensive M-FS-12731	B67-10297	02	jacketed piping WSU-333	B67-10018	05
<b>INSTRUMENT</b>			Technique for stripping Teflon insulated wire M-FS-1774	B67-10048	05
Concept for modifying drafting instruments to minimize smearing KSC-10056	B67-10283	05	Tester automatically checks insulation of individual conductors in multiple-strand cables NUC-10068	B67-10260	01
Modified blackbody device emits high-density radiation M-FS-12744	B67-10388	02	Inexpensive cryogenic insulation replaces vacuum jacketed line NUC-10061	B67-10264	02
<b>INSTRUMENTATION</b>			Cut-through tester accurately measures insulation failure rates M-FS-12506	B67-10354	03
Instrument adjustment knob locks to prevent accidental maladjustment M-FS-190	B64-10249	05	Hand-operated plug insertion valve M-FS-12019	B67-10466	05
Gapped toroid provides infinite resolution of delay-line pickup GSFC-370	B65-10258	01	High temperature thermocouple design provides gas cooling without increasing overall size of unit NUC-10515	B67-10497	01
Minimum permissible leakage resistance established for instrumentation systems M-FS-848	B66-10397	01	Flat cable insulation stripping machine M-FS-13776	B67-10581	05
Computer program determines performance efficiency of remote measuring systems M-FS-1137	B66-10503	01	<b>INSULATOR</b>		
Low level accelerometer test methods are investigated M-FS-908	B66-10510	01	Connector for thermocouple leads saves costly wire, makes reliable connectors LANGLEY-26	B63-10529	01
Double copper sheath multiconductor instrumentation cable is durable and easily installed in high thermal or nuclear radiation area NUC-10007	B67-10538	01	Insulator-holder protects transistors in dense electronic assemblies MSC-214	B65-10389	01
<b>INSULATED STRUCTURE</b>			Reflective insulator layers separated by bonded silica beads MSC-215	B66-10070	03
Double copper sheath multiconductor instrumentation cable is durable and easily installed in high thermal or nuclear radiation area NUC-10007	B67-10538	01	Thermocouple-flexible cable connector insulator is highly reliable NU-0082	B66-10709	01
<b>INSULATION</b>			Technique eliminates high voltage arcing at electrode-insulator contact area LEWIS-10133	B67-10470	01
Low-cost insulation system for cryostats eliminates need for a vacuum LEWIS-64	B63-10365	03	<b>INTEGRATED CIRCUIT</b>		
Spherical electrode eliminates high-voltage breakdown LEWIS-155	B65-10139	01	Field-effect transistor replaces bulky transformer in analog-gate circuit GSFC-351	B65-10284	01
Refractory oxides evaluated for high-temperature use LANGLEY-121	B65-10167	03	Diffusion technique stabilizes resistor values MSC-205	B66-10142	01
Thin transparent films formed from powdered glass GSFC-352	B65-10217	03	High-performance RC bandpass filter is adapted to miniaturized construction ARC-60	B66-10309	01
Insulation accelerates rate of cooling with cryogenic fluid MSC-161	B65-10240	02	Integrator can easily be set and reset with an electronic switch ARC-10002	B67-10135	01
Closed fluid system without moving parts controls temperature LEWIS-222	B65-10331	02	Method of improving contact bonds in silicon integrated circuits M-FS-1753	B67-10335	01
Soluble undercoating facilitates removal of foamed-in-place insulation LEWIS-193	B65-10344	03	Transient sensor development M-FS-13370	B67-10471	01
Air-cured ceramic coating insulates against high heat fluxes M-FS-150	B65-10357	03	Test and inspection for process control of monolithic circuits M-FS-13084	B67-10507	01
Nylon bit removes cork insulation without damage to substrate MSC-381	B66-10152	05	Low cost SCR lamp driver indicates contents of digital computer registers GSFC-10221	B67-10656	01
Control system maintains compartment at constant temperature JPL-SC-145	B66-10188	05	<b>INTEGRATOR</b>		
Technique cuts time and cost of bending			Digital logic elements provide additional functions from analog input MSC-64	B64-10064	01

## INTENSIFIER TUBE

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Solid-state switching used to speed up capacitive integrator LANGLEY-104	B65-10159	01	WOOD-089	B65-10372	03
Electronic ampere-hour integrator is accurate to one percent GSFC-203	B65-10308	01	<b>INVENTORY CONTROL</b> Computer program determines inventory size M-FS-1135	B66-10506	01
<b>INTENSIFIER TUBE</b> Thermal neutron image intensifier tube provides brightly visible radiographic pattern ARG-120	B67-10296	02	<b>INVERTER</b> Circuit controls transients in scr inverters GSFC-120	B63-10600	01
<b>INTENSITY</b> Variable light source with a million-to-one intensity ratio JPL-W00-008	B63-10424	03	Signal generator converts direct current to multiphase supplies MSC-11043	B67-10368	01
<b>INTERFACE</b> Indium foil with beryllia washer improves transistor heat dissipation GSFC-42	B63-10033	01	<b>INVESTMENT CASTING</b> Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns ARC-7	B63-10008	05
Seal allows blind assembly and thermal expansion of components NU-0005	B65-10053	05	<b>IODIDE</b> Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03
<b>INTERFERENCE</b> Interference effects eliminated in random oriented space station antenna system MSC-11004	B67-10435	01	New method used to fabricate gallium arsenide photovoltaic device W00-062	B64-10019	01
Cardiotachometer with linear beat-to-beat frequency response ARC-10033	B67-10598	01	Pressure transducer 3/8-inch in size can be faired into surface W00-065	B64-10021	05
<b>INTERFERENCE FACTOR TABLE</b> Basic suppression techniques are evaluated M-FS-867	B66-10449	01	Cuprous selenide and sulfide form improved photovoltaic barriers W00-212	B66-10025	01
<b>INTERFEROMETER</b> Interferometer combines laser light source and digital counting system MSC-151	B65-10161	01	<b>IODINE</b> Static electricity of polymers reduced by treatment with iodine NPO-10062	B67-10132	03
Interferometer construction assures parallelism of critical components JPL-704	B65-10292	02	Photovoltaic effect in organic polymer-iodine complex NPO-10373	B67-10634	03
Unique construction makes interferometer insensitive to mechanical stresses JPL-725	B65-10295	02	<b>IODINE 131</b> Ion exchange determines iodine-131 concentration in aqueous samples ARG-208	B67-10129	04
Motion drive system is accurately controlled in the 1-micron range JPL-864	B66-10695	05	<b>ION</b> Fine-mesh screen made by simplified method W00-104	B64-10282	03
<b>INTERFEROMETRY</b> Measuring coplanarity of surfaces MSC-12044	B67-10371	02	<b>ION BEAM</b> New apparatus increases ion beam power density LEWIS-73	B63-10440	01
<b>INTERNAL COMBUSTION ENGINE</b> Indicator system provides complete data of engine cylinder pressure variation LEWIS-291	B66-10470	05	<b>ION BOMBARDMENT</b> Highly sensitive solids mass spectrometer uses inert-gas ion source ERC-11	B66-10114	02
<b>INTERNAL COMPRESSION INLET</b> Perforations in jet engine supersonic inlet increase shock stability NEO-8	B66-10530	05	Complex surfaces plated by thin-film deposition in one operation LEWIS-292	B67-10006	05
<b>INTERNAL PRESSURE</b> Investigation of pressurized toroidal shells HQ-27	B67-10117	05	<b>ION CHAMBER</b> Ion chambers simplify absolute intensity measurements in the vacuum ultraviolet ERC-10	B66-10439	01
<b>INTERNAL STRESS</b> Photosensitive filler minimizes internal stresses in epoxy resins M-FS-1880	B67-10227	03	<b>ION DENSITY</b> New apparatus increases ion beam power density LEWIS-73	B63-10440	01
<b>INTERPOLATION</b> Simple scale interpolator facilitates reading of graphs LANGLEY-88	B65-10070	05	<b>ION ENGINE</b> New apparatus increases ion beam power density LEWIS-73	B63-10440	01
<b>INTERSTICE</b> Wire bundle formed into grids with minute interstices			Apparatus measures very small thrusts W00-048	B64-10284	05
			Wire bundle formed into grids with minute interstices W00-089	B65-10372	03
			<b>ION EXCHANGE</b> Ion exchange determines iodine-131		



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# ITERATIVE SOLUTION

concentration in aqueous samples ARG-208	B67-10129	04	in irradiated nuclear fuel NUC-10047	B67-10194	03
<b>ION GAUGE</b> Electron multiplier has improved performance and stability GSFC-546	B67-10060	01	Simplified method measures changes in tensile yield strength using least number of specimens NUC-10075	B67-10266	03
<b>ION PUMP</b> Ion pump provides increased vacuum pumping speed NEO-13	B65-10239	02	Neutron irradiation of Am241 effectively produces curium ARG-10030	B67-10501	03
<b>IONIC REACTION</b> Hydrated multivalent cations are new class of molten salt mixtures ARG-211	B67-10033	03	<b>ISOCYANATE</b> Process produces chlorinated aromatic isocyanate in high yield M-FS-1658	B66-10646	03
<b>IONIZATION</b> Radon gas, useful for medical purposes, safely fixed in quartz ARG-2	B66-10468	04	<b>ISOLATION</b> High-pass RF coaxial filter rejects dc and low frequency signals GSFC-73	B64-10173	01
<b>IONIZATION CHAMBER</b> Densitometer system for liquid hydrogen has high accuracy, fast response M-FS-909	B66-10438	01	Mechanism isolates load weighing cell during lifting of load MSC-297	B66-10071	05
<b>IONIZATION GAUGE</b> Precision gage measures ultrahigh vacuum levels GSFC-114	B63-10597	01	Study of fast response thermocouple measurement of temperatures in cryogenic gases M-FS-1659	B66-10661	01
Cold cathode ionization gauge has rigid metal housing GSFC-445	B66-10041	01	Amplifier provides dual outputs from a single source with complete isolation NUC-10056	B67-10221	01
Rod and dish cathode improves Penning-type vacuum gauge GSFC-447	B66-10082	01	Multiple meter monitoring circuits served by single alarm MSC-10984	B67-10369	01
<b>IONIZING RADIATION</b> Review of physics, instrumentation and dosimetry of radioactive isotopes ARG-10037	B67-10640	02	Analog buffer isolates high impedance source from low impedance load M-FS-13481	B67-10544	01
<b>IRON</b> Modified filter prevents conduction of micro- wave signals along high-voltage power supply leads JPL-63	B63-10091	01	<b>ISOLATOR</b> Wire mesh isolator protects sensitive electronic components GSFC-347	B65-10216	05
Iron serves as diffusion barrier in thermally regenerative galvanic cell ARG-29	B67-10189	03	Accumulator isolator prevents malfunctioning of faulty hydraulic system M-FS-1415	B67-10528	05
Simplified technique demonstrates magnetic domain switching M-FS-13153	B67-10342	02	Solid state single-ended switching dc-to-dc converter M-FS-13598	B67-10558	01
Eddy current probe measures size of cracks in nonmetallic materials M-FS-14059	B67-10645	03	<b>ISOSTATIC PRESSURE</b> Isostatic compression process converts polyaromatics into structural material JPL-892	B67-10168	03
<b>IRON ALLOY</b> Gage of 6.5 per cent Si-Fe sheet is chemically reduced MSC-537	B66-10454	03	<b>ISOTHERMAL FLOW</b> Study of thermal effects on nickel- cadmium batteries GSFC-10003	B67-10614	01
Process yield Co-Fe alloys with superior high temperature magnetic properties LEWIS-333	B66-10535	03	Improved calorimeter provides accurate thermal measurements of space batteries GSFC-10003A	B67-10615	01
<b>IRON OXIDE</b> Cryogenic filter method produces super-pure helium and helium isotopes JPL-374	B63-10235	03	<b>ISOTOPE</b> Neon isotopes cancel errors in gas laser M-FS-1476	B66-10583	02
Magnetic fluid readily controlled in zero gravity environment LEWIS-126	B65-10335	03	Calculation of resonance neutron absorption in two-region problems /the GAROL code/ NUC-10045	B67-10223	06
<b>IRRADIATION</b> Irradiated gases transferred without contamination or dilution LEWIS-278	B67-10044	03	<b>ITERATION</b> Computer modification reduces time of performing iterative division M-FS-166	B65-10005	01
Separation technique provides rapid quantitative determination of cesium-137			<b>ITERATIVE SOLUTION</b> Computer subroutine ISUDS accurately solves large system of simultaneous linear algebraic equations NUC-10051	B67-10344	06

Computer program VARI-QUIR III provides solution of steady-state, multigroup, two-dimensional neutron diffusion equations  
NUC-10052 B67-10345 06

## J

## J- 2 ROCKET ENGINE

Solid state annunciator facilitates complex system troubleshooting  
M-FS-1258 B66-10505 01

## JACKING EQUIPMENT

Heavy duty precision leveling jacks expedite setup time on horizontal boring mill  
M-FS-1084 B66-10411 05

## JET ENGINE

Perforations in jet engine supersonic inlet increase shock stability  
NEO-8 B66-10530 05

## JET FUEL

Centrifugal device separates liquid from gas  
MSC-282 B65-10394 05

## JET PLUME

Computer program uses characteristics method for free-jet investigation  
LANGLEY-10117 B67-10490 06

## JIG

Jig and fixture aid fabrication of tungsten rivets  
LEWIS-185 B65-10101 05

Spiral heater coils hand-formed with fixture  
LEWIS-208 B65-10192 05

Assembly jig assures reliable solar cell modules  
GSFC-455 B66-10040 05

Jig protects transistors from heat while tinning leads  
MSC-515 B66-10240 05

Heat treatment stabilizes welded aluminum jig and tool structures  
MSC-800 B66-10458 03

## JIG BORING MACHINE

Depth indicator and stop aid machining to precise tolerances  
M-FS-553 B66-10149 05

## JOINT

Lightweight universal joint transmits both torque and thrust  
JPL-375 B63-10236 05

Sleeve and cutter simplify disconnecting welded joint in tubing  
JPL-384 B63-10240 05

New method used to fabricate light-weight heat exchanger for rocket motor  
LEWIS-43 B63-10346 02

Circuit reliability boosted by soldering pins of disconnect plugs to sockets  
JPL-447 B64-10002 01

Flexible fastener allows thermal expansion  
LANGLEY-40 B64-10145 05

Splice plate design assures structural separation by mild explosive  
MSC-137 B65-10166 05

Ball and socket joints provide accurate biaxial gimbal  
JPL-658 B65-10205 05

Thermocouple-to-instrumentation connector features quick assembly  
NU-0022 B65-10246 05

Universal bellows joint restraint permits

angular and offset movement  
W00-102 B65-10371 05

Photosensors used to maintain welding electrode-to-joint alignment  
MSC-243 B65-10401 05

Flexible coiled spline securely joins mating cylinders  
W00-270 B66-10172 05

Tool separates sleeve-type unions without heat  
MSC-497 B66-10253 05

Union would facilitate joining of tubing, minimize braze contamination  
MSC-777 B66-10311 05

Hollow spherical rotors fabricated by electroplating  
JPL-SC-117 B66-10366 05

Spherical pipe joint delivers loads equally to mating flange  
M-FS-807 B66-10665 05

High-strength braze joints between copper and steel  
M-FS-2519 B67-10211 05

Pipe joints reinforced in place with fitted aluminum sleeves  
MSC-11109 B67-10271 05

Self-aligning rod prevents eccentric loading of tensile specimens  
NUC-10525 B67-10594 05

Development of helical seal for high temperature /2000 degrees F/ application  
M-FS-13304 B67-10655 05

## JOURNAL BEARING

Ohmmeter senses depletion of lubricant in journal bearings  
LEWIS-37 B64-10042 01

A conceptual design for squeeze film bearings  
M-FS-573 B66-10226 05

## JUNCTION

Multiple temperatures sampled using only one reference junction  
GSFC-485 B66-10260 01

## JUNCTION TRANSISTOR

Economical fabrication process produces high-quality junction transistors  
JPL-SC-065 B64-10330 01

## K

## KEPLER LAW

Fortran IV program for two-impulse rendezvous analysis  
M-FS-13971 B67-10479 06

## KETONE

Degreasing of titanium to minimize stress corrosion  
LEWIS-382 B67-10147 03

## KEYING

Polarizing keys prevent mismatch of connector plugs and receptacles  
MSC-443 B66-10251 01

## KINEMATICS

Tester for study of rolling element bearings  
LEWIS-305 B67-10009 01

## KINETIC ENERGY

Kinetic-energy absorber employs frictional force between mating cylinders  
LEWIS-75 B63-10442 05

Shock absorber operates over wide range  
MSC-168 B65-10241 05

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# LASER

<b>KINETICS</b>				Composite gaskets are compatible with liquid oxygen, resist compression set	B66-10395	03
Multidimensional reaction kinetic ablation program /REKAP/ MSC-10079	B67-10495	06		M-FS-455		
<b>KLYSTRON</b>				Polarized light reveals stress in machined laminated plastics	B67-10383	03
Apparatus makes klystron operating frequency adjustable from remote point NPD-09831	B67-10514	01		LEWIS-10018		
<b>KNEE</b>				<b>LAMP</b>		
Adjustable hinge permits movement of knee in plaster cast M-FS-1756	B67-10056	04		Igniting system for mercury vapor lamps protects transistorized sustaining supply JPL-421	B63-10262	01
<b>KRYPTON</b>				Electrodeless discharge lamp is easily started, has high stability WDO-030	B66-10015	01
Radioactive method enables determination of surface areas rapidly and accurately NU-0088	B66-10710	03		Lamp automatically switches to new filament on burnout M-FS-498	B66-10046	01
<b>L</b>				Circular, explosion-proof lamp provides uniform illumination MSC-382	B66-10156	02
<b>LABORATORY APPARATUS</b>				Two-light circuit continuously monitors ac ground, phase, and neutral wires MSC-356	B66-10163	01
Ceramic-coated boat is chemically inert, provides good heat transfer LANGLEY-90	B65-10063	05		Lamp enables measurement of oxygen concentration in presence of water vapor MSC-10043	B67-10387	01
Apparatus enables automatic microanalysis of body fluids JPL-962	B66-10515	04		Low cost SCR lamp driver indicates contents of digital computer registers GSFC-10221	B67-10656	01
<b>LABYRINTH</b>				<b>LANDING SYSTEM</b>		
Labyrinth-type valve seat increases valve life by decreasing fluid velocity M-FS-1051	B66-10424	05		Land landing couch dynamics computer program MSC-1210	B67-10233	06
<b>LAGRANGE EQUATION</b>				<b>LANGUAGE PROGRAMMING</b>		
Study of dynamic response of elastic space stations NPD-10124	B67-10169	06		Assembly processor program converts symbolic programming language to machine language M-FS-13262	B67-10493	06
<b>LAMB WAVE</b>				<b>LAP JOINT</b>		
Improved ultrasonic TV images achieved by use of Lamb-wave orientation technique ARG-203	B67-10295	02		Lightweight door seals cryogenic container against diaphragm type loading M-FS-476	B65-10402	05
Lamb waves increase sensitivity in nondestructive testing ARG-10009	B67-10605	02		Solar cell submodule design facilitates assembly of lightweight arrays JPL-728	B66-10231	02
<b>LAMINAR BOUNDARY LAYER</b>				<b>LAPLACE OPERATOR</b>		
Thin-film gage measures low heat-transfer rates LANGLEY 205	B66-10180	01		Polynomial manipulator AP-168 MSC-1231	B67-10103	01
<b>LAMINATE</b>				<b>LASER</b>		
Flexible curtain shields equipment from intense heat fluxes M-FS-48	B65-10044	03		Modification increases light output of injection-luminescent diodes M-FS-192	B65-10006	01
Liquid crystals detect voids in fiberglass laminates LEWIS-10104	B67-10286	03		Laser beam transmits electric power GSFC-293	B65-10158	01
Adhesives for laminating polyimide insulated flat conductor cable M-FS-12066	B67-10429	03		Interferometer combines laser light source and digital counting system MSC-151	B65-10161	01
Warpage eliminated in copper-clad microwave circuit laminates M-FS-13892	B67-10454	03		Solid-state laser transmitter is amplitude modulated MSC-121	B65-10238	01
<b>LAMINATED MATERIAL</b>				Communication system uses modulated laser beam GSFC-377	B65-10333	01
Peel resistance of adhesive bonds accurately measured GSFC-320	B65-10173	03		Laser measuring system accurately locates point coordinates on photograph ARG-74	B66-10560	02
Device detects unbonded areas in plastic laminates WDO-206	B65-10380	01		Optical superheterodyne receiver uses laser for local oscillator M-FS-1605	B66-10584	01
Drill bit design assures clean holes in laminated materials WDO-098	B65-10386	05		Concept for using laser beams to measure electron density in plasmas		
Impact- and puncture-resistant material protects parts from damage MSC-747	B66-10375	05				

M-FS-965	B66-10645	01	losses and high reliability LANGLEY-68	B67-10603	01
Design concepts using ring lasers for frequency stabilization M-FS-2448	B67-10143	01	<b>LEACHING</b> Porous mandrels provide uniform deformation in hydrostatic powder metallurgy M-FS-1972	B67-10209	03
Absolute frequency stabilization of laser oscillator against laser amplifier M-FS-2559	B67-10255	01	<b>LEAD</b> Metals plated on fluorocarbon polymers JPL-544	B63-10612	03
Accuracy of laser measurements improved by pulse autocorrelator electronic system MSC-10033	B67-10338	01	Tool forms right angles in component leads M-FS-722	B66-10346	05
Proposed method of rotary dynamic balancing by laser M-FS-12422	B67-10452	02	Lead plated aluminum ring provides static high pressure seal for large diameter pressure vessel NUC-10008	B67-10539	05
Development of Curie point switching for thin film, random access, memory device NPQ-10402	B67-10633	02	<b>LEAD OXIDE</b> Lead oxide ceramic makes excellent high- temperature lubricant LEWIS-144	B64-10116	03
<b>LASER COMMUNICATION</b> Laser communication system is insensitive to atmospherically induced noise GSFC-10396	B67-10587	01	<b>LEAD TELLURIDE</b> Thermoelectric elements diffusion-bonded to tungsten electrodes GSFC-346	B65-10309	01
<b>LASER MODE</b> Neon isotopes cancel errors in gas laser M-FS-1476	B66-10583	02	<b>LEAKAGE</b> Vented piston seal prevents fluid leakage between two chambers JPL-179	B63-10141	05
<b>LASER OUTPUT</b> Laser system generates single-frequency light M-FS-2556	B67-10288	02	Self sealing disconnect for tubing forms metal seal after breakaway JPL-354	B63-10226	05
<b>LATEX</b> Method accurately measures mean particle diameters of monodisperse polystyrene latexes ARG-207	B67-10054	02	Diaphragm eliminates leakage in cryogenic fluid duct coupling WOO-142	B65-10227	05
<b>LATHE</b> Lathe converted for grinding aspheric surfaces GSFC-115	B63-10556	05	Weld leaks rapidly and safely detected M-FS-362	B65-10265	01
Metal bellows custom-fabricated from tubing LEWIS-192	B65-10150	05	O-ring tube fittings form leakproof seal in hydraulic systems M-FS-481	B66-10020	05
Lathe attachment used to machine elliptical cones MSC-100	B65-10168	05	Capacitive system detects and locates fluid leaks M-FS-478	B66-10099	01
Self-aligning fixture used in lathe chuck jaw refacing FRC-21	B65-10198	05	Dispenser leak-tests and sterilizes rubber gloves MSC-285	B66-10166	03
Tool post modification allows easy turret lathe cutting-tool alignment M-FS-581	B66-10191	05	Expandable rubber plug seals openings for pressure testing NU-0048	B66-10229	05
Lathe chuck key incorporates safety feature MSC-506	B66-10243	05	Vacuum test fixture improves leakage rate measurements MSC-271	B66-10286	01
Device facilitates centering of workpieces in lathe chuck M-FS-685	B66-10277	05	Union would facilitate joining of tubing, minimize braze contamination MSC-777	B66-10311	05
Swiveling lathe jaw concept for holding irregular pieces M-FS-783	B66-10321	05	Minimum permissible leakage resistance established for instrumentation systems M-FS-848	B66-10397	01
<b>LAUNCH VEHICLE</b> Earth orbit rendezvous evaluation program M-FS-13016	B67-10407	06	Leak locator for vacuum jacketed pipelines eliminates need for removal of outer jacket M-FS-888	B66-10412	01
<b>LAUNCH VEHICLE CONFIGURATION</b> Computer program provides improved longitudinal response analysis for axisymmetric launch vehicles LANGLEY-10093	B67-10531	06	Electroplating eliminates gas leakage in brazed areas M-FS-923	B66-10415	05
<b>LAUNCHING</b> Controlled release device prevents damage from dynamic stresses KSC-66-14	B66-10628	05	Gas leak detector is simple and inexpensive M-FS-1206	B66-10669	01
<b>LC CIRCUIT</b> Multipulse current source offers low power			Orbital tube flaring system produces tubing connectors with zero leakage		

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## LIGHT MODULATOR

M-FS-2016	B67-10019	05	LIDAR		
Visco seal design offers zero-leakage and wear-free characteristics			Precision CW laser automatic tracking system investigated		
WSO-329	B67-10047	05	M-FS-1606	B66-10629	01
Portable detector set discloses helium leak rates			LIFE SUPPORT SYSTEM		
M-FS-1733	B67-10065	01	Computer program analyzes generalized environmental control and life support systems		
Portable fixture facilitates pressure testing of instrumentation fittings			MSC-1157	B67-10415	06
M-FS-2032	B67-10121	03	LIFETIME		
Cryogenic seal remains leaktight during thermal displacement			Flow liner extends operating life of high-angulation bellows		
ARG-96	B67-10134	02	M-FS-12023	B67-10512	05
Cracks in glass electrical connector headers removed by dry blasting with fine abrasive			Honeycomb seal backing ring increases turbopump disk life		
LEWIS-381	B67-10148	03	M-FS-13303	B67-10607	05
Fixture facilitates helium leak testing of pipe welds			LIFT DEVICE		
M-FS-2167	B67-10178	05	Mechanism isolates load weighing cell during lifting of load		
Ultrasonic wrench produces leaktight connections			MSC-297	B66-10071	05
M-FS-12561	B67-10353	05	Simulator effects partial gravity conditions		
Cryogenic seal concept for static and dynamic conditions			MSC-152	B66-10339	05
M-FS-12986	B67-10673	05	Self-actuating grapple automatically engages and releases loads from overhead cranes		
LEAST SQUARES METHOD			ARG-81	B66-10522	05
Numerical least-square method for resolving complex pulse height spectra			Hoist is automatically stopped at low deceleration rate		
GSFC-10142	B67-10480	06	M-FS-1639	B66-10545	05
Automatic design of optical systems by digital computer			Orthopedic stretcher with average-sized person can pass through 18-inch opening		
NPD-10265	B67-10632	06	M-FS-811	B66-10573	05
LEGENDRE POLYNOMIAL			LIGHT		
Computer program ETC improves computation of elastic transfer matrices of Legendre polynomials P/0/ and P/1/			Variable light source with a million-to-one intensity ratio		
NUC-10070	B67-10566	06	JPL-W00-008	B63-10424	03
LEGIBILITY			LIGHT ABSORPTION		
Disk calculator indicates legible lettering size for slide projection			Coded photographic proof paper could serve as convenient densitometer		
GSFC-409	B65-10339	05	M-FS-13374	B67-10443	02
Legibility of electroluminescent instrument panels investigated			LIGHT BULB		
MSC-494	B66-10316	02	Inexpensive infrared source improvised from flashlight		
LENS			M-FS-494	B66-10096	02
Lathe converted for grinding aspheric surfaces			LIGHT EMISSION		
GSFC-115	B63-10556	05	Optical arrangement increases useful light output of semiconductor diodes		
Optical arrangement increases useful light output of semiconductor diodes			JPL-SC-064	B65-10020	05
JPL-SC-064	B65-10020	05	Inexpensive infrared source improvised from flashlight		
Screen of cylindrical lenses produces stereoscopic television pictures			M-FS-494	B66-10096	02
M-FS-273	B66-10086	02	LIGHT INTENSITY		
Circular, explosion-proof lamp provides uniform illumination			Variable light source with a million-to-one intensity ratio		
MSC-382	B66-10156	02	JPL-W00-008	B63-10424	03
Offset lenses add versatility to phototypesetting machine			Nonreciprocal gain control for ring laser		
HQ-9	B66-10173	02	M-FS-14041	B67-10653	02
Panels illuminated by edge-lighted lens technique			LIGHT MODULATOR		
MSC-871	B66-10507	02	Light ray modulation controls optical system alignment		
Electronic filter discriminates between true and false reflections			GSFC-171	B65-10211	02
HQ-55	B67-10071	02	Communication system uses modulated laser beam		
Camera lens adapter magnifies image			GSFC-377	B65-10333	01
M-FS-11955	B67-10431	02	Device to color modulate a stationary light beam gives high intensity		
			HQ-44	B66-10476	01
			Improved design provides faster response time in photomultiplier		
			GSFC-451	B66-10526	01

# LIGHT PROBE

# SUBJECT INDEX

Light-intensity modulator withstands high heat fluxes MSC-246	B66-10532	02	FRC-10017	B67-10549	06
<b>LIGHT PROBE</b>			<b>LIGHTING</b>		
Photoelectric system continuously monitors liquid level M-FS-417	B65-10382	01	Illuminated display panel is easily changed MSC-108	B65-10003	05
<b>LIGHT SCATTERING</b>			<b>LIGHTING EQUIPMENT</b>		
Thin carbon film serves as UV bandpass filter ERC-8	B66-10060	02	Panels illuminated by edge-lighted lens technique MSC-871	B66-10507	02
<b>LIGHT SOURCE</b>			<b>LIGHTWEIGHT</b>		
Fresnel cup reflector directs maximum energy from light source JPL-424	B63-10263	03	Break-up of metal tube makes one-time shock absorber, bars rebound LANGLEY-1A	B63-10304	05
Mirror device aligns machine surface perpendicular to sight lines WOO-5	B63-10421	02	Lightweight magnesium-lithium alloys show promise M-FS-17	B63-10389	03
Variable light source with a million-to-one intensity ratio JPL-WOO-008	B63-10424	03	Comfortable, lightweight safety helmet holds radio transmitter, receiver MSC-53	B64-10015	05
Attachment converts microscope to point source autocollimator JPL-499	B64-10124	05	Aluminum/steel wire composite plates exhibit high tensile strength M-FS-401	B66-10262	05
Electronic device simulates respiration rate and depth MSC-89	B64-10255	01	<b>LIMITER</b>		
Modification increases light output of injection-luminescent diodes M-FS-192	B65-10006	01	Tunnel-diode circuit features zero-level clipping GSFC-241	B65-10002	01
Simple optical system used to align spectrograph LANGLEY-92	B65-10071	02	High-speed square-wave current limiter operates efficiently JPL-SC-073	B65-10233	01
Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01	T-handle wrench has torque-limiting action MSC-280	B66-10065	05
Interferometer combines laser light source and digital counting system MSC-151	B65-10161	01	Hand drill adapter limits holes to desired depth MSC-346	B66-10123	05
Photoresistance analog multiplier has wide range GSFC-360	B65-10287	01	Magnetically operated limit switch has improved reliability, minimizes arcing MSC-422	B66-10270	01
Small, high-intensity flasher permits continuous close-in photography NU-0043	B66-10119	03	Circuit protects regulated power supply against overload current GSFC-453	B66-10292	01
Optical gyro pickoff operates at cryogenic temperatures M-FS-407	B66-10128	01	<b>LINE SHAPE</b>		
Direction indicator system does not require complicated optics WOO-305	B66-10407	01	Parallel line raster eliminates ambiguities in reading timing of pulses less than 500 microseconds apart JPL-805	B66-10386	01
Electrically controlled optical latch and switch requires less current JPL-SC-111	B66-10414	01	<b>LINEAR ARRAY</b>		
Photocell shadowing technique improves light source detector JPL-809	B66-10564	01	Binary sequence detector uses minimum number of decision elements JPL-673	B66-10264	01
Use of color-coded sleeve shutters accelerates oscillograph channel selection KSC-10092	B67-10382	01	<b>LINEAR CIRCUIT</b>		
<b>LIGHT TRANSMISSION</b>			Simple circuit functions as frequency discriminator for PFM signals GSFC-267	B65-10102	01
Borate glass efficiently transmits ultraviolet light ARG-91	B66-10475	03	Diffusion technique stabilizes resistor values MSC-205	B66-10142	01
Blood oxygen saturation determined by transmission spectrophotometry of hemolyzed blood samples MSC-11018	B67-10252	04	Linear signal noise summer accurately determines and controls S/N ratio JPL-SC-152	B66-10433	01
Computer program for optical systems ray tracing			Linear circuit analysis program for IBM 1620 Monitor II, 1311/1443 data processing system /CIRCS/ NPD-10131	B67-10173	06
			General purpose computer programs for numerically analyzing linear ac electrical and electronic circuits for steady-state conditions M-FS-13094	B67-10331	06

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# LIQUID HELIUM

Electronic skewing circuit monitors exact position of object underwater NUC-10146	B67-10629	01	Volumetric system calibrates meters for large flow rates W00-130	B65-10323	05
<b>LINEAR EQUATION</b> Computer subroutine ISUDS accurately solves large system of simultaneous linear algebraic equations NUC-10051	B67-10344	06	System proportions fluid-flow in response to demand signals GSFC-457	B66-10094	01
<b>LINEAR PROGRAMMING</b> Polynomial manipulator AP-168 MSC-1231	B67-10103	01	Segmented ball valve is easy to open and close W00-248	B66-10195	05
Computer program provides linear sampled-data analysis for high order systems M-FS-12821	B67-10287	06	Studies reveal effects of pipe bends on fluid flow cavitation M-FS-516	B66-10228	05
<b>LINEAR SYSTEM</b> Simple circuit provides adjustable voltage with linear temperature variation JPL-W00-029	B63-10537	01	Flow ring valve is simple, quick-acting M-FS-752	B66-10255	05
Voltage generator sweeps oscillator frequency linearly with time M-FS-219	B64-10320	01	Vacuum test fixture improves leakage rate measurements MSC-271	B66-10286	01
Interferometer combines laser light source and digital counting system MSC-151	B65-10161	01	Fiber length and orientation prevent migration in fluid filters M-FS-541	B66-10319	05
General frequency response program calculates frequency response of system, open at any specified element M-FS-12817	B67-10521	06	Diaphragm valve for corrosive and high temperature fluid flow control has unique features LEWIS-304	B66-10365	05
<b>LINEARITY</b> Raster linearity of video cameras calibrated with precision tester GSFC-200	B64-10209	01	High pressure cryogenic liquid flow sight assembly provides streamlined flow for easy observation LEWIS-310	B66-10394	01
Circuit reduces distortion of FM modulator GSFC-257	B65-10152	01	Labyrinth-type valve seat increases valve life by decreasing fluid velocity M-FS-1051	B66-10424	05
Digital voltage-controlled oscillator GSFC-512	B67-10449	01	Miniature valve accurately controls small volume fluid flow ARG-66	B66-10473	05
<b>LINEARIZATION</b> Compact actuator converts rotary to linear motion JPL-786	B66-10265	05	Computer program performs flow analysis through turbines LEWIS-236	B66-10496	01
<b>LINER</b> Flow liner extends operating life of high-angulation bellows M-FS-12023	B67-10512	05	Rotational fluid coupling eliminates hose entanglements MSC-312	B66-10585	05
<b>LINK</b> Electromechanically operated camera shutter provides uniform exposure JPL-357	B63-10227	01	Positive displacement cylinder measures corrosive liquid volume MSC-1038	B66-10589	05
<b>LIQUID</b> Level of super-cold liquids automatically maintained by levelometer JPL-397	B63-10250	01	Cryogenic fluid sampling device permits testing under hazardous conditions M-FS-1927	B66-10654	02
Special pliers connect hose containing liquid under pressure JPL-IT-1003	B63-10291	05	Visco seal design offers zero-leakage and wear-free characteristics WSD-329	B67-10047	05
Tool facilitates sealing of metal fill tubes MSC-24	B63-10519	05	Flow-test device fits into restricted access passages MSC-1078	B67-10074	01
Filler device for handling hot corrosive materials MSC-85	B64-10166	03	Lead plated aluminum ring provides static high pressure seal for large diameter pressure vessel NUC-10008	B67-10539	05
<b>LIQUID FLOW</b> Meter accurately measures flow of low-conductivity fluids JPL-0021	B63-10280	01	<b>LIQUID GAS</b> Complementary system vaporizes subcooled liquid, improves transformer efficiency M-FS-550	B66-10045	02
Fluid check valve has fail-safe feature JPL-0019	B65-10207	05	<b>LIQUID-GAS MIXTURE</b> Centrifugal device separates liquid from gas MSC-282	B65-10394	05
Spiraled channels improve heat transfer between fluids JPL-694	B65-10291	02	<b>LIQUID HELIUM</b> Cryogenic filter method produces super-pure helium and helium isotopes JPL-374	B63-10235	03
			Automatic thermal switch accelerates cooling-down of cryogenic system		

## LIQUID HYDROGEN

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JPL-655	B65-10068	01	fluids LEWIS-322	B66-10392	01
Vacuum chamber provides improved insulation and support for cryostat M-FS-415	B65-10368	02	Flowmeter measures flow rates of high temperature fluids LEWIS-328	B66-10521	01
Resistor monitors transfer of liquid helium LANGLEY-229	B66-10580	01	Crucible cast from beryllium oxide and refractory cement is impervious to flux and molten metal ARG-22	B66-10527	03
Simple pump maintains liquid helium level in cryostat M-FS-1763	B67-10039	05	Two techniques enable sampling of filtered and unfiltered molten metals ARG-150	B67-10034	03
<b>LIQUID HYDROGEN</b>			Substituting gold for silver improves electrical connections M-FS-2390	B67-10228	03
Control system maintains selected liquid level M-FS-470	B66-10039	01	Design for high-temperature /1800 deg F/ liquid metal pressure transducer LEWIS-10144	B67-10458	01
Coating permits use of strain gage in water and liquid hydrogen M-FS-594	B66-10192	01	<b>LIQUID NITROGEN</b>		
Leak locator for vacuum jacketed pipelines eliminates need for removal of outer jacket M-FS-888	B66-10412	01	Helical tube separates nitrogen gas from liquid nitrogen JPL-398	B63-10251	05
In-tank shutoff valve is provided with maximum blast protection M-FS-1529	B66-10514	05	Cryopumping of hydrogen in vacuum chambers is aided by catalytic oxidation of hydrogen LEWIS-15	B63-10340	05
Mixer conditions temperature of liquified gas streams M-FS-1784	B66-10565	02	Mount makes liquid nitrogen-cooled gamma ray detector portable LEWIS-259	B66-10103	01
Liquid hydrogen densitometer utilizes open-ended microwave cavity LEWIS-390	B67-10115	01	Closed loop operation eliminates need for auxiliary gas in high pressure pumping station M-FS-893	B66-10408	05
Thermodynamic properties of saturated liquid parahydrogen charted for important temperature range NUC-10018	B67-10346	03	Technique for stripping Teflon insulated wire M-FS-1774	B67-10048	05
Performance of turbine-type flowmeters in liquid hydrogen LEWIS-10137	B67-10506	01	Concept for cryogenic liquid reclamation system NPO-10322	B67-10420	02
<b>LIQUID INJECTION</b>			Self-aligning rod prevents eccentric loading of tensile specimens NUC-10525	B67-10594	05
Elimination of rocket engine asymmetric loads during tests at sea level M-FS-1730	B66-10674	05	Polystyrene cryostat facilitates testing tensile specimens under liquid nitrogen NUC-10522	B67-10613	01
A method of determining combustion gas flow M-FS-13757	B67-10455	03	Tensile testing grips are easily assembled under liquid nitrogen NUC-10524	B67-10628	01
<b>LIQUID LEVEL</b>			<b>LIQUID OXYGEN /LOX/</b>		
Liquid-level meter has no moving parts M-FS-3	B63-10378	03	Crack detection method is safe in presence of liquid oxygen M-FS-236	B65-10107	01
Oscillator circuit measures liquid level in tanks M-FS-245	B65-10209	01	Surfactant for dye-penetrant inspection is insensitive to liquid oxygen M-FS-475	B66-10131	01
Photoelectric system continuously monitors liquid level M-FS-417	B65-10382	01	Composite gaskets are compatible with liquid oxygen, resist compression set M-FS-455	B66-10395	01
Control system maintains selected liquid level M-FS-470	B66-10039	01	In-tank shutoff valve is provided with maximum blast protection M-FS-1529	B66-10514	01
Device without electrical connections in tank measures liquid level WOO-235	B66-10198	01	Synthesis of various highly halogenated monomers and polymers M-FS-2143	B67-10100	01
Inductive system detects level of conducting fluids LEWIS-322	B66-10392	01	Liquid oxygen ducting cleaned by falling film method M-FS-11816	B67-10299	01
Automatic cryogenic liquid level controller is safe for use near combustible substances LEWIS-195	B66-10482	01	<b>LIQUID PROPELLANT ROCKET ENGINE</b>		
<b>LIQUID MERCURY</b>			Monitoring circuit accurately measures		
Liquid switch is remotely operated by low dc voltage GSFC-119	B63-10599	01			
<b>LIQUID METAL</b>					
Inductive system detects level of conducting					



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## LOADING APPARATUS

movement of solenoid valve M-FS-1829	B66-10568	01	LANGLEY-195	B66-10077	05
<b>LIQUID SODIUM</b> Fluoride coatings make effective lubricants in molten sodium environment LEWIS-229	B66-10005	03	Low-power ring counter drives high-level loads GSFC-431	B66-10106	01
<b>LIQUID-SOLID INTERFACE</b> Computer program MCAP-TOSS calculates steady-state fluid dynamics of coolant in parallel channels and temperature distribution in surrounding heat-generating solid NUC-10042	B67-10456	06	Fatigue tester achieves true axial motion through flex plates and bars NU-0021	B66-10164	01
<b>LITHIUM</b> Process controls introduction of selected impurities into semiconductor wafers GSFC-523	B67-10303	01	Binary fluid amplifier solves stability and load problems ERC-15	B66-10177	01
<b>LITHIUM ALLOY</b> Lightweight magnesium-lithium alloys show promise M-FS-17	B63-10389	03	Pressure-welded flange assembly provides leaktight seal at reduced bolt loads M-FS-640	B66-10247	05
Adherent protective coatings plated on magnesium-lithium alloy M-FS-365	B65-10294	03	Diffusion bonding makes strong seal at flanged connector M-FS-637	B66-10250	05
Coating protects magnesium-lithium alloys against corrosion M-FS-2446	B67-10149	03	Dry film lubricant is effective at extreme loads M-FS-628	B66-10256	03
Magnesium-lithium alloys developed for low temperature use M-FS-1541	B67-10365	03	Pneumatic separator gives quick release to heavy loads KSC-66-10	B66-10294	05
<b>LITHIUM FLUORIDE</b> Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03	Control circuit maintains unity power factor of reactive load MSC-192	B66-10431	01
<b>LITHIUM HYDRIDE</b> Vanadium diaphragm electrode serves as hydrogen diffuser in lithium hydride cell ARG-10048	B67-10499	01	Circuit increases capability of hysteresis synchronous motor MSC-1080	B67-10084	01
<b>LOAD DISTRIBUTION</b> Equations provide tubular information on effects of uniform and variable loads on thin, flat, circular plates ARG-151	B66-10601	05	Web belt load measuring instrument has excellent stability MSC-921	B67-10242	01
Spherical pipe joint delivers loads equally to mating flange M-FS-807	B66-10665	05	Rectilinear display gives acceleration load factor and velocity information MSC-1045	B67-10248	01
Elimination of rocket engine asymmetric loads during tests at sea level M-FS-1730	B66-10674	05	Heavy-gage bonded honeycomb sandwich as primary load-bearing structure M-FS-12060	B67-10427	05
<b>LOAD FACTOR</b> Rapid billet loader aids extrusion of refractory metals LEWIS-50	B63-10354	05	Pump simulator provides variable pressure-flow characteristics LEWIS-10122	B67-10453	05
Ring counter may be advanced or retarded by command signal GSFC-101	B64-10144	01	Computer program provides improved longitudinal response analysis for axisymmetric launch vehicles LANGLEY-10093	B67-10531	06
Circuit improvement produces monostable multivibrator with load-carrying capability GSFC-34A	B65-10011	01	<b>LOAD TEST</b> Study made of procedures for externally loading and corrosion testing stress corrosion specimens M-FS-12064	B67-10451	03
Variable load automatically tests dc power supplies GSFC-291	B65-10105	01	<b>LOADING</b> Self-balancing beam permits safe, easy load handling under overhang M-FS-84	B63-10571	05
Lightweight door seals cryogenic container against diaphragm type loading M-FS-476	B65-10402	05	Circuit controls transients in scr inverters GSFC-120	B63-10600	01
Mechanism isolates load weighing cell during lifting of load MSC-297	B66-10071	05	Buckle joins web straps quickly, adjusts easily LANGLEY-21	B64-10119	05
Plugged hollow shaft makes fatigue-resistant shear pin			Ptc thermistor protects multiloaded power supplies GSFC-236	B64-10281	01
			Self-aligning rod prevents eccentric loading of tensile specimens NUC-10525	B67-10594	05
			<b>LOADING APPARATUS</b> Rapid billet loader aids extrusion of refractory metals LEWIS-50	B63-10354	05

## LOADING RATE

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Friction loading device enables accurate testing of brittle materials NU-0051	B66-10345	05	nanosecond amplifier-discriminator circuit ARG-61	B66-10500	01
Universal transloader moves delicate equipment without stress MSC-654	B66-10384	05	Nixie tube display unit employs time-shared logic ARG-117	B66-10512	01
Self-actuating grapple automatically engages and releases loads from overhead cranes ARG-81	B66-10522	05	One-count memory circuit prevents machine mode interaction ARG-90	B66-10559	01
<b>LOADING RATE</b> Shock absorber operates over wide range MSC-168	B65-10241	05	Fluid logic control circuit operates nutator actuator motor LEWIS-294	B66-10593	05
Single-source mechanical loading system produces biaxial stresses in cylinders M-FS-12530	B67-10380	05	Logic circuitry used to automatically test shielded cables HQ-60	B66-10659	01
<b>LOG PERIODIC ANTENNA</b> Antenna configurations provide polarization diversity GSFC-74	B66-10066	01	Solid state circuit averages multiple signals and rejects those varying significantly from the average NUC-10066	B67-10262	01
<b>LOGARITHM</b> Logarithmic amplifier uses field effect transistors JPL-509	B65-10145	01	Current steering commutator offers versatility JPL-812	B67-10410	01
SiC/Si diode trigger circuit provides automatic range switching for log amplifier M-FS-1879	B67-10314	01	Logic circuit detects both present and missing negative pulses in superimposed wavetrains M-FS-12518	B67-10565	01
Study of corrosion of 1100 aluminum ARG-10045	B67-10578	03	<b>LOGIC NETWORK</b> Logic system aids in evaluation of project readiness MSC-753	B66-10457	05
<b>LOGIC</b> Binary counter uses fluid logic elements M-FS-323	B65-10377	01	<b>LONG RANGE</b> Probabilistic approach to long range planning of manpower MSC-11524	B67-10510	06
Binary counter accumulates time by complementary preset MSC-242	B65-10399	01	<b>LONGITUDE</b> GMT/local-time conversion chart GSFC-10521	B67-10548	01
<b>LOGIC CIRCUIT</b> Frequency-shift-keyer circuit improves PCM conversion for radio transmission GSFC-80	B63-10511	01	<b>LOOP</b> Bandwidth switching is transient-free, avoids loss of loop lock W00-054	B64-10349	01
Computer circuit will fit on single silicon chip JPL-513	B63-10514	01	Circuit measures hysteresis loop areas at 30 Hz M-FS-13069	B67-10519	01
Digital logic elements provide additional functions from analog input MSC-64	B64-10064	01	General frequency response program calculates frequency response of system, open at any specified element M-FS-12817	B67-10521	06
Ring counter may be advanced or retarded by command signal GSFC-101	B64-10144	01	<b>LOW DENSITY GAS</b> Fluorocarbon seal replaces metal piston ring in low density gas environment LEWIS-10277	B67-10591	05
Novel circuit combines pulse stretcher with nor gate GSFC-187	B64-10150	01	<b>LOW FREQUENCY</b> New low level ac amplifier provides adjustable noise cancellation and automatic temperature compensation ARC-2	B63-10003	04
Logic circuit exhibits optimum performance LANGLEY-129	B65-10193	01	High-pass RF coaxial filter rejects dc and low frequency signals GSFC-73	B64-10173	01
Delayed ripple counter simplifies square-root computation GSFC-398	B65-10343	01	<b>LOW PASS FILTER</b> Computer determines high-frequency phase stability GSFC-113	B63-10555	01
Simple circuit performs binary addition and subtraction GSFC-399	B65-10355	01	<b>LOW POWER</b> Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss LEWIS-39	B63-10342	01
Queuing register uses fluid logic elements M-FS-317	B66-10100	05	<b>LOW TEMPERATURE BRAZING</b> Coating method enables low-temperature brazing of stainless steel		
Exclusive-or logic circuit has useful properties LANGLEY-214	B66-10272	01			
Bipolar current driver for memory circuits GSFC-213	B66-10469	01			
Digital system provides superregulation of					

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# MACHINE TOOL

NU-0030	B65-10250	03	LUNAR GRAVITATIONAL EFFECT		
			Technique simulates effect of reduced gravity	B64-10146	04
			LANGLEY-44		
LOW TEMPERATURE ENVIRONMENT			LUNAR ORBIT		
Gallium useful bearing lubricant in high-vacuum environment	B63-10337	03	Computer program determines thermal environment and temperature history of lunar orbiting space vehicles	B67-10307	06
LEWIS-12			M-FS-12916		
New weldable high strength aluminum alloy developed for cryogenic service	B66-10613	05	LUNAR SPACECRAFT		
M-FS-737			Three-axis attitude and direction reference instrument has only one moving part	B66-10644	01
Cold solid propellant motor has stop-restart capability	B66-10673	03	M-FS-1819		
JPL-836			Computer program determines thermal environment and temperature history of lunar orbiting space vehicles	B67-10307	06
JPL-836			M-FS-12916		
LOW TEMPERATURE PHYSICS			LUNAR SURFACE		
Development of low temperature battery	B67-10546	01	Development of lunar drill to take core samples to 100-foot depths	B67-10529	05
LEWIS-10326			M-FS-13015		
LUBRICANT			LUNG		
Gallium useful bearing lubricant in high-vacuum environment	B63-10337	03	Device induces lungs to maintain known constant pressure	B64-10108	04
LEWIS-12			MSC-50		
Molybdenum disulfide mixtures make effective high-vacuum lubricants	B63-10453	03			
M-FS-54					
Burnishing technique improves lubrication of threaded fasteners	B65-10302	03			
LEWIS-217					
Unique gear design provides self-lubrication	B65-10366	03			
JPL-SC-079					
Gallium alloy films investigated for use as boundary lubricants	B66-10165	03			
LEWIS-245					
Dry film lubricant is effective at extreme loads	B66-10256	03			
M-FS-628					
Copper-acrylic enamel serves as lubricant for cold drawing of refractory metals	B66-10471	05			
ARG-54					
Tester for study of rolling element bearings	B67-10009	01			
LEWIS-305					
LUBRICATING OIL					
Ohmmeter senses depletion of lubricant in journal bearings	B64-10042	01			
LEWIS-37					
Radioactive tracer system detects oil contaminants in fluid lines	B66-10090	03			
M-FS-512					
LUBRICATION					
Gate valve with ceramic-coated base operates at high temperatures	B63-10562	03			
ARC-23					
LUBRICATION SYSTEM					
Miniature bearings lubricated by sonic dispersion method	B65-10106	03			
M-FS-202					
LUBRICATION TESTING MACHINE					
Machine tests slow-speed sliding friction in high vacuum	B67-10379	05			
M-FS-12341					
LUMINOUS INTENSITY					
Light-intensity modulator withstands high heat fluxes	B66-10532	02			
MSC-246					
LUNAR CINEMATOGRAPHY					
Subminiature deflection circuit operates integrated sweep circuits in TV camera	B67-10155	01			
MSC-1263					
LUNAR COMPOSITION					
Development of lunar drill to take core samples to 100-foot depths	B67-10529	05			
M-FS-13015					

M-FS-1084	B66-10411	05	Coating protects magnesium-lithium alloys against corrosion		
Flexible drive allows blind machining and welding in hard-to-reach areas			M-FS-2446	B67-10149	03
MSC-524	B66-10428	05	Magnesium-lithium alloys developed for low temperature use		
			M-FS-1541	B67-10365	03
<b>MACHINING</b>			<b>MAGNESIUM CELL</b>		
Metal-bending brake facilitates lightweight, close-tolerance fabrication			Development of low temperature battery		
ARC-29	B64-10069	05	LEWIS-10326	B67-10546	01
Micromachining produces optical apertures to micron dimensions			<b>MAGNESIUM-LITHIUM ALLOY</b>		
GSFC-206	B64-10211	05	Adherent protective coatings plated on magnesium-lithium alloy		
Lathe attachment used to machine elliptical cones			M-FS-365	B65-10294	03
MSC-100	B65-10168	05	<b>MAGNET</b>		
Calibrated clamp facilitates pressure application			Unmanned seismometer levels self, corrects drift errors		
MSC-298	B66-10059	05	GSFC-100	B63-10551	01
Modified soldering iron speeds cutting of synthetic materials			Ball bearing used in design of rugged flow-meter		
M-FS-725	B66-10246	05	LEWIS-159	B64-10170	05
Mill profiler machines soft materials accurately			<b>MAGNETIC AMPLIFIER</b>		
M-FS-692	B66-10254	05	High power dc/dc and dc/ac electrical power conversion techniques developed		
Fixed vacuum plate clamps styrofoam for machining			M-FS-13227	B67-10390	01
M-FS-683	B66-10283	05	<b>MAGNETIC CIRCUIT</b>		
Swiveling lathe jaw concept for holding irregular pieces			Transfluxor circuit amplifies sensing current for computer memories		
M-FS-783	B66-10321	05	JPL-406	B63-10255	01
Internal machining accomplished at constant radii			Variable frequency transistor inverters use multiple core transformers		
M-FS-1573	B66-10546	05	GSFC-183	B65-10119	01
Traveling wire electrode increases productivity of electrical discharge machining /EDM/ equipment			Magnetic-shift-register circuit controls step motor operations		
ARG-136	B67-10238	05	GSFC-340	B65-10226	01
Machining heavy plastic sections			Magnetically operated limit switch has improved reliability, minimizes arcing		
M-FS-12720	B67-10381	03	MSC-422	B66-10270	01
Standard surface grinder for precision machining of thin-wall tubing			<b>MAGNETIC COIL</b>		
ARG-10014	B67-10400	05	Calculations enable optimum design of magnetic brake		
Proposed method of rotary dynamic balancing by laser			LEWIS-251	B66-10073	05
M-FS-12422	B67-10452	02	<b>MAGNETIC CONTROL</b>		
<b>MACROMOLECULE</b>			Magnetic fluid readily controlled in zero gravity environment		
Large volume continuous counterflow dialyzer has high efficiency			LEWIS-126	B65-10335	03
HQ-10055	B67-10395	04	<b>MAGNETIC CORE</b>		
<b>MAGNESIUM</b>			Transfluxor circuit amplifies sensing current for computer memories		
New method forms bond line free of voids			JPL-406	B63-10255	01
LANGLEY-20	B63-10558	05	New sintering process adjusts magnetic value of ferrite cores		
Vapor condensation process produces slurry of magnesium particles in liquid hydrocarbons			GSFC-129	B63-10606	01
LEWIS-263	B66-10104	03	Blocking oscillator uses low triggering voltage		
Magnesium-zinc reduction is effective in preparation of metals			MSC-58	B64-10017	01
ARG-10050	B67-10579	03	Molded elastomer provides compact ferrite-core holder, simplifies assembly		
Fogging technique used to coat magnesium with plastic			JPL-584	B64-10084	05
LEWIS-10316	B67-10584	03	Circuit detects errors in address currents for magnetic core arrays		
<b>MAGNESIUM ALLOY</b>			M-FS-234	B65-10047	01
Lightweight magnesium-lithium alloys show promise			Improved magnetometer uses toroidal gating coil		
M-FS-17	B63-10389	03	GSFC-249	B65-10103	01
Adherent protective coatings plated on magnesium-lithium alloy			Analog-to-digital converter has increased reliability and reduced power consumption		
M-FS-365	B65-10294	03	GSFC-246	B65-10194	01
			Digital system detects binary code patterns containing errors		

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# MAGNETIC TAPE RECORDER

GSFC-541	B66-10516	01	<b>MAGNETIC INSTRUMENT</b> Variable frequency magnetic multivibrator generates stable square-wave output GSFC-AE-21	B65-10124	01
High transients suppressed in electromagnetic devices KSC-66-13	B67-10031	01	Optical output enhances flowmeter accuracy M-FS-482	B65-10395	02
Variable reluctance switch avoids contact corrosion and contact bounce MSC-1178	B67-10137	01	<b>MAGNETIC MATERIAL</b> Flexible magnetic planning boards are easily transported M-FS-340	B65-10219	05
Multiplexing control device enables handling of wide variations in sampling rates M-FS-1871	B67-10150	01	<b>MAGNETIC MEMORY</b> Transfluxor circuit amplifies sensing current for computer memories JPL-406	B63-10255	01
Computer memory access technique NPO-10201	B67-10585	01	Multipulse current source offers low power losses and high reliability LANGLEY-68	B67-10603	01
Multipulse current source offers low power losses and high reliability LANGLEY-68	B67-10603	01	<b>MAGNETIC MOMENT</b> Neutron diffractometer allows both magnetic and crystallographic analyses ARG-191	B67-10131	02
<b>MAGNETIC DOMAIN</b> Simplified technique demonstrates magnetic domain switching M-FS-13153	B67-10342	02	<b>MAGNETIC PROPERTY</b> Process yield Co-Fe alloys with superior high temperature magnetic properties LEWIS-333	B66-10535	03
<b>MAGNETIC EFFECT</b> Variable-capacitance tachometer eliminates troublesome magnetic fields GSFC-435	B66-10126	01	<b>MAGNETIC PUMPING</b> Rotating magnetic poles used to pump mercury LEWIS-276	B66-10434	05
<b>MAGNETIC FIELD</b> Supercold technique duplicates magnetic field in second superconductor JPL-376	B63-10237	05	<b>MAGNETIC RESONANCE</b> Magnetometer measures orthogonal components of magnetic fields GSFC-395	B65-10315	01
Shaped superconductor cylinder retains intense magnetic field JPL-381	B63-10238	01	<b>MAGNETIC SHIELDING</b> Electron beam welding of copper-MONEL facilitated by circular magnetic shields M-FS-569	B66-10215	05
Explosives actuate nonmagnetic indexing device GSFC-237	B65-10017	05	<b>MAGNETIC TAPE</b> Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01
Magnetic field controls carbon arc tail flame MSC-139	B65-10108	01	Metal strip forms 21 foot boom, rolls up for compact storage GSFC-151	B64-10011	05
High permeability semiconductors permit close-tolerance soldering GSFC-319	B65-10134	05	Compact cartridge drives coded tape at constant readout speed JPL-472	B64-10222	01
Density trace made with computer printout GSFC-322	B65-10200	01	Data retrieval system provides unlimited hardware design information MSC-1144	B67-10170	01
Superconductor shields test chamber from ambient magnetic fields JPL-627	B65-10297	02	Computer program generates averaged value data tapes M-FS-12728	B67-10411	06
Magnetometer measures orthogonal components of magnetic fields GSFC-395	B65-10315	01	Technique for measuring magnetic tape interlayer adhesion NPO-10011	B67-10417	03
Solenoid magnetic fields calculated from superposed semi-infinite solenoids LEWIS-184	B66-10490	01	Device measures static friction of magnetic tape GSFC-10360	B67-10586	03
Study of yttrium iron garnet rods reveals new magnetostatic echo mode ERC-37	B67-10153	01	Conceptual servo technique for controlling tape drivers M-FS-12955	B67-10595	01
<b>MAGNETIC FIELD COIL</b> Magnetic field test coils are temperature compensated GSFC-294	B65-10081	02	<b>MAGNETIC TAPE RECORDER</b> Small digital recording head has parallel bit channels, minimizes cross talk JPL-0029	B63-10284	01
<b>MAGNETIC FIELD DISTURBANCE</b> Low input voltage converter/regulator minimizes external disturbances GSFC-527	B66-10689	01	Circuit converts AM signals to FM for magnetic recording GSFC-227	B65-10001	01
<b>MAGNETIC FIELD INTENSITY</b> Shaped superconductor cylinder retains intense magnetic field JPL-381	B63-10238	01	PCM magnetic tape system efficiently records		
Niobium thin films are superconductive in strong magnetic fields at low temperatures JPL-SC-174	B66-10122	02			

## MAGNETISM

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and reproduces data GSFC-375	B65-10311	01	Collar positions strip stock used to form coil on mandrel JPL-198	B65-10130	05
An improved magnetic tape recorder GSFC-08259	B67-10646	01	Metal bellows custom-fabricated from tubing LEWIS-192	B65-10150	05
Scan rate converter for tape recording and playback of TV pictures NPO-10166	B67-10676	01	Rotating mandrel speeds assembly of plastic inflatables LANGLEY-155	B66-10137	05
<b>MAGNETISM</b> Setting of angles on machine tools speeded by magnetic protractor ARC-5	B63-10006	01	Special mandrel permits uniform welding of out-of-round tubing M-FS-706	B66-10323	05
Residual magnetism holds solenoid armature in desired position LEWIS-343	B67-10038	01	Ductile mandrel and parting compound facilitate tube drawing ARG-43	B66-10571	05
<b>MAGNETOHYDRODYNAMIC ACCELERATION</b> Segmented electrode increases operating pressure of MHD accelerator LANGLEY-95	B65-10356	02	Porous mandrels provide uniform deformation in hydrostatic powder metallurgy M-FS-1972	B67-10209	03
<b>MAGNETOHYDRODYNAMIC GENERATOR</b> Wire winding increases lifetime of oxide- coated cathodes LEWIS-154	B65-10032	03	<b>MANGANESE</b> Sodium perxenate permits rapid oxidation of manganese for easy spectrophotometric determination ARG-262	B67-10421	03
<b>MAGNETOMETER</b> Improved magnetometer uses toroidal gating coil GSFC-249	B65-10103	01	<b>MANGANESE COMPOUND</b> Development of Curie point switching for thin film, random access, memory device NPO-10402	B67-10633	02
Magnetometer measures orthogonal components of magnetic fields GSFC-395	B65-10315	01	<b>MANIFOLD</b> Heated die facilitates tungsten forming LEWIS-25A	B66-10047	05
Thermal motor positions magnetometer sensors ARC-51	B66-10078	05	Combustion chamber inlet manifold separates vapor from liquid M-FS-531	B66-10052	05
<b>MAGNETORESISTANCE</b> Magnetoresistor monitors relay performance M-FS-1754	B66-10650	01	Inflatable holding fixture permits X-rays to be taken of inner weld areas M-FS-856	B66-10327	03
<b>MAGNETRON</b> Ion pump provides increased vacuum pumping speed NEO-13	B65-10239	02	Welds chilled by liquid coolant manifold M-FS-679	B66-10354	05
<b>MAINTENANCE</b> Magnetic field controls carbon arc tail flame MSC-139	B65-10108	01	Brazing retort manifold design concept may minimize air contamination and enhance uniform gas flow M-FS-707	B66-10371	05
Interior servicing platform simplifies maintenance of storage tanks M-FS-1300	B66-10425	05	Elimination of rocket engine asymmetric loads during tests at sea level M-FS-1730	B66-10674	05
<b>MAJORITY CARRIER</b> Logic realization of simple majority voting connectives JPL-727	B67-10511	06	<b>MANOMETER</b> Fluid-pressure measurement apparatus uses short-length manometer tubes LEWIS-28	B65-10027	05
<b>MANAGEMENT</b> System automatically provides dynamic launch decision criteria M-FS-13063	B67-10363	01	Ultraminiature manometer-tipped cardiac catheter ARC-10054	B67-10669	01
<b>MANAGEMENT PLANNING</b> GREMEX-A new management training concept GSFC-574	B67-10092	01	<b>MANPOWER</b> Probabilistic approach to long range planning of manpower MSC-11524	B67-10510	06
Vis-A-Plan /visualize a plan/ management technique provides performance-time scale KSC-10073	B67-10240	06	<b>MANUAL</b> Workmanship standards for fusion welding NUC-10050	B67-10200	05
KOPE /Kalendar Oriented Program Efforts/ provides data for management decisions M-FS-12331	B67-10478	06	Pocket-size manual tape reader device aids computer tape checking KSC-10058	B67-10361	01
Probabilistic approach to long range planning of manpower MSC-11524	B67-10510	06	<b>MANUAL CONTROL</b> Heavy-duty staple remover operated by hand JPL-IT-1004	B63-10292	05
<b>MANDREL</b> Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns ARC-7	B63-10008	05	Knob linkage permits one-hand control of several operations MSC-30	B65-10022	05

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## MATRIX

Handtool facilitates extraction of circuit modules LANGLEY-38	B65-10231	05	Multiple test chamber exposes materials to various environments MSC-179	B65-10268	01
Manual-feed adapter permits microfilming of continuous oscillograph output NU-0029	B65-10249	01	Hot-wire detector for chemically active materials used in gas chromatography MSC-269	B66-10139	03
Rack mount device quickly inserts or extracts chassis units MSC-244	B65-10385	05	Simple technique determines ac properties of hard superconductive materials M-FS-1818	B66-10657	02
Fingertip current control facilitates use of arc welding gun MSC-289	B66-10092	05	Evaluation of high temperature stranded hookup wire M-FS-2478	B67-10122	03
Safety switch permits emergency bridge crane shutdown M-FS-549	B66-10168	05	Study made of dielectric properties of promising materials for cryogenic capacitors M-FS-13620	B67-10366	03
<b>MANUFACTURING</b>			Material fatigue data obtained by card-programmed hydraulic loading system LANGLEY-10042	B67-10491	03
Bellows design features low spring rate and long life MSC-521	B66-10190	05	<b>MATERIALS SCIENCE</b>		
Computerized parts list system coordinates engineering releases, parts control, and manufacturing planning NUC-10073	B67-10348	06	Development of technology for hot-drape forming of large torus sections M-FS-12141	B67-10341	05
<b>MAPPING</b>			<b>MATHEMATICAL MODEL</b>		
Photoelectric scanner makes detailed work function maps of metal surface JPL-SC-176	B66-10440	01	Analysis of dynamic systems with DAP4H computer program M-FS-13999	B67-10523	06
Movable RF probe eliminates need for calibration in plasma accelerators LEWIS-10127	B67-10362	01	Propellant tank pressurization analysis program M-FS-1506	B67-10625	06
<b>MASER</b>			<b>MATHEMATICAL TABLE</b>		
Parametric up-converter increases flexibility of maser KSC-67-98	B67-10104	01	Equations provide tubular information on effects of uniform and variable loads on thin, flat, circular plates ARG-151	B66-10601	05
Apparatus makes klystron operating frequency adjustable from remote point NPO-09831	B67-10514	01	<b>MATHEMATICS</b>		
<b>MASER OUTPUT</b>			Calculations enable optimum design of magnetic brake LEWIS-251	B66-10073	05
Highly stable microwave delay line NPO-09828	B67-10642	01	New computer system simplifies programming of mathematical equations M-FS-441	B66-10361	01
<b>MASKING</b>			Minimum permissible leakage resistance established for instrumentation systems M-FS-848	B66-10397	01
Reusable neoprene jacket protects parts for chemical milling WOO-071	B65-10179	03	Mathematical relation predicts achievable densities of compacted particles ARG-10082	B67-10592	03
<b>MASS</b>			Analytical drafting curves provide exact equations for plotted data LANGLEY-285	B67-10601	02
System precisely controls oscillation of vibrating mass M-FS-1875	B67-10276	01	<b>MATHEMATICS /GEN/</b>		
<b>MASS SPECTROMETER</b>			Mechanical properties of plastics predetermined by empirical method ARC-28	B64-10068	03
Highly sensitive solids mass spectrometer uses inert-gas ion source ERC-11	B66-10114	02	Delayed ripple counter simplifies square-root computation GSFC-398	B65-10343	01
Submicron holes in thin films increase sampling range of mass spectrometers JPL-SC-097	B66-10380	03	<b>MATRIX</b>		
<b>MASS SPECTRUM</b>			New class of thermosetting plastics has improved strength, thermal and chemical stability LEWIS-10108	B67-10197	03
Highly sensitive solids mass spectrometer uses inert-gas ion source ERC-11	B66-10114	02	Composite solar cell matrix is reliable, lightweight and flexible NPO-10821	B67-10503	01
<b>MATERIAL REMOVAL</b>			Study made of mechanics of deformation and fracture of fibrous composites HQ-10035	B67-10660	03
Electrochemical milling removes burrs and solder from tubing ends M-FS-714	B66-10358	03			
Technique for stripping Teflon insulated wire M-FS-1774	B67-10048	05			
<b>MATERIAL TESTING</b>					
Graphite element serves as radiant heat source M-FS-105	B65-10218	01			

## MATRIX ANALYSIS

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Computer program /P1-GAS/ calculates the P-0 and P-1 transfer matrices for neutron moderation in a monatomic gas NUC-10141	B67-10678	06	Device enables measurement of moments of inertia about three axes GSFC-49	B65-10176	05
<b>MATRIX ANALYSIS</b> Structural Analysis and Matrix Interpretive System /SAMIS/ NPD-10130	B67-10171	01	Sensitive electrometer features digital output GSFC-288	B65-10206	01
<b>MCLEOD GAUGE</b> Baking enables McLeod gauge to measure in ultrahigh vacuum range GSFC-440	B65-10329	01	Oscillator circuit measures liquid level in tanks M-FS-245	B65-10209	01
Modified McLeod gage records automatically LEWIS-290	B66-10290	02	Multiaxial analyzer detects low-energy electrons GSFC-329	B65-10213	01
Modified McLeod pressure gage eliminates measurement errors ARC-62	B66-10481	01	Instrument accurately measures extremely low air densities M-FS-193	B65-10221	01
<b>MEASURES</b> Oil-smeared models aid wind tunnel measurements LANGLEY-4	B63-10311	03	Servo calorimeter measures material heating rate NU-0024	B65-10247	01
Ultra-sensitive transducer advances micro-measurement range ARC-26	B64-10004	01	Differential pressure gauge has fast response M-FS-358	B65-10285	05
Corrosion of metal samples rapidly measured NU-0041	B66-10140	03	Coaxial capacitor used to determine fluid density LEWIS-232	B65-10296	02
<b>MEASURING APPARATUS</b> Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01	Remote rapidly varying pressures accurately measured FRC-28	B65-10301	01
Ultra-sensitive transducer advances micro-measurement range ARC-26	B64-10004	01	Improved strain-wire flowmeter has fast response time LEWIS-241	B65-10304	01
Improved insertion-loss tester JPL-358	B64-10080	01	Electronic ampere-hour integrator is accurate to one percent GSFC-203	B65-10308	01
Apparatus measures concentration of suspended droplets in gas streams LANGLEY-31	B64-10237	01	Air brake-dynamometer accurately measures torque LEWIS-163	B65-10312	05
Gage measures electrical connector pin retention force JPL-SC-071	B65-10034	03	Magnetometer measures orthogonal components of magnetic fields GSFC-395	B65-10315	01
Ionization vacuum gage starts quickly, is unaffected by spurious currents JPL-304	B65-10036	02	Direct force-measuring transducer used in blood pressure research ARC-53	B65-10325	01
Metal diaphragm used to calibrate miniature transducers M-FS-207	B65-10059	01	Rough surface improves stability of air-sounding balloons M-FS-320	B65-10326	05
Device measures curved surface finish on gear teeth WOO-112	B65-10064	05	Baking enables McLeod gauge to measure in ultrahigh vacuum range GSFC-440	B65-10329	01
Sensitive level sensor made with spirit level, gives electrical output LANGLEY-49	B65-10067	01	Wedge immersed thermistor bolometer measures infrared radiation GSFC-443	B65-10330	02
System measures angular displacement without contact LANGLEY-46	B65-10073	01	Vibrating diaphragm measures high electrostatic field strengths MSC-189	B65-10352	01
Transducer senses displacements of panels subjected to vibration ARC-37	B65-10085	01	Three-dimensional wire-mesh capacitor system measures fluid density WOO-194	B65-10379	01
Apparatus measures swelling of membranes in electrochemical cells GSFC-280	B65-10087	01	Photoelectric system continuously monitors liquid level M-FS-417	B65-10382	01
Microwave technique measures plasma characteristics LANGLEY-134	B65-10122	02	Special mount improves remote transducer accuracy LEWIS-269	B66-10021	01
System measures unidirectional forces, excludes extraneous forces LEWIS-170	B65-10154	05	Flowmeter measures low gas-flow rates M-FS-215	B66-10036	01
			Cold cathode ionization gauge has rigid metal housing GSFC-445	B66-10041	01



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# MEASURING APPARATUS

Improved electrode paste provides reliable measurement of galvanic skin response MSC-146	B66-10049	04	JPL-SC-177	B66-10444	01
Ferroelectric bolometer measures RF absolute power at submillimeter wavelengths GSFC-422	B66-10051	01	Indicator system provides complete data of engine cylinder pressure variation LEWIS-291	B66-10470	05
Calorimeter accurately measures thermal radiation energy LANGLEY-173	B66-10058	02	Spiral spring/strain gage combination accurately measures shock induced deflection MSC-789	B66-10488	01
Transmission system isolates pressure transducer from severe environment WOO-239	B66-10064	01	Gage tests tube flares quickly and accurately KSC-66-19	B66-10537	05
Angular acceleration measured by deflection in sensing ring MSC-250	B66-10105	01	Device accurately measures and records low gas-flow rates M-FS-1077	B66-10569	01
Mechanism continuously measures static and dynamic cable loads MSC-217	B66-10107	05	Positive displacement cylinder measures corrosive liquid volume MSC-1038	B66-10589	05
Variable-capacitance tachometer eliminates troublesome magnetic fields GSFC-435	B66-10126	01	Sensors measure surface ablation rate of reentry vehicle heat shield LANGLEY-287	B66-10592	01
Apparatus measures thermal conductivity of honeycomb-core panels LANGLEY-202	B66-10127	01	Instrument accurately measures small temperature changes on test surface LANGLEY-174	B66-10637	01
Sextant measures spacecraft altitude without gravitational reference MSC-200	B66-10143	02	Magnetoresistor monitors relay performance M-FS-1754	B66-10650	01
Extendable mast used in one shot soil penetrometer JPL-685	B66-10146	05	Rocket engine vibration accurately measured by photography M-FS-1916	B66-10652	02
Improved system measures output energy of pyrotechnic devices WOO-256	B66-10159	01	Slide rule-type color chart predicts reproduced photo tones MSC-1227	B66-10680	01
Transducer measures force in vacuum environment LEWIS-218	B66-10161	01	Mechanical device accurately measures RF phase differences in VHF or UHF ranges M-FS-1738	B66-10694	05
Coating permits use of strain gage in water and liquid hydrogen M-FS-594	B66-10192	01	New electrolyte may increase life of polarographic oxygen sensors MSC-1049	B67-10003	03
Segmented ball valve is easy to open and close WOO-248	B66-10195	05	Crystal microbalance measures condensable molecular fluxes JPL-845	B67-10012	03
Device without electrical connections in tank measures liquid level WOO-235	B66-10198	01	Absolute viscosity measured using instrumented parallel plate system JPL-874	B67-10041	01
Hand tool permits shrink sizing of assembled tubing MSC-504	B66-10239	05	Instrument continuously measures density of flowing fluids LEWIS-309	B67-10080	01
Strain gage network distinguishes between thermal and mechanical deformations GSFC-478	B66-10280	01	Fatigue zones in metals identified by polarized light photography WOO-286	B67-10082	02
Extensometer automatically measures elongation in elastomers M-FS-517	B66-10284	05	Web belt load measuring instrument has excellent stability MSC-921	B67-10242	01
Vacuum test fixture improves leakage rate measurements MSC-271	B66-10286	01	Vibration analysis utilizing Mossbauer effect M-FS-11974	B67-10339	01
Dielectrometer design permits measurement in vacuum under irradiation M-FS-359	B66-10401	01	Cut-through tester accurately measures insulation failure rates M-FS-12506	B67-10354	03
Plant respirometer enables high resolution of oxygen consumption rates HQ-47	B66-10406	04	Machine tests slow-speed sliding friction in high vacuum M-FS-12341	B67-10379	05
Ion chambers simplify absolute intensity measurements in the vacuum ultraviolet ERC-10	B66-10439	01	Crack growth measured on flat and curved surfaces at cryogenic temperatures LEWIS-389	B67-10384	01
Thermionic scanner pinpoints work function of emitter surfaces			Transistor **H** parameter conversion slide rule JPL-649	B67-10561	01

Instrument accurately measures weld angle and offset M-FS-12849	B67-10563	05	MECHANIZATION		
Device measures static friction of magnetic tape GSFC-10360	B67-10586	03	Mechanizes X-ray inspection system for large tanks M-FS-12867	B67-10564	02
Neutron detector simultaneously measures fluence and dose equivalent ARG-10071	B67-10597	02	MEDICAL ELECTRONICS		
Areas of irregular, discontinuous patterns rapidly and accurately measured GSFC-10184	B67-10674	01	Phonocardiograph system monitors heart sounds MSC-185	B66-10154	04
MECHANICAL DRAWING			MEDICAL EQUIPMENT		
Built-in templates speed up process for making accurate models LANGLEY-23	B63-10526	05	Tiny biomedical amplifier combines high performance, low power drain ARC-41	B65-10203	01
Use of photographs speeds inspection of printed-circuit boards MSC-72	B64-10118	01	Computer circuit calculates cardiac output MSC-274	B66-10006	01
Instrument transmits vanishing point to illustration point MSC-267A	B66-10324	01	Orthopedic stretcher with average-sized person can pass through 18-inch opening M-FS-811	B66-10573	05
Concept for modifying drafting instruments to minimize smearing KSC-10056	B67-10283	05	Modified algometer provides accurate depth measurements MSC-616	B66-10647	04
MECHANICAL PROPERTY			Adjustable hinge permits movement of knee in plaster cast M-FS-1756	B67-10056	04
Mechanical properties of plastics predetermined by empirical method ARC-28	B64-10068	03	Ultrasonic hand tool allows convenient diagnostic scanning of bone integrity M-FS-14102	B67-10486	02
Weldable aluminum alloy has improved mechanical properties M-FS-295	B66-10445	03	MELTING POINT		
Mechanical properties of wire insulation automatically determined MSC-10983	B67-10370	01	Integral coolant channels simply made by melt-out method M-FS-91	B63-10497	05
Study made of ductility limitations of aluminum-silicon alloys M-FS-12524	B67-10392	03	MEMORY		
Study made of acoustical monitoring for mechanical checkout M-FS-13372	B67-10430	02	Bipolar current driver for memory circuits GSFC-213	B66-10469	01
MECHANICAL SYSTEM			MEMORY STORAGE UNIT		
Electromechanically operated camera shutter provides uniform exposure JPL-357	B63-10227	01	Circuit detects errors in address currents for magnetic core arrays M-FS-234	B65-10047	01
Multiple test tubes stirred mechanically ARC-42	B65-10120	01	Improved wire memory matrix uses very little power JPL-SC-167	B65-10359	01
Concept of planetary gear system to control fluid mixture ratio M-FS-1785	B66-10477	05	One-count memory circuit prevents machine mode interaction ARG-90	B66-10559	01
Analytical technique permits comparison of reliability of alternate mechanical designs NUC-10065	B67-10261	06	Mosfet analog memory circuit achieves long duration signal storage M-FS-860	B66-10603	01
Single-source mechanical loading system produces biaxial stresses in cylinders M-FS-12530	B67-10380	05	Improved memory word line configuration allows high storage density GSFC-559	B66-10617	01
Rolamite - a new mechanical design concept SAN-10001	B67-10611	05	Computer memory access technique NPD-10201	B67-10585	01
MECHANISM			Development of Curie point switching for thin film, random access, memory device NPD-10402	B67-10633	02
Simple mechanism combines positive locking and quick-release features WOO-4	B63-10420	05	MERCURY /METAL/		
Latching mechanism operates in limited access area MSC-230	B66-10338	05	Liquid switch is remotely operated by low dc voltage GSFC-119	B63-10599	01
Mechanical properties of wire insulation automatically determined MSC-10983	B67-10370	01	Oil-damped mercury pool makes precise optical alignment tool GSFC-353	B65-10253	02
			Flowmeter measures low gas-flow rates M-FS-215	B66-10036	01
			Rotating magnetic poles used to pump mercury LEWIS-276	B66-10434	05
			MERCURY ARC		
			Emission tester for high-power vacuum tubes JPL-628	B64-10158	01

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# METAL FORMING

## MERCURY LIGHT

Igniting system for mercury vapor lamps protects transistorized sustaining supply  
JPL-421 B63-10262 01

High-intensity flashing beacon powered by mercury cells  
LANGLEY-80 B65-10361 01

## MERCURY VAPOR

Igniting system for mercury vapor lamps protects transistorized sustaining supply  
JPL-421 B63-10262 01

## METABOLISM

Study made of relationship between growth and metabolism  
ARG-10046 B67-10604 04

## METAL

High purity electroforming yields superior metal models  
ARC-6 B63-10007 05

Packless valve with all-metal seal handles wide temperature, pressure range  
JPL-361 B63-10228 05

Break-up of metal tube makes one-time shock absorber, bars rebound  
LANGLEY-1A B63-10304 05

Tool facilitates sealing of metal fill tubes  
MSC-24 B63-10519 05

Refractory thermal insulation for smooth metal surfaces  
M-FS-160 B64-10099 03

Mounting for diodes provides efficient heat sink  
M-FS-197 B64-10283 01

Metal sheath improves thermocouple using graphite in one leg  
NU-0011 B65-10051 01

Titanium treatment improves brazed joints  
MSC-127 B65-10153 05

Strain gage network distinguishes between thermal and mechanical deformations  
GSFC-478 B66-10280 01

Heat-treatment of metal parts facilitated by sand embedment  
M-FS-1543 B66-10616 03

Lightweight, all-metal hose assembly has high flexibility and strength over wide range of temperature and pressure  
M-FS-1831 B66-10635 05

Lateral ring metal elastic wheel absorbs shock loading  
M-FS-1312 B66-10663 05

Thermoelectric metal comparator determines composition of alloys and metals  
ARG-235 B67-10035 01

Solubility data are compiled for metals in liquid zinc  
ARG-149 B67-10191 03

Soft metal plating enables hard metal seal to operate successfully in low temperature, high pressure environment  
NUC-10083 B67-10350 03

Test system accurately determines tensile properties of irradiated metals at cryogenic temperatures  
NUC-10521 B67-10617 02

## METAL BONDING

Refractory metals welded or brazed with tungsten inert gas equipment  
LEWIS-219 B65-10319 05

Assembly jig assures reliable solar cell modules  
GSFC-455 B66-10040 05

Adhesive for polyester films cures at room temperature, has high initial tack  
M-FS-938 B66-10487 03

Correlation established between heat transfer and ultrasonic transmission properties of copper braze bonds  
ARG-247 B67-10037 02

Silver plating ensures reliable diffusion bonding of dissimilar metals  
M-FS-1975 B67-10124 03

Method of improving contact bonds in silicon integrated circuits  
M-FS-1753 B67-10335 01

## METAL COATING

Jig protects transistors from heat while tinning leads  
MSC-515 B66-10240 05

Soft metal plating enables hard metal seal to operate successfully in low temperature, high pressure environment  
NUC-10083 B67-10350 03

## METAL CORROSION

Corrosion of metal samples rapidly measured  
NU-0041 B66-10140 03

Trace levels of metallic corrosion in water determined by emission spectrography  
MSC-1193 B66-10701 03

## METAL CUTTING

Metal boot permits fabrication of hermetically sealed splices in metal sheathed instrumentation cables  
NU-0083 B66-10704 05

Study made of explosive cutting in simulated space environments  
M-FS-1597 B67-10040 01

Variable-speed, portable routing skate  
M-FS-13772 B67-10525 05

## METAL FATIGUE

Fatigue zones in metals identified by polarized light photography  
WOO-286 B67-10082 02

## METAL FOIL

Impact- and puncture-resistant material protects parts from damage  
MSC-747 B66-10375 05

Nonelectrolytic tantalum capacitors developed  
M-FS-1546 B66-10552 01

## METAL FORMING

Integral ribs formed in metal panels by cold-press extrusion  
M-FS-230 B65-10141 05

Metal parts hydrosized by explosive force  
M-FS-289 B65-10170 05

Fiberglass dies speed forming of large metal sheets  
M-FS-214 B65-10210 05

Die and telescoping punch form convolutions in thin diaphragm  
JPL-SC-135 B65-10393 05

Coiled sheet metal strip opens into tubular configuration  
GSFC-425 B66-10009 03

Explosive force of Primacord grid forms large sheet metal parts  
M-FS-316 B66-10014 05

## METAL ION

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Heated die facilitates tungsten forming LEWIS-25A	B66-10047	05	JPL-170	B63-10139	05
Electrical upsetting of metal sheet forms weld edge M-FS-720	B66-10248	05	<b>METAL SURFACE</b>		
High-energy-rate magnetohydraulic metal forming system M-FS-2142	B67-10126	02	Surfactant for dye-penetrant inspection is insensitive to liquid oxygen M-FS-475	B66-10131	03
Development of technology for hot-drape forming of large torus sections M-FS-12141	B67-10341	05	Portable sandblaster cleans small areas MSC-523	B66-10242	05
Magnesium-zinc reduction is effective in preparation of metals ARG-10050	B67-10579	03	Braze alloys used as temperature indicators NU-0063	B66-10274	01
<b>METAL ION</b>			Photoelectric scanner makes detailed work function maps of metal surface JPL-SC-176	B66-10440	01
Reusable chelating resins concentrate metal ions from highly dilute solutions JPL-758	B66-10451	03	Technique for measuring absorptance and emittance by using cyclic incident radiation LEWIS-321	B66-10630	02
<b>METAL JOINT</b>			<b>METAL WORKING</b>		
High pressure tube coupling requires no threads or flares MSC-600	B66-10285	05	Rapid billet loader aids extrusion of refractory metals LEWIS-50	B63-10354	05
Thin plastic sheet eliminates need for expensive plating M-FS-1896	B66-10681	03	Guide for extrusion dies eliminates straightening operation LEWIS-152	B64-10014	05
Braze joint quality tested electromagnetically M-FS-12795	B67-10333	01	Jig and fixture aid fabrication of tungsten rivets LEWIS-185	B65-10101	05
Study made of transfer of heat energy through metal joints in vacuum environment M-FS-12534	B67-10465	02	Collar positions strip stock used to form coil on mandrel JPL-198	B65-10130	05
<b>METAL-METAL BONDING</b>			Lathe attachment used to machine elliptical cones MSC-100	B65-10168	05
Stringent cleaning technique assures reliable epoxy bond GSFC-161	B64-10142	03	Split glass tube assures quality in electron beam brazing M-FS-564	B66-10151	05
Brazing process provides high-strength bond between aluminum and stainless steel M-FS-803	B66-10352	05	Device spot-laps spheres to very close tolerances JPL-SC-119	B66-10175	05
Welding, bonding, and sealing of refractory metals by vapor deposition LEWIS-123	B67-10232	03	Pressure vessels fabricated with high-strength wire and electroformed nickel M-FS-580	B66-10218	05
<b>METAL OXIDE SEMICONDUCTOR /MOS/</b>			Hollow needle used to cut metal honeycomb structures MSC-486	B66-10244	05
Field-effect transistor replaces bulky transformer in analog-gate circuit GSFC-351	B65-10284	01	Metal tube can be folded for compact storage, is self-erecting LEWIS-288	B66-10450	05
Metal oxide silicon /MOS/ transistors protected from destructive damage by wire device ARC-65	B66-10419	01	Metallographic holding fixture permits polishing of soft metals on vibratory lapping machine ARG-42	B66-10562	05
Mosfet analog memory circuit achieves long duration signal storage M-FS-860	B66-10603	01	Study made to establish parameters and limitations of explosive welding M-FS-13006	B67-10393	05
MOSFET improves performance of power supply regulator GSFC-10022	B67-10569	01	Metal tube reducer is inexpensive and simple to operate ARG-49	B67-10401	05
<b>METAL PARTICLE</b>			Precision metal molding M-FS-13305	B67-10423	05
Silver-palladium braze alloy recovered from masking materials M-FS-1845	B66-10631	03	Tube-to-header joint for bimetallic construction LEWIS-10282	B67-10464	05
<b>METAL PLATE</b>			Copper and nickel adherently electroplated on titanium alloy M-FS-13952	B67-10532	03
Built-in templates speed up process for making accurate models LANGLEY-23	B63-10526	05	<b>METALLOGRAPHY</b>		
Steel test panel helps control additives in pyrophosphate copper plating LEWIS-10101	B67-10358	05	Metallographic samples mounted with room- temperature, curable, polyester casting		
<b>METAL REINFORCEMENT</b>					
Method of welding joint in closed vessel improves quality of seam					

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## MICROPHONE

resins ARG-10025	B67-10484	03	Opaque microfiche masthead permits easy reading HQ-7	B65-10306	01
<b>METALLURGY</b>					
Rotating filters permit wide range of optical pyrometry LANGLEY-33	B65-10100	02	Planetary camera control improves microfiche production HQ-1	B65-10313	01
Rotating holder permits accurate grinding of metallurgical microsamples LEWIS-131	B65-10262	05	<b>MICROINSTRUMENTATION</b>		
Simple, nondestructive test identifies metals MSC-525	B66-10305	03	Micromachining produces optical apertures to micron dimensions GSFC-206	B64-10211	05
<b>METEOROID</b>			Liquid micrurgy chamber and microsyringe designs allow more efficient micromanipulations ARG-251	B67-10305	04
Ultra-sensitive transducer advances micro-measurement range ARC-26	B64-10004	01	<b>MICROMETEOROID</b>		
<b>METEOROLOGICAL BALLOON</b>			Improved sensor counts micrometeoroid penetrations LEWIS-76	B63-10443	01
Rough surface improves stability of air-sounding balloons M-FS-320	B65-10326	05	Ultra-sensitive transducer advances micro-measurement range ARC-26	B64-10004	01
<b>METER</b>			<b>MICROMETER</b>		
Liquid-level meter has no moving parts M-FS-3	B63-10378	03	Apparatus measures swelling of membranes in electrochemical cells GSFC-280	B65-10087	01
<b>METHANE</b>			Modified algesimeter provides accurate depth measurements MSC-616	B66-10647	04
Corrosion of aluminum alloys by chlorinated hydrocarbon/methanol mixtures MSC-11365	B67-10442	03	Automated microsyringe is highly accurate and reliable NPD-10142	B67-10203	01
<b>MICHELSON INTERFEROMETER</b>			<b>MICROMINIATURIZATION</b>		
System enables more complete calibrations of dynamic-pressure transducers M-FS-2063	B67-10099	01	Microminiature thermocouple monitors own installation M-FS-1111	B66-10463	05
<b>MICROANALYSIS</b>			Rolamite - a new mechanical design concept SAN-10001	B67-10611	05
Standards for electron probe microanalysis of silicates prepared by convenient method GSFC-469	B66-10234	03	<b>MICROMINIATURIZED ELECTRONIC EQUIPMENT</b>		
Apparatus enables automatic microanalysis of body fluids JPL-962	B66-10515	04	Frequency discriminator with binary output eliminates tuned circuits M-FS-376	B65-10349	01
<b>MICROBIOLOGY</b>			<b>MICROMOTOR</b>		
Continuous microbial cultures maintained by electronically-controlled device ARG-177	B67-10556	04	Computer circuit will fit on single silicon chip JPL-513	B63-10514	01
<b>MICROCIRCUIT</b>			<b>MICROORGANISM</b>		
Field-effect transistor replaces bulky transformer in analog-gate circuit GSFC-351	B65-10284	01	Microorganisms detected by enzyme-catalyzed reaction JPL-782	B66-10117	04
Rugged microelectronic module package supports circuitry on heat sink MSC-81A	B66-10245	01	<b>MICROPARTICLE</b>		
<b>MICROELECTRONICS</b>			Dust particle injector for hypervelocity accelerators provides high charge-to-mass ratio GSFC-509	B66-10347	01
Logic circuit exhibits optimum performance LANGLEY-129	B65-10193	01	<b>MICROPHONE</b>		
Miniature electrometer preamplifier effectively compensates for input capacitance ARC-69	B66-10549	01	Small foamed polystyrene shield protects low-frequency microphones from wind noise M-FS-123	B63-10579	01
Reparable, high-density microelectronic module provides effective heat sink M-FS-13075	B67-10356	01	Microphone multiplex system provides multiple outlets from single source GSFC-426	B66-10308	01
Temperature-stabilized, triggerable microelectronic astable multivibrator starts reliably MSC-1173	B67-10624	01	Phonocardiograph microphone is rugged and moistureproof MSC-212	B66-10314	04
<b>MICROFILM</b>			Personal communication system combines high performance with miniaturization MSC-720	B67-10119	01
Library of documents compressed into lap-held display kit MSC-125	B65-10030	01	Device enables calibration of microphones at high sound pressure levels M-FS-11980	B67-10336	01
Manual-feed adapter permits microfilming of continuous oscillograph output NU-0029	B65-10249	01			

## MICROSCOPE

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## MICROSCOPE

Attachment converts microscope to point source autocollimator  
JPL-499 B64-10124 05

Micromachining produces optical apertures to micron dimensions  
GSFC-206 B64-10211 05

## MICROSCOPY

Liquid micrurgy chamber and microsyringe designs allow more efficient micromanipulations  
ARG-251 B67-10305 04

Ronchi test applied to measurement of surface roughness  
M-FS-12583 B67-10636 02

## MICROSTRUCTURE

Study made of ductility limitations of aluminum-silicon alloys  
M-FS-12524 B67-10392 03

## MICROWAVE

Novel horn antenna reduces side lobes, improves radiation pattern  
JPL-425 B63-10264 01

Surface-crack detection by microwave methods  
ARC-10009 B67-10482 01

## MICROWAVE ANTENNA

Flange on microwave antenna subreflector cuts ground noise  
JPL-362 B63-10229 01

Scanning means for Cassegrainian antenna  
JPL-946 B67-10174 05

## MICROWAVE APPARATUS

Compact microwave mixer has high conversion efficiency  
GSFC-197 B66-10625 01

Dielectric prisms would improve performance of quasi-optical microwave components  
ERC-10011 B67-10416 01

Highly stable microwave delay line  
NPD-09828 B67-10642 01

Reflectometer for receiver input system  
NPD-10843 B67-10657 01

## MICROWAVE ATTENUATION

Modified filter prevents conduction of microwave signals along high-voltage power supply leads  
JPL-63 B63-10091 01

## MICROWAVE CIRCUIT

Double-throw microwave device switches two lines quickly  
JPL-410 B63-10258 01

Superconductor magnets used for stagger-tuning traveling-wave maser  
GSFC-292 B65-10165 01

Warpage eliminated in copper-clad microwave circuit laminates  
M-FS-13892 B67-10454 03

## MICROWAVE FILTER

Modified filter prevents conduction of microwave signals along high-voltage power supply leads  
JPL-63 B63-10091 01

## MICROWAVE FREQUENCY

Modified filter prevents conduction of microwave signals along high-voltage power supply leads  
JPL-63 B63-10091 01

Cryogenic waveguide window is sealed with plastic foam  
JPL-559 B63-10613 01

## MICROWAVE SWITCHING

Double-throw microwave device switches two lines quickly  
JPL-410 B63-10258 01

## MICROWAVE TRANSMISSION

Traveling-wave tube circuit simplifies microwave relay  
GSFC-299 B65-10127 01

Composite filter steepens rejection slopes in microwave application  
GSFC-480 B66-10393 01

## MILLIMETER WAVE

Ferroelectric bolometer measures RF absolute power at submillimeter wavelengths  
GSFC-422 B66-10051 01

Efficient millimeter wave /140 GHz/ diode for harmonic power generation  
HQ-61 B67-10166 01

## MILLING

Electrochemical milling removes burrs and solder from tubing ends  
M-FS-714 B66-10358 03

Heavy duty precision leveling jacks expedite setup time on horizontal boring mill  
M-FS-1084 B66-10411 05

Acid spray technique mills aluminum alloy materials without immersion  
M-FS-12500 B67-10463 03

## MILLING MACHINE

Depth indicator and stop aid machining to precise tolerances  
M-FS-553 B66-10149 05

Mill profiler machines soft materials accurately  
M-FS-692 B66-10254 05

Versatile machine mills, saws light materials  
M-FS-827 B66-10364 05

Computer used to program numerically controlled milling machine  
M-FS-1608 B66-10541 01

## MINERAL

Method for X-ray study under extreme temperature and pressure conditions  
MSC-11232 B67-10474 02

## MINIATURE ELECTRONIC EQUIPMENT

Metal diaphragm used to calibrate miniature transducers  
M-FS-207 B65-10059 01

High-performance RC bandpass filter is adapted to miniaturized construction  
ARC-60 B66-10309 01

Miniature telemetry system accurately measures pressure  
ARC-74 B66-10624 01

Ultraminiature television camera  
M-FS-11967 B67-10469 01

Ultraminiature manometer-tipped cardiac catheter  
ARC-10054 B67-10669 01

## MINIATURIZATION

Welded pressure transducer made as small as 1/8th-inch in diameter  
ARC-11 B63-10429 03

Subminiaturized gas chromatograph gives fast, efficient analysis  
JPL-735 B66-10182 01

Miniature capacitive accelerometer is especially applicable to telemetry  
ARC-72 B66-10491 01

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# MOLTEN-SALT ELECTROLYTE

<b>MINORITY CARRIER</b>			reproduces phase information in 2-mc signals		
Laboratory pulse modulator uses minority carrier storage diodes			M-FS-664	B66-10437	01
M-FS-2442	B67-10226	01	Double emitter suppressed carrier modulator uses commercially available components		
<b>MIRROR</b>			M-FS-2494	B67-10101	01
Variable-transparency wall regulates temperatures of structures			<b>MODULE</b>		
LANGLEY-25	B63-10528	03	Portable display paneling has wide use, easy take down and assembly		
Light-sensitive potentiometer measures product of two variables			ARC-17	B63-10435	05
GSFC-240	B65-10076	01	Solar cell submodule design facilitates assembly of lightweight arrays		
Beam splitter used in dual filming technique			JPL-728	B66-10231	02
M-FS-501	B66-10072	02	Flat pack interconnection structure simplifies modular electronic assemblies		
Mount enables precision adjustment of optical-instrumentation mirror			JPL-819	B67-10560	01
MSC-184	B66-10199	02	<b>MOISTURE DETECTOR</b>		
Precision CW laser automatic tracking system investigated			Detection of entrapped moisture in honeycomb sandwich structures		
M-FS-1606	B66-10629	01	MSC-1103	B67-10116	01
Process sequence produces strong, lightweight reflectors of excellent quality			<b>MOLD</b>		
LEWIS-331	B67-10010	05	Improved molybdenum disulfide-silver motor brushes have extended life		
Special purpose reflectometer uses modified Ulbricht sphere			M-FS-64	B63-10479	03
MSC-1135	B67-10109	02	Refractory ceramic has wide usage, low fabrication cost		
Measuring coplanarity of surfaces			M-FS-67	B63-10481	03
MSC-12044	B67-10371	02	Plastic molds reduce cost of encapsulating electric cable connectors		
Ellipsoidal-mirror reflectometer accurately measures infrared reflectance of materials			M-FS-69	B63-10568	05
GSFC-566	B67-10444	01	Pressure molding of powdered materials improved by rubber mold insert		
Gimbaled-mirror scanning system capable of spiral pattern			WOO-100	B64-10270	03
GSFC-10170	B67-10609	02	Spray-on technique simplifies fabrication of complex thermal insulation blanket		
Telescope mount with azimuth-only primary			M-FS-497	B66-10053	03
NPU-10468	B67-10671	02	<b>MOLDING MATERIAL</b>		
<b>MISSILE</b>			Cork is used to make tooling patterns and molds		
High purity electroforming yields superior metal models			MSC-425	B66-10328	05
ARC-6	B63-10007	05	Improved compression molding process		
<b>MIXED FLOW</b>			LANGLEY-10027	B67-10302	03
Flowmeter determines mix ratio for viscous adhesives			<b>MOLECULAR COLLISION</b>		
M-FS-2308	B67-10378	01	Quantum mechanical calculations of reactive scattering cross sections in bimolecular encounters		
<b>MIXER</b>			M-FS-13594	B67-10527	03
Added diodes increase output of balanced mixer circuit			<b>MOLECULAR DIFFUSION</b>		
GSFC-354	B65-10276	01	Large volume continuous counterflow dialyzer has high efficiency		
Compact microwave mixer has high conversion efficiency			HQ-10055	B67-10395	04
GSFC-197	B66-10625	01	<b>MOLECULAR DISSOCIATION</b>		
<b>MOBILITY</b>			Heater decomposes oil backstreaming from high-vacuum pumps		
Floating device aligns blind connections			GSFC-356	B65-10224	02
MSC-256	B66-10007	05	<b>MOLECULAR FLOW</b>		
<b>MODULATION TECHNIQUE</b>			Test device prevents molecular bounce-back		
Dual regulator controls two gases from a single reference			GSFC-82	B63-10546	03
MSC-227	B66-10167	05	Crystal microbalance measures condensable molecular fluxes		
Device to color modulate a stationary light beam gives high intensity			JPL-845	B67-10012	03
HQ-44	B66-10476	01	<b>MOLECULAR SIEVE</b>		
Laser communication system is insensitive to atmospherically induced noise			Purification train produces ultrapure hydrogen gas		
GSFC-10396	B67-10587	01	M-FS-1913	B67-10078	03
<b>MODULATOR</b>			<b>MOLECULE</b>		
Added diodes increase output of balanced mixer circuit			Test device prevents molecular bounce-back		
GSFC-354	B65-10276	01	GSFC-82	B63-10546	03
Single-sideband modulator accurately			<b>MOLTEN-SALT ELECTROLYTE</b>		
			Hydrated multivalent cations are new class		

## MOLYBDENUM

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of molten salt mixtures ARG-211	B67-10033	03	Monitoring system determines amplitude and time of vibration channel peaks JPL-879	B66-10699	01
<b>MOLYBDENUM</b> Reaction of steam with molybdenum is studied ARG-295	B67-10502	03	Monitor assures availability and quality of communication channels KSC-66-38	B67-10028	01
<b>MOLYBDENUM ALLOY</b> Etching process mills pH 14-8 Mo alloy steel to precise tolerances MSC-270	B66-10110	03	Closed circuit TV system monitors welding operations MSC-11002	B67-10162	01
<b>MOLYBDENUM OXIDE</b> Reaction of steam with molybdenum is studied ARG-295	B67-10502	03	IR vidicon scanner monitors many test points M-FS-1937	B67-10277	01
<b>MOLYBDENUM SULFIDE</b> Molybdenum disulfide mixtures make effective high-vacuum lubricants M-FS-54	B63-10453	03	Improved head-controlled TV system produces high-quality remote image ARG-128	B67-10317	01
Improved molybdenum disulfide-silver motor brushes have extended life M-FS-64	B63-10479	03	Portable spectrometer monitors inert gas shield in welding process M-FS-12144	B67-10326	02
<b>MOMENT EQUATION</b> Equations provide tubular information on effects of uniform and variable loads on thin, flat, circular plates ARG-151	B66-10601	05	Multiple meter monitoring circuits served by single alarm MSC-10984	B67-10369	01
<b>MONATOMIC GAS</b> Computer program /P1-GAS/ calculates the P-0 and P-1 transfer matrices for neutron moderation in a monatomic gas NUC-10141	B67-10678	06	Continuous wave detector has wide frequency range M-FS-1849	B67-10386	01
<b>MONITOR</b> Circuit switches latching relay in response to signals of different polarity WOO-055	B63-10508	01	Study made of acoustical monitoring for mechanical checkout M-FS-13372	B67-10430	02
Simple circuit continuously monitors thermocouple sensor M-FS-61	B63-10567	01	Instrumentation monitors transported material through variety of parameters M-FS-12938	B67-10545	01
Auxiliary circuit enables automatic monitoring of EKG MSC-106	B65-10142	01	Electronic skewing circuit monitors exact position of object underwater NUC-10146	B67-10629	01
Electromechanical flowmeter accurately monitors fluid flow GSFC-357	B65-10273	01	Automatic design of optical systems by digital computer NPD-10265	B67-10632	06
Rugged pressed disk electrode has low contact potential MSC-158	B65-10320	01	<b>MONKEY</b> Test monkeys anesthetized by routine procedure HQ-18	B65-10332	04
Capacitive system detects and locates fluid leaks M-FS-478	B66-10099	01	<b>MONOCHROMATIC RADIATION</b> Computer programs simplify optical system analysis GSFC-306	B65-10093	01
Phonocardiograph microphone is rugged and moistureproof MSC-212	B66-10314	04	<b>MONOMER</b> Valve seat pores sealed with thermosetting monomer M-FS-900	B66-10322	03
Sniffer used as portable hydrogen leak detector M-FS-846	B66-10356	01	Arylenesiloxane copolymers M-FS-1812	B67-10079	03
System monitors discrete computer inputs M-FS-1021	B66-10389	01	<b>MONOMOLECULAR LAYER</b> Miniature bearings lubricated by sonic dispersion method M-FS-202	B65-10106	03
Optical monitor panel provides flexible test panel configurations KSC-66-18	B66-10494	01	<b>MONOPULSE ANTENNA</b> Antenna configurations provide polarization diversity GSFC-74	B66-10066	01
Security warning system monitors up to fifteen remote areas simultaneously KSC-66-39	B66-10548	01	Antenna simulator permits preinstallation system checkout GSFC-522	B66-10518	01
Resistor monitors transfer of liquid helium LANGLEY-229	B66-10580	01	<b>MONTE CARLO METHOD</b> Design reliability goal developed from small sample M-FS-403	B66-10405	05
Magnetoresistor monitors relay performance M-FS-1754	B66-10650	01	Computer program uses Monte Carlo techniques for statistical system performance analysis M-FS-2234	B67-10306	06



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# N-P-N JUNCTION

Algebraic Monte Carlo procedure reduces statistical analysis time and cost factors M-FS-1887	B67-10434	01	MULTIPLEXER	Microphone multiplex system provides multiple outlets from single source GSFC-426	B66-10308	01
MOSSBAUER EFFECT				Multiplexer uses insulated gate-field effect transistors M-FS-13096	B67-10396	01
Vibration analysis utilizing Mossbauer effect M-FS-11974	B67-10339	01	MULTIPLIER	Computer determines high-frequency phase stability GSFC-113	B63-10555	01
MOTION EQUATION				Variable load automatically tests dc power supplies GSFC-291	B65-10105	01
Study of dynamic response of elastic space stations NPO-10124	B67-10169	06		Photoresistance analog multiplier has wide range GSFC-360	B65-10287	01
Computer program for determination of natural frequencies of closed spherical sandwich shells MSC-1246	B67-10279	06		Circuit provides accurate four-quadrant multiplication WOO-272	B66-10331	01
MOTION PICTURE				Circuit multiplies pulse width modulation, exhibits linear transfer function HQ-56	B67-10055	01
Photographic method measures particle size and velocity in fluid stream M-FS-1536	B66-10668	01	MULTIVIBRATOR	Monostable circuit with tunnel diode has fast recovery GSFC-132	B63-10603	01
Aerial-image enables diagrams and animation to be inserted in motion pictures ARG-165	B67-10398	02		Temperature-sensitive network drives astable multivibrator GSFC-137	B63-10609	01
MOTOR CASE				Circuit improvement produces monostable multivibrator with load-carrying capability GSFC-34A	B65-10011	01
Cold solid propellant motor has stop-restart capability JPL-836	B66-10673	03		Variable frequency transistor inverters use multiple core transformers GSFC-183	B65-10119	01
MOTOR SYSTEM				Variable frequency magnetic multivibrator generates stable square-wave output GSFC-AE-21	B65-10124	01
Improved molybdenum disulfide-silver motor brushes have extended life M-FS-64	B63-10479	03		Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01
Quick-acting clutch disengages idle drive motor GSFC-143	B64-10028	05		Complementary monostable circuits achieve low power drain and high reliability GSFC-433	B66-10179	01
Vehicle walks on varied terrain, can assist handicapped persons WOO-005	B64-10274	05		Signal generator converts direct current to multiphase supplies MSC-11043	B67-10368	01
Rotor position sensor switches currents in brushless dc motors GSFC-315	B65-10151	01		Temperature-stabilized, triggerable microelectronic astable multivibrator starts reliably MSC-1173	B67-10624	01
Electronic phase-locked-loop speed control system is stable JPL-SC-084	B66-10232	01	MUSCULAR STRENGTH	Automated urinalysis technique determines concentration of creatine and creatinine by colorimetry NPO-10149	B67-10245	04
Compact actuator converts rotary to linear motion JPL-786	B66-10265	05		MYLAR		
Brushless dc motor has high efficiency, long life GSFC-181	B66-10355	01		O-rings with Mylar back-up provide high-pressure cryogenic seal M-FS-603	B66-10278	05
Simple motor drive system operates heavy hinged door NU-0093	B66-10712	05		Mylar film eliminates silk screening of equipment panels MSC-798	B66-10455	05
MULTILAYER STRUCTURE						
Reflective insulator layers separated by bonded silica beads MSC-215	B66-10070	03				
Multilayer refractory nozzles produced by plasma-spray process WOO-318	B66-10611	05				
High-temperature /1100 degrees F/ capacitors operate without supplement cooling LEWIS-10324	B67-10550	01				
MULTIPHASE FLOW						
Signal generator converts direct current to multiphase supplies MSC-11043	B67-10368	01				
MULTIPLEX TRANSMISSION						
Security warning system monitors up to fifteen remote areas simultaneously MSC-66-39	B66-10548	01				

N

## NANOSECOND

Single channel pulse-height analyzer operates in subnanosecond range  
LEWIS-267 B66-10377 01

Pulse stretcher has improved dynamic range and linearity  
ARG-82 B66-10509 01

## NATURAL FREQUENCY

Computer program for determination of natural frequencies of closed spherical sandwich shells  
MSC-1246 B67-10279 06

## NAVIGATION AID

Improved magnetometer uses toroidal gating coil  
GSFC-249 B65-10103 01

## NAVIGATION AND GUIDANCE

Star/horizon simulator used to test space guidance system  
MSC-407 B67-10110 02

Conceptual nonorthogonal gyro configuration for guidance and navigation  
MSC-11363 B67-10433 01

## NAVIGATION INSTRUMENT

Developmental instrument supplies accurate attitude and attitude-rate data  
HQ-57 B66-10607 01

Three-axis attitude and direction reference instrument has only one moving part  
M-FS-1819 B66-10644 01

## NEGATIVE CONDUCTANCE

Logic circuit detects both present and missing negative pulses in superimposed wavetrains  
M-FS-12518 B67-10565 01

## NEON

Neon isotopes cancel errors in gas laser  
M-FS-1476 B66-10583 02

## NEOPRENE

Chain friction system gives positive, reversible drive  
ARC-8 B63-10009 05

Elastomers bonded to metal surfaces seal electrochemical cells  
GSFC-168 B64-10113 03

Reusable neoprene jacket protects parts for chemical milling  
WOD-071 B65-10179 03

Method prevents secondary radiation in radiographic inspection  
M-FS-13383 B67-10391 02

## NEPHELOMETER

Improved atmospheric particle analyzer  
ERC-33 B67-10231 01

## NETWORK

Logic realization of simple majority voting connectives  
JPL-727 B67-10511 06

## NETWORK ANALYSIS

Transient Analysis Generator /TAG/ simulates behavior of large class of electrical networks  
NPD-10031 B67-10319 06

## NETWORK SYNTHESIS

Boron trifluoride nuclear detector preamplifier uses single-cable connection  
LEWIS-178 B65-10255 01

Computer program for network synthesis by frequency response fit  
M-FS-12686 B67-10406 06

## NEUTRON

Aluminum-titanium hydride-boron carbide composite provides lightweight neutron shield material  
NUC-10069 B67-10265 03

## NEUTRON ABSORBER

Calculation of resonance neutron absorption in two-region problems /the GAROL code/  
NUC-10045 B67-10223 06

## NEUTRON ACTIVATION

Nondestructive test method accurately sorts mixed bolts  
M-FS-1426 B66-10574 01

Neutron activation analysis traces copper artifacts to geographical point of origin  
ARG-119 B67-10036 02

Wear studies made of slip rings and gas bearing components  
M-FS-12882 B67-10403 05

Compilation of detection sensitivities in thermal-neutron activation  
ARG-10068 B67-10641 03

## NEUTRON BEAM

M-SAP and G-SAP neutron and gamma ray albedo model scatter shield analysis program  
NUC-10126 B67-10536 06

## NEUTRON DETECTOR

Current pulse amplifier transmits detector signals with minimum distortion and attenuation  
NUC-10055 B67-10347 01

Neutron detector simultaneously measures fluence and dose equivalent  
ARG-10071 B67-10597 02

## NEUTRON DIFFRACTION

Neutron diffractometer allows both magnetic and crystallographic analyses  
ARG-191 B67-10131 02

## NEUTRON FLUX

A fast-neutron spectrometer of advanced design  
M-FS-1664 B66-10555 01

Neutron irradiation of Am241 effectively produces curium  
ARG-10030 B67-10501 03

Computer program calculates gamma ray source strengths of materials exposed to neutron fluxes  
NUC-10143 B67-10665 06

## NEUTRON PHYSICS

Multichannel pulse height analyzer is inexpensive, features low power requirements  
HQN-10020 B67-10258 01

Practical new method of measuring thermal-neutron fluence  
NUC-10086 B67-10352 02

## NEUTRON SCATTERING

Computer program VARI-QUIR III provides solution of steady-state, multigroup, two-dimensional neutron diffusion equations  
NUC-10052 B67-10345 06

Computer program /P1-GAS/ calculates the P-0 and P-1 transfer matrices for neutron moderation in a monatomic gas  
NUC-10141 B67-10678 06

## NEUTRON SOURCE

Detection of entrapped moisture in honeycomb sandwich structures  
MSC-1103 B67-10116 01

Apparatus for fabrication of americium-

## SUBJECT INDEX

## NITROGEN POLYMER

beryllium neutron sources prevents capsule contamination ARG-184	B67-10202	05	LANGLEY-116	B65-10220	03
<b>NEUTRON SPECTROMETRY</b>			<b>NICKEL FLUORIDE</b>		
A fast-neutron spectrometer of advanced design M-FS-1664	B66-10555	01	Experiments shed new light on nickel-fluorine reactions ARG-10008	B67-10397	03
<b>NEWTON-RAPHSON METHOD</b>			<b>NICKEL PLATING</b>		
Computer program for network synthesis by frequency response fit M-FS-12686	B67-10406	06	Electroless nickel resist used in alkali-etching of aluminum GSFC-284	B65-10162	03
Computer program provides steady state analysis for liquid propellant propulsion systems MSC-10064	B67-10414	06	Nickel solution prepared for precision electroforming W00-070	B65-10303	03
<b>NICKEL</b>			Nickel/tin coating protects threaded fasteners in corrosive environment MSC-253	B65-10398	03
Ellipsoidal optical reflectors reproduced by electroforming GSFC-92	B63-10547	05	Copper wire plated with nickel and silver resists corrosion M-FS-761	B66-10421	03
Tungsten wire and tubing joined by nickel brazing M-FS-394	B65-10391	05	Electroless nickel plating on stainless steels and aluminum GSFC-533	B66-10479	03
Quality control criteria for acceptance testing of cross-wire welds MSC-627	B66-10587	05	Nondestructive test method accurately sorts mixed bolts M-FS-1426	B66-10574	01
Study made of Raney nickel technology M-FS-2054	B67-10208	03	<b>NIOBIUM</b>		
Copper and nickel adherently electroplated on titanium alloy M-FS-13952	B67-10532	03	Niobium thin films are superconductive in strong magnetic fields at low temperatures JPL-SC-174	B66-10122	02
<b>NICKEL ALLOY</b>			<b>NIOBIUM ALLOY</b>		
Cryogenic trap valve has no moving parts M-FS-487	B66-10136	05	Protected, high-temperature connecting cable LEWIS-10149	B67-10461	01
Nickel-base superalloys developed for high-temperature applications LEWIS-226	B66-10222	03	<b>NIOBIUM COMPOUND</b>		
Study made of corrosion resistance of stainless steel and nickel alloys in nuclear reactor superheaters ARG-230	B67-10051	03	Environmental study of miniature slip rings M-FS-2443	B67-10210	05
Composite weld rod corrects individual filler weaknesses M-FS-1923	B67-10107	05	<b>NITRATE</b>		
Weld procedure produces quality welds for thick sections of Hastelloy-X NUC-10048	B67-10195	05	Special treatment reduces helium permeation of glass in vacuum systems HQ-25	B66-10372	02
Excellent spring properties developed in two nickel alloys for use at cryogenic temperatures NUC-10084	B67-10349	03	<b>NITROGEN</b>		
Study of crevice-galvanic corrosion of aluminum ARG-10013	B67-10583	03	Helical tube separates nitrogen gas from liquid nitrogen JPL-398	B63-10251	05
<b>NICKEL-CADMIUM BATTERY</b>			Compressed gas system operates semitrailer brakes during winching operation JPL-0036	B64-10306	05
Didymium compound improves nickel-cadmium cell GSFC-295	B65-10083	03	Economical and maintenance-free gas system operates railroad switches NU-0045	B66-10124	05
Hermetically sealed cells protected from internal gas pressure GSFC-555	B66-10692	01	Experimental investigation of megawatt dc arc heating of nitrogen LEWIS-313	B66-10508	02
Battery charge regulator is coulometer controlled GSFC-561	B67-10446	01	Effects of helium and nitrogen as pressurants in nitrogen tetroxide transfer MSC-924	B67-10083	03
Study of thermal effects on nickel-cadmium batteries GSFC-10003	B67-10614	01	Fluid properties handbook M-FS-13462	B67-10440	03
<b>NICKEL COMPOUND</b>			<b>NITROGEN COMPOUND</b>		
Thoriated nickel bonded by solid-state diffusion method			Nitrogen dioxide produced by self-sustained pyrolysis of nitrous oxide LANGLEY-32	B65-10074	05
			<b>NITROGEN OXIDE</b>		
			Effects of helium and nitrogen as pressurants in nitrogen tetroxide transfer MSC-924	B67-10083	03
			<b>NITROGEN POLYMER</b>		
			Flexible protective coatings made from silicon-nitrogen materials M-FS-528	B66-10027	03

# **NODE**

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## **NODE**

Computer program resolves radiative, conductive, and convective heat transfer problems for variety of geometries  
M-FS-1910

B67-10329 06

Simple, nondestructive test identifies metals  
MSC-525 B66-10305 03

Nondestructive test method accurately sorts mixed bolts  
M-FS-1426 B66-10574 01

## **NOISE**

Transient sensor development  
M-FS-13370

B67-10471 01

Braze joint quality tested electromagnetically  
M-FS-12795 B67-10333 01

Noise study of single stage compressor rotor-stator interaction  
LANGLEY-137

B67-10516 02

Handbooks describe eddy current techniques used in nondestructive testing of metal parts and components  
M-FS-13172 B67-10374 03

## **NOISE ATTENUATION**

Small foamed polystyrene shield protects low-frequency microphones from wind noise  
M-FS-123

B63-10579 01

Surface-crack detection by microwave methods  
ARC-10009 B67-10482 01

## **NOISE ELIMINATION**

New low level ac amplifier provides adjustable noise cancellation and automatic temperature compensation  
ARC-2

B63-10003 04

Study of stress corrosion in aluminum alloys  
M-FS-13906 B67-10533 03

Flange on microwave antenna subreflector cuts ground noise  
JPL-362

B63-10229 01

Mechanizes X-ray inspection system for large tanks  
M-FS-12867 B67-10564 02

TV synchronization system features stability and noise immunity  
JPL-915

B67-10118 01

Nondestructive testing techniques used in analysis of honeycomb structure bond strength  
M-FS-1214 B67-10574 01

Laser system generates single-frequency light  
M-FS-2556

B67-10288 02

Lamb waves increase sensitivity in nondestructive testing  
ARG-10009 B67-10605 02

## **NOISE INTENSITY**

Small foamed polystyrene shield protects low-frequency microphones from wind noise  
M-FS-123

B63-10579 01

Eddy current probe measures size of cracks in nonmetallic materials  
M-FS-14059 B67-10645 03

## **NOISE MEASUREMENT**

Edge-type connectors evaluated by electrical noise measurement  
M-FS-2243

B67-10125 01

## **NONELECTRONIC APPARATUS**

Nonelectrolytic tantalum capacitors developed  
M-FS-1546 B66-10552 01

Automatic testing device facilitates noise checks and electronic calibrations  
LEWIS-10173

B67-10467 01

## **NONEQUILIBRIUM**

Quantum mechanical calculations of reactive scattering cross sections in bimolecular encounters  
M-FS-13594 B67-10527 03

## **NOISE REDUCTION**

Flange on microwave antenna subreflector cuts ground noise  
JPL-362

B63-10229 01

## **NONLINEAR EQUATION**

Computer program determines chemical equilibria in complex systems  
LEWIS-281 B66-10671 01

## **NOISE SUPPRESSOR**

New low level ac amplifier provides adjustable noise cancellation and automatic temperature compensation  
ARC-2

B63-10003 04

Equation relates flow at free jet to flow downstream  
M-FS-13789 B67-10612 06

Novel horn antenna reduces side lobes, improves radiation pattern  
JPL-425

B63-10264 01

## **NONLINEAR FEEDBACK**

Nonlinear feedback reduces analog-to-digital converter error  
ARC-46 B65-10277 01

Small digital recording head has parallel bit channels, minimizes cross talk  
JPL-0029

B63-10284 01

## **NONLINEARITY**

Digital-output cardiometer measures rapid changes in heartbeat rate  
MSC-133 B65-10143 01

Field-effect transistor improves electrometer amplifier  
ARC-36

B64-10143 01

Feedback loop compensates for rectifier nonlinearity  
M-FS-384 B66-10382 01

## **NOISE THRESHOLD**

Transistor biased amplifier minimizes diode discriminator threshold attenuation  
ARG-163

B67-10311 01

## **NORMAL SHOCK WAVE**

Program computes equilibrium normal shock and stagnation point solutions for arbitrary gas mixtures  
LANGLEY-10090 B67-10509 06

## **NOISE TOLERANCE**

Laser communication system is insensitive to atmospherically induced noise  
GSFC-10396

B67-10587 01

## **NOSE CONE**

High purity electroforming yields superior metal models  
ARC-6 B63-10007 05

## **NONDESTRUCTIVE TESTING**

Force controlled solenoid drives microweld tester  
WOO-125

B65-10182 01

Colloidal suspension simulates linear dynamic pressure profile  
WOO-266 B66-10214 05

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# O-RING SEAL

<b>NOTCH</b>				<b>CINDA - Chrysler improved numerical differencing analyzer computer program</b>			
Apparatus of small size can be extended into long, rigid boom				M-FS-2298	B67-10278	06	
	JPL-305	B63-10200	05				
<b>NOTCH STRENGTH</b>				<b>General purpose computer programs for numerically analyzing linear ac electrical and electronic circuits for steady-state conditions</b>			
New weldable high strength aluminum alloy developed for cryogenic service				M-FS-13094	B67-10331	06	
	M-FS-737	B66-10613	05				
<b>NOZZLE</b>				<b>Numerical least-square method for resolving complex pulse height spectra</b>			
Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application				GSFC-10142	B67-10480	06	
	LANGLEY-6A	B63-10318	03				
Improved technique for localizing electro-polishing features novel nozzles				<b>Computer program ETC improves computation of elastic transfer matrices of Legendre polynomials P/0/ and P/1/</b>			
	WOO-101	B64-10271	01	NUC-10070	B67-10566	06	
Grit blasting nozzle fabricated from mild tool steel proves satisfactory				<b>NUMERICAL CONTROL</b>			
	M-FS-1420	B66-10597	05	Computer used to program numerically controlled milling machine			
<b>NOZZLE FLOW</b>				M-FS-1608	B66-10541	01	
Flow control valve is independent of pressure drop				<b>Run numbering system for use with data recorders</b>			
	JPL-WOO-039	B65-10121	05	M-FS-2557	B67-10215	01	
<b>NUCLEAR ENERGY</b>				<b>NUMERICAL INTEGRATION</b>			
Potassium plasma cell facilitates thermionic energy conversion process				Self-starting procedure simplifies numerical integration			
	ARG-10010	B67-10399	01	ARC-50	B67-10013	01	
<b>NUCLEAR FUEL</b>				<b>NUTS AND BOLTS</b>			
Separation technique provides rapid quantitative determination of cesium-137 in irradiated nuclear fuel				Simple mechanism combines positive locking and quick-release features			
	NUC-10047	B67-10194	03	WOO-4	B63-10420	05	
<b>NUCLEAR HEAT</b>				Instrument adjustment knob locks to prevent accidental maladjustment			
Servo calorimeter measures material heating rate				M-FS-190	B64-10249	05	
	NU-0024	B65-10247	01				
<b>NUCLEAR MAGNETIC RESONANCE</b>				Captive nut fastener securely joins brittle materials			
An improved nuclear magnetic resonance spectrometer				NU-0008	B65-10245	05	
	JPL-762	B67-10234	01				
<b>NUCLEAR PARTICLE</b>				Pneumatic wrench retains or discharges nuts or bolts as desired			
Instrument performs nondestructive chemical analysis, data can be telemetered				NU-0085	B66-10707	05	
	JPL-SC-078	B65-10317	01				
<b>NUCLEAR RADIATION</b>				Single wrench separates nuts from free-floating bolts			
Mechanisms of superconductivity investigated by nuclear radiation				NUC-10013	B67-10158	05	
	M-FS-1944	B67-10057	02				
Computer program calculates gamma ray source strengths of materials exposed to neutron fluxes				Cable clamp bolt fixture facilitates assembly in close quarters			
	NUC-10143	B67-10665	06	KSC-67-80	B67-10244	05	
<b>NUCLEAR SHIELDING</b>				<b>NYLON</b>			
Aluminum-titanium hydride-boron carbide composite provides lightweight neutron shield material				Portable flooring protects finished surfaces, is easily moved			
	NUC-10069	B67-10265	03	M-FS-15	B63-10387	05	
SOC-DS computer code provides tool for design evaluation of homogeneous two-material nuclear shield				Nylon bit removes cork insulation without damage to substrate			
	NUC-10142	B67-10537	06	MSC-381	B66-10152	05	
<b>NUCLEAR SPECTROSCOPY</b>				Improved adhesive for cryogenic applications cures at room temperature			
Status of ultrachemical analysis for semiconductors				WOO-132	B66-10185	03	
	M-FS-2254	B67-10138	03				
<b>NUMERICAL ANALYSIS</b>				Improved method facilitates debulking and curing of phenolic impregnated asbestos			
New computer program solves wide variety of heat flow problems				MSC-949	B66-10459	05	
	M-FS-421	B66-10404	01				
An orthonormalization procedure for multivariable function approximation				<b>O-RING SEAL</b>			
	M-FS-1313	B66-10579	01	Reinforcement core facilitates O-ring installation			
				WOO-228	B65-10378	05	
				Rubber-coated bellows improves vibration damping in vacuum lines			
				LEWIS-273	B66-10187	02	
				O-rings with Mylar back-up provide high-pressure cryogenic seal			
				M-FS-603	B66-10278	05	

Inflatable O-ring seal would ease closing of hatch cover plate MSC-740	B66-10385	05	W00-030	B66-10015	01
<b>OHMMETER</b>			Improved carbon electrode reduces arc sputtering MSC-219	B66-10026	01
Ohmmeter senses depletion of lubricant in journal bearings LEWIS-37	B64-10042	01	Optical gyro pickoff operates at cryogenic temperatures M-FS-407	B66-10128	01
Continuity tester screens out faulty socket connections JPL-596	B64-10065	01	Optically driven switch turn-off time reduced by opaque coatings JPL-SC-107	B66-10141	01
Electronic ohmmeter provides direct digital output GSFC-363	B65-10274	01	Electrically controlled optical latch and switch requires less current JPL-SC-111	B66-10414	01
<b>OIL</b>			Machining heavy plastic sections M-FS-12720	B67-10381	03
Oil-smear models aid wind tunnel measurements LANGLEY-4	B63-10311	03	Automatic design of optical systems by digital computer NPO-10265	B67-10632	06
Fine-particle filter prevents damage to vacuum pumps LEWIS-106	B63-10489	05	<b>OPTICAL FILTER</b>		
<b>OLEFIN</b>			Thin transparent films formed from powdered glass GSFC-352	B65-10217	03
Variable-transparency wall regulates temperatures of structures LANGLEY-25	B63-10528	03	Exposure valve /eV/ system expanded to include filter factors and transmittance LANGLEY-190	B66-10602	02
<b>OMNIDIRECTIONAL ANTENNA</b>			<b>OPTICAL IMAGE</b>		
Lightweight load support serves as vibration damper JPL-661	B65-10144	05	Optical monitor panel provides flexible test panel configurations KSC-66-18	B66-10494	01
Omnidirectional antennas transmit and receive over large bandwidth GSFC-436	B66-10133	01	<b>OPTICAL INSTRUMENT</b>		
Interference effects eliminated in random oriented space station antenna system MSC-11004	B67-10435	01	Optics used to measure torque at high rotational speeds LEWIS-13	B63-10338	01
<b>OPACITY</b>			Mirror device aligns machine surface perpendicular to sight lines W00-5	B63-10421	02
Opaque microfiche masthead permits easy reading HQ-7	B65-10306	01	Ellipsoidal optical reflectors reproduced by electroforming GSFC-92	B63-10547	05
Optically driven switch turn-off time reduced by opaque coatings JPL-SC-107	B66-10141	01	Plastic films for reflective surfaces reproduced from masters GSFC-188	B64-10151	03
Pyrometry handbook describes practical aspects of surface temperature measurements of opaque materials LEWIS-349	B66-10520	01	Micromachining produces optical apertures to micron dimensions GSFC-206	B64-10211	05
<b>OPERATIONAL PROBLEM</b>			Carbon-arc rod holder has long life, reduces arc splatter MSC-144	B65-10095	03
Logic system aids in evaluation of project readiness MSC-753	B66-10457	05	Interferometer construction assures parallelism of critical components JPL-704	B65-10292	02
<b>OPTICAL ABSORPTION</b>			Unique construction makes interferometer insensitive to mechanical stresses JPL-725	B65-10295	02
Blood oxygen saturation determined by transmission spectrophotometry of hemolyzed blood samples MSC-11018	B67-10252	04	Nickel solution prepared for precision electroforming W00-070	B65-10303	03
<b>OPTICAL BEAM SCANNING</b>			Optical projectors simulate human eyes to establish operator's field of view W00-250	B66-10010	02
Design concept for improved photo-scan tube JPL-818	B67-10157	01	Mount enables precision adjustment of optical-instrumentation mirror MSC-184	B66-10199	02
<b>OPTICAL CORRECTION PROCEDURE</b>			Optical device enables small detector to see large field of view W00-253	B66-10263	02
Oil-damped mercury pool makes precise optical alignment tool GSFC-353	B65-10253	02	Simplified fixture permits precision		
<b>OPTICAL EQUIPMENT</b>					
Computer programs simplify optical system analysis GSFC-306	B65-10093	01			
Light ray modulation controls optical system alignment GSFC-171	B65-10211	02			
Electrodeless discharge lamp is easily started, has high stability					

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# ORIFICE

alignment of an optical target M-FS-1181	B66-10556	01	JPL-0033	B66-10223	01
Optical superheterodyne receiver uses laser for local oscillator M-FS-1605	B66-10584	01	Direction indicator system does not require complicated optics W00-305	B66-10407	01
Optical automatic gain channel M-FS-1550	B66-10596	02	Point-source light sensor circuit is insensitive to background light JPL-778	B66-10502	01
Special purpose reflectometer uses modified Ulbricht sphere MSC-1135	B67-10109	02	<b>OPTICAL SIGNAL</b> Local measurements in turbulent flows through cross correlation of optical signals M-FS-1268	B67-10030	01
Visual attitude orientation and alignment system MSC-647	B67-10120	02	<b>OPTICAL SPECTRUM</b> Computer program for optical systems ray tracing FRC-10017	B67-10549	06
<b>OPTICAL MEASUREMENT</b> Solvent residue content measured by light scattering technique M-FS-850	B66-10320	01	<b>OPTICAL TRACKING</b> Precision CW laser automatic tracking system investigated M-FS-1606	B66-10629	01
Laser measuring system accurately locates point coordinates on photograph ARG-74	B66-10560	02	<b>OPTICS</b> Attachment converts microscope to point source autocollimator JPL-499	B64-10124	05
System enables dimensional inspection of very large structures M-FS-2477	B67-10214	05	Simple optical system used to align spectrograph LANGLEY-92	B65-10071	02
<b>OPTICAL METHOD</b> Liquid-level meter has no moving parts M-FS-3	B63-10378	03	System measures angular displacement without contact LANGLEY-46	B65-10073	01
Instrument quickly transposes ground reference target to eye level MSC-275	B66-10061	05	<b>OPTIMIZATION</b> Computer program determines inventory size M-FS-1135	B66-10506	01
<b>OPTICAL MODULATION</b> Wideband, high efficiency optical modulator requires less than 10 watts drive power M-FS-12733	B67-10289	01	A design procedure for the weight optimization of straight finned radiators GSFC-547	B66-10618	05
<b>OPTICAL PATH</b> Photoelectric system continuously monitors liquid level M-FS-417	B65-10382	01	Packaging of electronic modules JPL-801	B66-10664	01
<b>OPTICAL POLARIZATION</b> Fatigue zones in metals identified by polarized light photography W00-286	B67-10082	02	Computer optimization program finds values for several independent variables that minimize a dependent variable M-FS-13030	B67-10328	06
<b>OPTICAL PROPERTY</b> Optical output enhances flowmeter accuracy M-FS-482	B65-10395	02	<b>ORBITAL RENDEZVOUS</b> Earth orbit rendezvous evaluation program M-FS-13016	B67-10407	06
<b>OPTICAL PUMPING</b> Magnetometer measures orthogonal components of magnetic fields GSFC-395	B65-10315	01	<b>ORBITAL SIMULATOR</b> Study of thermal effects on nickel- cadmium batteries GSFC-10003	B67-10614	01
<b>OPTICAL PYROMETER</b> Infrared shield facilitates optical pyrometer measurements LANGLEY-133	B65-10272	02	<b>ORGANIC COMPOUND</b> Solvent residue content measured by light scattering technique M-FS-850	B66-10320	01
Ultraviolet photographic pyrometer used in rocket exhaust analysis M-FS-499	B66-10095	02	Primary cells utilize halogen-organic charge transfer complex JPL-926	B66-10682	02
Pyrometry handbook describes practical aspects of surface temperature measurements of opaque materials LEWIS-349	B66-10520	01	<b>ORGANIC SILICON COMPOUND</b> Arylenesiloxane copolymers M-FS-1812	B67-10079	03
<b>OPTICAL REFLECTIVITY</b> System measures angular displacement without contact LANGLEY-46	B65-10073	01	<b>ORGANOMETALLIC COMPOUND</b> New class of compounds have very low vapor pressures ARG-115	B67-10184	03
<b>OPTICAL SENSOR</b> Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01	Uranyl phthalocyanines show promise in the treatment of brain tumors ARG-100	B67-10188	04
Multicolor stroboscope pinpoints resonances in vibrating components			<b>ORIFICE</b> Elastic orifice automatically regulates gas bearings JPL-135	B63-10123	05

# ORTHOGONAL FUNCTION

## SUBJECT INDEX

Modified gas bearing is adjustable to optimum stiffness ratio M-FS-145	B64-10050	05	Circuit reduces distortion of FM modulator GSFC-257	B65-10152	01
Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	Dc to ac converter operates efficiency at low input voltages GSFC-130	B65-10178	01
<b>ORTHOGONAL FUNCTION</b>			Voltage variable oscillator has high phase stability LANGLEY-123	B65-10204	01
Developmental instrument supplies accurate attitude and attitude-rate data HQ-57	B66-10607	01	Oscillator circuit measures liquid level in tanks M-FS-245	B65-10209	01
Twin helix system produces fast scan in infrared detector M-FS-1598	B66-10638	02	Voltage controlled oscillator is easily aligned, has low phase noise JPL-510	B65-10223	01
<b>ORTHOTROPIC CYLINDER</b>			Electrostatically driven dynamic capacitor employs capacitive feedback JPL-771	B65-10293	01
Analysis of stability-critical orthotropic cylinders subjected to axial compression M-FS-12869	B67-10375	03	Frequency correction device uses digital circuitry GSFC-268	B65-10307	01
<b>OSCILLATING CYLINDER</b>			Hybrid circuit achieves pulse regeneration with low power drain GSFC-382	B65-10314	01
Problem of oscillating cone in supersonic flow is solved by small perturbation techniques M-FS-869	B66-10700	02	A conceptual design for squeeze film bearings M-FS-573	B66-10226	05
<b>OSCILLATION</b>			Single-sideband modulator accurately reproduces phase information in 2-mc signals M-FS-664	B66-10437	01
Device enables measurement of moments of inertia about three axes GSFC-49	B65-10176	05	Optical superheterodyne receiver uses laser for local oscillator M-FS-1605	B66-10584	01
Negative feedback system reduces pump oscillations M-FS-1852	B67-10064	05	Fluidic oscillator used as humidity sensor LEWIS-340	B67-10063	05
<b>OSCILLATION FREQUENCY</b>			An efficient, temperature-compensated subcarrier oscillator JPL-SC-091	B67-10251	01
Circuit converts AM signals to FM for magnetic recording GSFC-227	B65-10001	01	Absolute frequency stabilization of laser oscillator against laser amplifier M-FS-2559	B67-10255	01
<b>OSCILLATOR</b>			Digital-to-analog converter operates from low level inputs JPL-907	B67-10357	01
Increased performance reliability obtained with dual /redundant/ oscillator system GSFC-36	B63-10027	01	Digital voltage-controlled oscillator GSFC-512	B67-10449	01
Frequency-shift-keyer circuit improves PCM conversion for radio transmission GSFC-80	B63-10511	01	New technique for determination of cross-power spectral density with damped oscillators M-FS-14022	B67-10602	02
Transistorized trigger circuit is frequency-controllable GSFC-111	B63-10553	01	<b>OSCILLOGRAPH</b>		
Highly efficient square-wave oscillator operator at high power levels GSFC-112	B63-10554	01	Manual-feed adapter permits microfilming of continuous oscillograph output NU-0029	B65-10249	01
Computer determines high-frequency phase stability GSFC-113	B63-10555	01	Lamp automatically switches to new filament on burnout M-FS-498	B66-10046	01
Blocking oscillator uses low triggering voltage MSC-58	B64-10017	01	Use of color-coded sleeve shutters accelerates oscillograph channel selection KSC-10092	B67-10382	01
Electronic device simulates respiration rate and depth MSC-89	B64-10255	01	<b>OSCILLOSCOPE</b>		
Voltage generator sweeps oscillator frequency linearly with time M-FS-219	B64-10320	01	Parallel line raster eliminates ambiguities in reading timing of pulses less than 500 microseconds apart JPL-805	B66-10386	01
FM oscillator uses tetrode transistor JPL-82	B65-10055	01	Semiconductors can be tested without removing them from circuitry M-FS-1163	B66-10447	01
Feedback oscillator functions as low-level pulse stretcher GSFC-261	B65-10069	01	Design concept for improved photo-scan tube		
Unijunction frequency divider is free of backward loading JPL-W00-010	B65-10112	01			
Variable frequency transistor inverters use multiple core transformers GSFC-183	B65-10119	01			



## SUBJECT INDEX

## OXYGEN PRODUCTION

JPL-818	B67-10157	01	M-FS-547	B66-10093	05
Oscilloscope used as X-Y plotter or two-dimensional analyzer			Device removes hydrogen gas from enclosed spaces		
LEWIS-311	B67-10269	01	GSFC-495	B66-10340	03
Electronic skewing circuit monitors exact position of object underwater			Sodium perxenate permits rapid oxidation of manganese for easy spectrophotometric determination		
NUC-10146	B67-10629	01	ARG-262	B67-10421	03
X-Y plotter adapter developed for SDS-930 computer			OXIDE		
NPD-10220	B67-10654	06	Reference black body is compact, convenient to use		
OUTPUT			ARC-3	B63-10004	03
Double-throw microwave device switches two lines quickly			Removable preheater elements improve oxide induction furnace		
JPL-410	B63-10258	01	JPL-288	B63-10193	01
Simple circuit provides adjustable voltage with linear temperature variation			Improved thermal insulation materials made of foamed refractory oxides		
JPL-W00-029	B63-10537	01	M-FS-735	B66-10288	03
Transistorized converter provides nondissipative regulation			Apparatus enables accurate determination of alkali oxides in alkali metals		
GSFC-238	B64-10305	01	LEWIS-256	B66-10296	03
Voltage generator sweeps oscillator frequency linearly with time			Recommended values of the thermophysical properties of eight alloys, their major constituents and oxides		
M-FS-219	B64-10320	01	NU-0095	B67-10062	03
Stepping motor drive circuit designed for low power drain			OXIDE FILM		
GSFC-198	B65-10026	01	Oxide film on metal substrate reduced to form metal-oxide-metal layer structure		
Digital-output cardiometer measures rapid changes in heartbeat rate			ARG-48	B67-10187	03
MSC-133	B65-10143	01	OXIDIZER		
Sensitive electrometer features digital output			Fuel and oxidizer valve assembly employs single solenoid actuator		
GSFC-288	B65-10206	01	MSC-1046	B66-10648	05
Frequency divider is free of spurious outputs			Addition of solid oxidizer increases liquid fuel specific impulse		
GSFC-308	B65-10334	01	JPL-861	B67-10058	03
Binary counter uses fluid logic elements			OXYGEN		
M-FS-323	B65-10377	01	Miniature oxygen-hydrogen cutting torch constructed from hypodermic needle		
Dual-voltage power supply has increased efficiency			JPL-545	B63-10517	05
LEWIS-107A	B66-10002	01	Cold trap increases sensitivity of gas chromatograph		
Automatic gain control circuit handles wide input range			M-FS-1617	B66-10517	03
MSC-166	B66-10089	01	Fluid properties handbook		
Improved system measures output energy of pyrotechnic devices			M-FS-13462	B67-10440	03
W00-256	B66-10159	01	OXYGEN APPARATUS		
Microphone multiplex system provides multiple outlets from single source			Respiratory transfer value has fail-safe feature		
GSFC-426	B66-10308	01	ARC-1	B65-10369	01
Modified univibrator compensates for output timing errors			Oxygen-hydrogen torch is a small-scale steam generator		
ARG-85	B67-10130	01	NU-0042	B66-10120	03
Amplifier provides dual outputs from a single source with complete isolation			OXYGEN BREATHING		
NUC-10056	B67-10221	01	Respiratory transfer value has fail-safe feature		
ARC-1			ARC-1	B65-10369	01
OVERVOLTAGE			OXYGEN DETECTOR		
Circuit protects regulated power supply against overload current			Fuel cell serves as oxygen level detector		
GSFC-453	B66-10292	01	JPL-SC-072	B65-10066	01
Trisphere spark gap actuates overvoltage relay			Blood oxygen saturation determined by transmission spectrophotometry of hemolyzed blood samples		
ARC-68	B66-10557	01	MSC-11018	B67-10252	04
OXIDATION			Improved sample capsule for determination of oxygen in hemolyzed blood		
Cryopumping of hydrogen in vacuum chambers is aided by catalytic oxidation of hydrogen			MSC-11017	B67-10408	04
LEWIS-15	B63-10340	05	OXYGEN PRODUCTION		
Tool provides constant purge during tube welding			Improved chlorate candle provides concentrated oxygen source		

## OXYGEN REGULATOR

## SUBJECT INDEX

MSC-1137 B67-10095 03

**OXYGEN REGULATOR**  
Plant respirometer enables high resolution of oxygen consumption rates  
HQ-47 B66-10406 04

**OXYGEN SENSOR**  
New electrolyte may increase life of polarographic oxygen sensors  
MSC-1049 B67-10003 03

Lamp enables measurement of oxygen concentration in presence of water vapor  
MSC-10043 B67-10387 01

**OXYGEN TREATMENT**  
Process reduces pore diameters to produce superior filters  
WOO-093 B66-10037 03

**OZONE**  
Porous glass makes effective substrate for ozone-sensing reagent  
GSFC-388 B65-10364 03

**P**

**P-N-P JUNCTION**  
Two-stage emitter follower is temperature stabilized  
MSC-20 B63-10493 01

**PACKAGING**  
Modular chassis simplifies packaging and interconnecting of circuit boards  
JPL-236A B63-10174 01

New package for belleville spring permits rate change, easy disassembly  
JPL-392 B63-10247 05

Lightweight magnesium-lithium alloys show promise  
M-FS-17 B63-10389 03

Use of tear ring permits repair of sealed module circuitry  
M-FS-210 B65-10014 05

Library of documents compressed into lap-held display kit  
MSC-125 B65-10030 01

Hollow plastic hoops protect thermocouple in storage and handling  
NU-0023 B65-10256 05

Frequency discriminator with binary output eliminates tuned circuits  
M-FS-376 B65-10349 01

Rugged microelectronic module package supports circuitry on heat sink  
MSC-81A B66-10245 01

Critical parts are stored and shipped in environmentally controlled reusable container  
M-FS-703 B66-10258 05

Packaging of electronic modules  
JPL-801 B66-10664 01

Reparable, high-density microelectronic module provides effective heat sink  
M-FS-13075 B67-10356 01

Study made of anodized aluminum circuit boards  
M-FS-13580 B67-10425 01

**PACKING DENSITY**  
PCM magnetic tape system efficiently records and reproduces data  
GSFC-375 B65-10311 01

**PAIN SENSITIVITY**  
Modified algometer provides accurate depth measurements

MSC-616 B66-10647 04

**PAINT**  
Inorganic paint is durable, fireproof, easy to apply  
GSFC-366 B65-10156 03

Aluminum alloys protected against stress-corrosion cracking  
M-FS-235 B65-10172 03

Special coatings control temperature of structures  
GSFC-444 B65-10337 03

Inexpensive infrared source improvised from flashlight  
M-FS-494 B66-10096 02

Technique eliminates high voltage arcing at electrode-insulator contact area  
LEWIS-10133 B67-10470 01

**PALLADIUM ALLOY**  
Thermodynamic properties of solid palladium-silver alloys and other alloys are investigated by torsion-effusion technique  
ARG-277 B67-10324 03

**PANEL**  
Portable display paneling has wide use, easy take down and assembly  
ARC-17 B63-10435 05

Electronic assembly rack panels snap on and off  
GSFC-59 B64-10121 05

Instrument adjustment knob locks to prevent accidental maladjustment  
M-FS-190 B64-10249 05

Transducer senses displacements of panels subjected to vibration  
ARC-37 B65-10085 01

Galvanic corrosion reduced in aluminum fabrications  
M-FS-272 B65-10140 03

Integral ribs formed in metal panels by cold-press extrusion  
M-FS-230 B65-10141 05

Concealed hinge permits flush mounting of doors and hatches  
MSC-623 B66-10336 05

Versatile machine mills, saws light materials  
M-FS-827 B66-10364 05

Impact- and puncture-resistant material protects parts from damage  
MSC-747 B66-10375 05

Mylar film eliminates silk screening of equipment panels  
MSC-798 B66-10455 05

Optical monitor panel provides flexible test panel configurations  
KSC-66-18 B66-10494 01

**PAPER**  
Expandable takeup reel facilitates paper tape removal  
WOO-271 B66-10399 05

Coded photographic proof paper could serve as convenient densitometer  
M-FS-13374 B67-10443 02

**PAPER CHROMATOGRAPHY**  
Electronic circuitry used to automate paper chromatography  
JPL-840 B67-10201 01

**PARABOLIC REFLECTOR**  
Unique construction makes interferometer

## SUBJECT INDEX

## PENNING GAUGE

insensitive to mechanical stresses JPL-725	B65-10295	02	<b>PARTICLE PRODUCTION</b> Process for preparing dispersions of alkali metals JPL-734	B66-10639	03
Small, high-intensity flasher permits continuous close-in photography NU-0043	B66-10119	03	<b>PARTICLE PROPERTY</b> Probe samples components of rocket engine exhaust M-FS-485	B65-10384	03
<b>PARABOLOIDAL MIRROR</b> Wide-aperture solar energy collector is light in weight JPL-SC-055	B65-10046	02	Experiments to investigate particulate materials in reduced gravity fields M-FS-13308	B67-10394	02
<b>PARACHUTE</b> Nylon shock absorber prevents injury to parachute jumpers MSC-226	B66-10080	05	<b>PARTICLE SIZE</b> Photographic method measures particle size and velocity in fluid stream M-FS-1536	B66-10668	01
Improved control system power unit for large parachutes MSC-12052	B67-10677	05	Method accurately measures mean particle diameters of monodisperse polystyrene latexes ARG-207	B67-10054	02
<b>PARACHUTING INJURY</b> Nylon shock absorber prevents injury to parachute jumpers MSC-226	B66-10080	05	<b>PARTICLE THEORY</b> Experiments to investigate particulate materials in reduced gravity fields M-FS-13308	B67-10394	02
<b>PARALLEL PLATE</b> Absolute viscosity measured using instrumented parallel plate system JPL-874	B67-10041	01	<b>PARTICULATE FILTER</b> Fine-particle filter prevents damage to vacuum pumps LEWIS-106	B63-10489	05
Machining heavy plastic sections M-FS-12720	B67-10381	03	<b>PATH</b> Copper foil provides uniform heat sink path MSC-262	B66-10004	02
<b>PARAMETRIC FREQUENCY CONVERTER</b> Parametric up-converter increases flexibility of maser KSC-67-98	B67-10104	01	<b>PATIENT</b> Buoyant Stokes litter assembly used for sea rescue operations MSC-131	B66-10019	05
<b>PARTICLE</b> Fine-mesh screen made by simplified method WOO-104	B64-10282	03	<b>PATTERN DISTRIBUTION</b> Areas of irregular, discontinuous patterns rapidly and accurately measured GSFC-10184	B67-10674	01
Improved atmospheric particle analyzer ERC-33	B67-10231	01	<b>PAYLOAD</b> Speed-sensing device aids crane operators WS-4	B64-10006	05
Mathematical relation predicts achievable densities of compacted particles ARG-10082	B67-10592	03	<b>PENDULUM</b> Seismic transducer measures small horizontal displacements M-FS-81	B65-10029	05
Air sampler collects and protects minute particles HQ-10037	B67-10661	01	<b>PENDULUM APPARATUS</b> Viscous-pendulum damper suppresses structural vibrations LANGLEY-45	B64-10272	05
<b>PARTICLE ACCELERATOR</b> Dust particle injector for hypervelocity accelerators provides high charge-to-mass ratio GSFC-509	B66-10347	01	Device enables measurement of moments of inertia about three axes GSFC-49	B65-10176	05
<b>PARTICLE COUNTER</b> Cleanroom air sampler counts, categorizes, and records particle data M-FS-2221	B67-10076	01	Shock-operated valve would automatically protect fluid systems M-FS-801	B66-10335	05
<b>PARTICLE DETECTOR</b> Microparticle impact sensor measures energy directly GSFC-252	B65-10048	01	Automatic system determines moments of inertia of asymmetrical objects M-FS-1769	B66-10636	01
Multiaxial analyzer detects low-energy electrons GSFC-329	B65-10213	01	<b>PENETRATING PARTICLE</b> Improved sensor counts micrometeoroid penetrations LEWIS-76	B63-10443	01
Boron trifluoride nuclear detector preamplifier uses single-cable connection LEWIS-178	B65-10255	01	<b>PENETROMETER</b> Extendable mast used in one shot soil penetrometer JPL-685	B66-10146	05
<b>PARTICLE DIFFUSION</b> Computer program VARI-QUIR III provides solution of steady-state, multigroup, two- dimensional neutron diffusion equations NUC-10052	B67-10345	06	<b>PENNING GAUGE</b> Rod and dish cathode improves Penning-type vacuum gauge GSFC-447	B66-10082	01
<b>PARTICLE MASS</b> Microparticle impact sensor measures energy directly GSFC-252	B65-10048	01			

# PERFORMANCE CHARACTERISTICS

# SUBJECT INDEX

## PERFORMANCE CHARACTERISTICS

Experimental scaling study of fluid amplifier elements  
M-FS-1882 B67-10088 02

Vis-A-Plan /visulaize a plan/ management technique provides performance-time scale  
KSC-10073 B67-10240 06

General purpose computer programs for numerically analyzing linear ac electrical and electronic circuits for steady-state conditions  
M-FS-13094 B67-10331 06

Torque meter aids study of hysteresis motor rings  
M-FS-12219 B67-10412 01

## PERFORMANCE PREDICTION

Human transfer functions used to predict system performance parameters  
LANGLEY-203 B66-10379 01

Performance of turbine-type flowmeters in liquid hydrogen  
LEWIS-10137 B67-10506 01

Computerized schedule effectiveness technique /SET/ determines present and future schedule position  
M-FS-13012 B67-10522 06

## PERMEABILITY

New energy storage concept uses tapes  
LEWIS-239 B66-10098 02

Special treatment reduces helium permeation of glass in vacuum systems  
HQ-25 B66-10372 02

## PERSONNEL SUBSYSTEM

Emergency escape system protects personnel from explosion and fire  
KSC-66-12 B66-10634 05

## PERT PROJECT

Computer/PERT technique monitors actual versus allocated costs  
LEWIS-260 B67-10025 01

A simplified PERT system  
M-FS-2267 B67-10241 05

Graphic visualization of program performance aids management review  
NUC-10011 B67-10568 06

## PERTURBATION

Problem of oscillating cone in supersonic flow is solved by small perturbation techniques  
M-FS-869 B66-10700 02

## PHASE

Computer determines high-frequency phase stability  
GSFC-113 B63-10555 01

## PHASE DEMODULATOR

Pn acquisition demodulator achieves automatic synchronization of a telemetry channel  
JPL-612 B66-10271 01

## PHASE DETECTOR

Phase detector circuit synthesizes own reference signal  
M-FS-247 B65-10080 01

Solid state phase detector replaces bulky transformer circuit  
MSC-11007 B67-10253 01

Sensitive bridge circuit measures conductance of low-conductivity electrolyte solutions  
ARG-147 B67-10294 01

## PHASE LOCK

Electronic phase-locked-loop speed control system is stable  
JPL-SC-084 B66-10232 01

An investigation of phase-lock loop swept-frequency synchronization  
M-FS-656 B66-10423 01

## PHASE MODULATION

Stable ac phase and amplitude comparator  
M-FS-13086 B67-10459 01

## PHASE SHIFT

Phase shift frequency synthesizer is efficient, small in size  
M-FS-250 B65-10169 01

Mechanical device accurately measures RF phase differences in VHF or UHF ranges  
M-FS-1738 B66-10694 05

## PHASE-SHIFT KEYING

Pn acquisition demodulator achieves automatic synchronization of a telemetry channel  
JPL-612 B66-10271 01

## PHENOL

Improved method facilitates debulking and curing of phenolic impregnated asbestos  
MSC-949 B66-10459 05

## PHENOL RESIN

Insulation for cryogenic tanks has reduced thickness and weight  
M-FS-326 B66-10183 02

## PHONOCARDIOGRAM

A phonocardiogram simulator  
KSC-67-94 B67-10239 01

## PHONOCARDIOGRAPHY

Phonocardiograph system monitors heart sounds  
MSC-185 B66-10154 04

Phonocardiograph microphone is rugged and moistureproof  
MSC-212 B66-10314 04

## PHOSPHORIC ACID

Electrolytic etching process provides effective bonding surface on stainless steel  
GSFC-484 B66-10299 03

## PHOTOCHEMISTRY

Dual photochemical replenisher system reduces chemical losses  
KSC-67-111 B67-10485 02

## PHOTOCONDUCTIVE CELL

Solar-angle sensor has no moving parts  
JPL-418 B63-10260 02

Photocell shadowing technique improves light source detector  
JPL-809 B66-10564 01

## PHOTOCONDUCTOR

Light-sensitive potentiometer measures product of two variables  
GSFC-240 B65-10076 01

Light-controlled resistors provide quadrature signal rejection for high-gain servo systems  
WSO-340 B67-10552 01

## PHOTODETECTOR

Sensor detects hydrocarbon oil contaminants in fluid lines  
M-FS-522 B66-10068 01

Optical device enables small detector to see large field of view  
WOO-253 B66-10263 02

Photocell shadowing technique improves light source detector  
JPL-809 B66-10564 01

# SUBJECT INDEX

# PHOTOGRAPHY

Blackbody cavity radiometer has rapid response JPL-521	B66-10679	01	pyrometry LANGLEY-33	B65-10100	02
<b>PHOTODIODE</b>			Simple circuit positions film frames in projector JPL-508	B65-10132	02
Simple circuit positions film frames in projector JPL-508	B65-10132	02	Planetary camera control improves microfiche production HQ-1	B65-10313	01
Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01	Beam splitter used in dual filming technique M-FS-501	B66-10072	02
Laser beam transmits electric power GSFC-293	B65-10158	01	Ultraviolet photographic pyrometer used in rocket exhaust analysis M-FS-499	B66-10095	02
Photoresistance analog multiplier has wide range GSFC-360	B65-10287	01	Small, high-intensity flasher permits continuous close-in photography NU-0043	B66-10119	03
<b>PHOTOELASTIC STRESS MEASUREMENT</b>			Automated drafting system uses computer techniques M-FS-788	B66-10362	01
Servo system facilitates photoelastic strain measurements on resins JPL-504	B64-10280	01	Aerial-image enables diagrams and animation to be inserted in motion pictures ARG-165	B67-10398	02
<b>PHOTOELECTRIC APPARATUS</b>			Camera lens adapter magnifies image M-FS-11955	B67-10431	02
Liquid-level meter has no moving parts M-FS-3	B63-10378	03	<b>PHOTOGRAPHIC DEVELOPER</b>		
Photoelectric semiconductor switch operates with low level inputs JPL-SC-068	B65-10033	01	Modified developer increases line resolution in photosensitive resist GSFC-386	B65-10278	01
Photoelectric scanner makes detailed work function maps of metal surface JPL-SC-176	B66-10440	01	Dual photochemical replenisher system reduces chemical losses KSC-67-111	B67-10485	02
Star/horizon simulator used to test space guidance system MSC-407	B67-10110	02	<b>PHOTOGRAPHIC FILM</b>		
<b>PHOTOELECTRIC CELL</b>			Commercial film produces positive X-ray photo in ten seconds M-FS-521	B66-10307	02
Solar-angle sensor has no moving parts JPL-418	B63-10260	02	Mylar film eliminates silk screening of equipment panels MSC-798	B66-10455	05
New method used to fabricate gallium arsenide photovoltaic device WOO-062	B64-10019	01	Gas pressure feeds film into camera at high speed ARG-97	B66-10474	02
Sensitive level sensor made with spirit level, gives electrical output LANGLEY-49	B65-10067	01	Polaroid film helps locate objects in inaccessible areas quickly MSC-960	B67-10008	02
Photoelectric system continuously monitors liquid level M-FS-417	B65-10382	01	<b>PHOTOGRAPHIC MEASUREMENT</b>		
Direction indicator system does not require complicated optics WOO-305	B66-10407	01	Photographic method measures particle size and velocity in fluid stream M-FS-1536	B66-10668	01
Remote preamplifier circuit maintains stability over wide temperature range WOO-278	B66-10432	01	Slide rule-type color chart predicts reproduced photo tones MSC-1227	B66-10680	01
<b>PHOTOGRAPH</b>			<b>PHOTOGRAPHY</b>		
Built-in templates speed up process for making accurate models LANGLEY-23	B63-10526	05	Front and back printed circuit layouts presented on single sheet GSFC-93	B63-10596	01
Use of photographs speeds inspection of printed-circuit boards MSC-72	B64-10118	01	Dot patterns provide reproducible flaw areas for study of adhesive bonds M-FS-862	B66-10367	05
<b>PHOTOGRAPH INTERPRETATION</b>			Exposure valve /eV/ system expanded to include filter factors and transmittance LANGLEY-190	B66-10602	02
Laser measuring system accurately locates point coordinates on photograph ARG-74	B66-10560	02	Fatigue zones in metals identified by polarized light photography WOO-286	B67-10082	02
<b>PHOTOGRAPHIC APPARATUS</b>			Computer program for video data processing system /VDPS/ NPO-10042	B67-10630	06
Illuminated display panel is easily changed MSC-108	B65-10003				
Nulling pyrometer uses Kerr cell shutter for fast responses NU-0010	B65-10050	05			
Rotating filters permit wide range of optical		01			

## PHOTOIONIZATION

An improved soft X-ray photoionization  
detector  
GSFC-540 B67-10072 02

## PHOTOLYSIS

Polymer film exhibits thermal and radiation  
stability  
LANGLEY-100 B66-10043 03

## PHOTOMETER

Scanning photometer system automatically  
determines atmospheric layer height  
MSC-245 B66-10170 01

Solvent residue content measured by light  
scattering technique  
M-FS-850 B66-10320 01

## PHOTOMETRY

PTFE-aluminum films serve as neutral  
density filters  
LANGLEY-189 B66-10017 02

## PHOTOMICROGRAPHY

Inspection of fine wires simplified by  
capillary tube wire holder  
MSC-358 B66-10329 05

Method accurately measures mean particle  
diameters of monodisperse polystyrene  
latexes  
ARG-207 B67-10054 02

## PHOTOMULTIPLIER

Variable light source with a million-to-one  
intensity ratio  
JPL-W00-008 B63-10424 03

System selects framing rate for spectrograph  
camera  
LANGLEY-55 B65-10086 01

Plastic scintillator converts standard  
photomultiplier to ultraviolet range  
ERC-9 B66-10108 02

Improved design provides faster response  
time in photomultiplier  
GSFC-451 B66-10526 01

Polarimeter provides transient response  
in nanosecond range  
JPL-890 B67-10021 02

Special purpose reflectometer uses modified  
Ulbricht sphere  
MSC-1135 B67-10109 02

## PHOTON

Offset lenses add versatility to  
phototypesetting machine  
HQ-9 B66-10173 02

## PHOTON ABSORPTION

Optically driven switch turn-off time reduced  
by opaque coatings  
JPL-SC-107 B66-10141 01

## PHOTORESISTIVITY

System for etching thick aluminum layers  
minimizes bridging and undercutting  
M-FS-1366 B66-10400 03

Process facilitates photoresist mask  
alignment on SiC crystals  
M-FS-2394 B67-10144 01

## PHOTOTRANSISTOR

Electrically controlled optical latch and  
switch requires less current  
JPL-SC-111 B66-10414 01

## PHOTOTUBE

Design concept for improved photo-scan tube  
JPL-818 B67-10157 01

## PHOTOVOLTAGE

Cuprous selenide and sulfide form improved

photovoltaic barriers  
W00-212 B66-10025 01

## PHOTOVOLTAIC EFFECT

Pressure transducer 3/8-inch in size can be  
faired into surface  
W00-065 B64-10021 05

Photovoltaic effect in organic polymer-  
iodine complex  
NPO-10373 B67-10634 03

## PHYSICAL CHEMISTRY

Apparatus presents visual display of  
semiconductor surface characteristics  
JPL-665 B66-10200 01

## PHYSICAL FITNESS

Simulator effects partial gravity conditions  
MSC-152 B66-10339 05

## PHYSICAL PROPERTY

Tiny sensor-transmitter can withstand extreme  
acceleration, gives digital output  
ARC-22 B63-10561 01

Silazane elastomer remains resilient at  
400 deg C  
M-FS-1144 B66-10667 05

Analytical technique characterizes all  
trace contaminants in water  
MSC-11032 B67-10243 03

Fluid properties handbook  
M-FS-13462 B67-10440 03

## PHYSICS

Review of physics, instrumentation and  
dosimetry of radioactive isotopes  
ARG-10037 B67-10640 02

## PHYSIOLOGICAL TELEMETRY

Analog device simulates physiological  
waveforms  
MSC-51 B64-10109 01

## PHYSIOLOGY

Test monkeys anesthetized by routine procedure  
HQ-18 B65-10332 04

Computer circuit calculates cardiac output  
MSC-274 B66-10006 01

## PIEZOELECTRIC CRYSTAL

Piezoresistive gage tests pin-connector  
sockets  
JPL-675 B65-10128 01

Crystal measures short-term, large-magnitude  
forces  
JPL-77 B65-10187 01

Acceleration-compensated pressure transducer  
has fast response  
LANGLEY-113 B66-10353 01

Quartz crystals detect gas contaminants  
during vacuum chamber evacuation  
NPO-10144 B67-10205 01

## PIEZOELECTRIC PRESSURE GAUGE

A piezo-bar pressure probe  
LEWIS-393 B67-10259 01

## PIEZOELECTRICITY

Device calibrates vibration transducers at  
amplitudes up to 20g  
M-FS-86 B63-10572 01

Ultra-sensitive transducer advances micro-  
measurement range  
ARC-26 B64-10004 01

Pressure transducer 3/8-inch in size can be  
faired into surface  
W00-065 B64-10021 05

Damping technique gives accelerometer flat

## SUBJECT INDEX

## PLASMA ARC

frequency response M-FS-471	B66-10293	01	Inexpensive insulation is effective for cryogenic transfer lines MSC-618	B66-10348	02
Method permits mechanical and electrical checkout of piezoelectric transducers while installed in a system ARC-73	B66-10533	01	Leak locator for vacuum jacketed pipelines eliminates need for removal of outer jacket M-FS-888	B66-10412	01
Design concepts using ring lasers for frequency stabilization M-FS-2448	B67-10143	01	Teflon sheet permits valve and valve operator to move as a single unit in a cryogenic pipe line NU-0077	B66-10702	05
<b>PIEZORESISTIVE DEVICE</b> Pressure transducer 3/8-inch in size can be faired into surface WOO-065	B64-10021	05	Study made of pneumatic high pressure piping materials /10,000 psi/ KSC-10133	B67-10437	03
Miniature stress transducer has directional capability JPL-591	B65-10023	01	<b>PISTON</b> Vented piston seal prevents fluid leakage between two chambers JPL-179	B63-10141	05
Gas pressure in sealed electrochemical cells measured externally GSFC-10004	B67-10551	03	Inexpensive check valve is installed in standard AN fittings JPL-2A	B65-10222	05
<b>PIGMENT</b> Pigmented coating resists thermal shock JPL-SC-083	B65-10354	03	Labyrinth-type valve seat increases valve life by decreasing fluid velocity M-FS-1051	B66-10424	05
<b>PIPE</b> Spring loaded beaded cable makes efficient wire puller WOO-108	B65-10031	05	Device accurately measures and records low gas-flow rates M-FS-1077	B66-10569	01
Portable tool removes burrs from pipe and tubing MSC-237	B65-10360	05	Check valve installation in pilot operated relief valve prevents reverse pressurization M-FS-1925	B66-10655	05
Portable tool cleans pipes and tubing MSC-238	B65-10375	05	Negative feedback system reduces pump oscillations M-FS-1852	B67-10064	05
Pipe cutting tool is useful in limited space MSC-36	B66-10102	05	Fluorocarbon seal replaces metal piston ring in low density gas environment LEWIS-10277	B67-10591	05
Studies reveal effects of pipe bends on fluid flow cavitation M-FS-516	B66-10228	05	<b>PIVOT</b> Solenoid permits remote control of stop watch and assures restarting FRC-17	B63-10024	01
Spherical pipe joint delivers loads equally to mating flange M-FS-807	B66-10665	05	<b>PLANETARY ATMOSPHERE</b> High intensity radiation heat source is capable of sustained operation / ARC-61	B66-10547	02
Technique cuts time and cost of bending jacketed piping WSO-333	B67-10018	05	<b>PLANT /BIOL/</b> Plant respirometer enables high resolution of oxygen consumption rates / HQ-47	B66-10406	04
Holding fixture facilitates pipe thread gage measurements M-FS-2009	B67-10066	05	Study made of relationship between growth and metabolism ARG-10046	B67-10604	04
Jacketed cryogenic piping is stress relieved M-FS-985	B67-10308	05	<b>PLASMA</b> Microwave technique measures plasma characteristics LANGLEY-134	B65-10122	02
Study made of thin-walled pipe response to turbulent fluids M-FS-1321	B67-10518	05	<b>PLASMA ACCELERATION</b> Gas-injection valve operates at high speed HQ-49	B66-10381	05
<b>PIPELINE</b> Special pliers connect hose containing liquid under pressure JPL-IT-1003	B63-10291	05	<b>PLASMA ACCELERATOR</b> Pulsed plasma accelerator operates repetitively without complex controls LANGLEY-48	B65-10062	01
Blade valve isolates compartment in pipe, opens to allow free flow JPL-585	B64-10188	05	Movable RF probe eliminates need for calibration in plasma accelerators LEWIS-10127	B67-10362	01
Portable power tool machines weld joints in field M-FS-258	B66-10145	05	<b>PLASMA ARC</b> Protective coating withstands high temperature in oxidizing atmosphere M-FS-529	B66-10044	03
Computer program determines gas flow rates in piping systems M-FS-443	B66-10300	01	Suppressor plate eliminates undesired arcing		
External linkage tie permits reduction in ducting system flange thickness M-FS-823	B66-10326	05			

## PLASMA COMPOSITION

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during electron beam welding M-FS-1126	B66-10357	05	transported M-FS-340	B65-10219	05
Intergranular metal phase increases thermal shock resistance of ceramic coating M-FS-1862	B66-10651	03	Fogging technique used to coat magnesium with plastic LEWIS-10316	B67-10584	03
<b>PLASMA COMPOSITION</b> Concept for using laser beams to measure electron density in plasmas M-FS-965	B66-10645	01	Dynamic captive plastic seal M-FS-12988	B67-10600	03
<b>PLASMA ELECTRODE</b> Plasma jet electrode has longer operating life NU-0098	B67-10024	02	<b>PLASTIC DEFORMATION</b> Plastic plus stainless-steel fibers make resilient, impermeable material WOO-246	B65-10374	03
<b>PLASMA GUN</b> Fast-acting calorimeter measures heat output of plasma gun accelerator LEWIS-388	B67-10192	01	Treatment increases stress-corrosion resistance of aluminum alloys M-FS-1840	B66-10595	05
<b>PLASMA JET</b> Carbon arc ignition improved by simple auxiliary circuit MSC-103	B65-10018	01	<b>PLASTIC FILM</b> Plastic films for reflective surfaces reproduced from masters GSFC-188	B64-10151	03
Plasma jet electrode has longer operating life NU-0098	B67-10024	02	Thermistor connector assembly increases accuracy of measurements LANGLEY-62	B65-10045	01
<b>PLASMA POTENTIAL</b> Computer programs calculate potential and charge distributions in a plasma M-FS-871	B66-10553	01	Process produces accurate registry between circuit board prints LANGLEY-288	B66-10660	02
<b>PLASTIC</b> Mechanical properties of plastics predeterm- ined by empirical method ARC-28	B64-10068	03	Scribable coating for plastic films MSC-11194	B67-10409	03
Improved holder protects crystal during high acceleration and impact JPL-463	B65-10037	05	<b>PLASTIC MATERIAL</b> Portable flooring protects finished surfaces, is easily moved M-FS-15	B63-10387	05
Epoxy-resin patterns speed shell-molding of aluminum parts M-FS-303	B65-10177	05	A technique for making animal restraints ARC-25	B63-10564	05
Organic reactants rapidly produce plastic foam LANGLEY-37	B65-10288	03	Plastic molds reduce cost of encapsulating electric cable connectors M-FS-69	B63-10568	05
Drill bit design assures clean holes in laminated materials WOO-098	B65-10386	05	Cryogenic waveguide window is sealed with plastic foam JPL-559	B63-10613	01
Corrosion of metal samples rapidly measured NU-0041	B66-10140	03	Mechanical properties of plastics predetermined by empirical method ARC-28	B64-10068	03
Plastic tubing protects flexible copper hose M-FS-772	B66-10588	05	Illuminated display panel is easily changed MSC-108	B65-10003	05
Dispersion of borax in plastic is excellent fire-retardant heat insulator ARG-5	B67-10016	03	Vapor pressure measured with inflatable plastic bag GSFC-281	B65-10136	03
New class of thermosetting plastics has improved strength, thermal and chemical stability LEWIS-10108	B67-10197	03	Inexpensive electrical connector is moisture and corrosionproof MSC-164	B65-10196	01
Machining heavy plastic sections M-FS-12720	B67-10381	03	Inert-gas welding and brazing enclosure fabricated from sheet plastic LEWIS-220	B65-10338	05
Polarized light reveals stress in machined laminated plastics LEWIS-10018	B67-10383	03	Flexible plastic ring assembly makes durable shaft seal WOO-227	B65-10367	05
Epoxy resins produce improved plastic scintillators ARG-241	B67-10596	03	Plastic plus stainless-steel fibers make resilient, impermeable material WOO-246	B65-10374	03
<b>PLASTIC COATING</b> Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application LANGLEY-6A	B63-10318	03	Device detects unbonded areas in plastic laminates WOO-206	B65-10380	01
Flexible magnetic planning boards are easily			Shrinkable sleeve eliminates shielding gap in RF cable WOO-207	B65-10387	01
			Bench vise adapter grips tubing securely and		



# SUBJECT INDEX

# PLUG

safely MSC-279	B66-10056	05	Welding, bonding, and sealing of refractory metals by vapor deposition LEWIS-123	B67-10232	03
Rotating mandrel speeds assembly of plastic inflatables LANGLEY-155	B66-10137	05	Steel test panel helps control additives in pyrophosphate copper plating LEWIS-10101	B67-10358	05
Thermoplastic rubberlike material produced at low cost JPL-793	B66-10453	03	<b>PLATINUM</b> Substituting gold for silver improves electrical connections M-FS-2390	B67-10228	03
Thin plastic sheet eliminates need for expensive plating M-FS-1896	B66-10681	03	<b>PLATINUM BLACK</b> Blackbody cavity radiometer has rapid response JPL-521	B66-10679	01
Improved compression molding process LANGLEY-10027	B67-10302	03	<b>PLENUM CHAMBER</b> Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05
Plastic shoe facilitates ultrasonic inspection of thin wall metal tubing NUC-10010	B67-10542	02	<b>PLOTTER</b> Plotter design simplifies determination of image sensor transfer characteristic NPO-10164	B67-10206	01
<b>PLASTIC TAPE</b> Calibrating ultrasonic test equipment for checking thin metal strip stock NUC-10009	B67-10127	01	Subroutines GEORGE and DRASTC simplify operation of automatic digital plotter NUC-10044	B67-10222	06
<b>PLASTICIZER</b> Mechanical properties of plastics predetermined by empirical method ARC-28	B64-10068	03	<b>PLOTTING</b> Veitch diagram plotter simplifies boolean functions JPL-385	B63-10241	05
<b>PLATE</b> Device transmits rotary motion through hermetically sealed wall JPL-303	B63-10198	05	Polychart contour plotter enables data extrapolation from multiple plotting charts M-FS-37	B64-10406	05
Lightweight universal joint transmits both torque and thrust JPL-375	B63-10236	05	Computer routine adds plotting capabilities to existing programs GSFC-490	B66-10511	01
Simple mechanism combines positive locking and quick-release features WOO-4	B63-10420	05	Analytical drafting curves provide exact equations for plotted data LANGLEY-285	B67-10601	02
Unmanned seismometer levels self, corrects drift errors GSFC-100	B63-10551	01	<b>PLOTTING INSTRUMENT</b> Polychart contour plotter enables data extrapolation from multiple plotting charts M-FS-37	B64-10406	05
Splice plate design assures structural separation by mild explosive MSC-137	B65-10166	05	Variable load automatically tests dc power supplies GSFC-291	B65-10105	01
<b>PLATFORM</b> Apparatus measures very small thrusts WOO-048	B64-10284	05	Simple scale interpolator facilitates reading of graphs LEWIS-92	B66-10302	05
Interior servicing platform simplifies maintenance of storage tanks M-FS-1300	B66-10425	05	Computer program utilizes Fortran IV subroutines for contour plotting NPO-10127	B67-10323	06
Work platform is supported by self-locking blades M-FS-2297	B67-10180	05	<b>PLUG</b> Design of valve permits sealing even if the stem is misaligned LEWIS-38	B63-10341	05
<b>PLATING</b> Adherent protective coatings plated on magnesium-lithium alloy M-FS-365	B65-10294	03	Circuit reliability boosted by soldering pins of disconnect plugs to sockets JPL-447	B64-10002	01
Plated nickel wire mesh makes superior catalyst bed MSC-216	B65-10321	03	Keyed plugs and sockets prevent improper connections MSC-231	B65-10381	01
Improved memory word line configuration allows high storage density GSFC-559	B66-10617	01	Electron beam seals outer surfaces of porous bodies M-FS-562	B66-10033	03
Complex surfaces plated by thin-film deposition in one operation LEWIS-292	B67-10006	05	Plugged hollow shaft makes fatigue-resistant shear pin LANGLEY-195	B66-10077	05
Undercoat prevents blistering of silver plating at elevated temperatures M-FS-2049	B67-10096	05	Expandable rubber plug seals openings for pressure testing		
Environmental study of miniature slip rings M-FS-2443	B67-10210	05			

## PLUME

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NU-0048	B66-10229	05	JPL-890	B67-10021	02
Shock-operated valve would automatically protect fluid systems			<b>POLARIZATION</b>		
M-FS-801	B66-10335	05	Circuit switches latching relay in response to signals of different polarity		
Plug replaces weld filler as seal in complex casting			W00-055	B63-10508	01
NU-0049	B66-10489	05	Nulling pyrometer uses Kerr cell shutter for fast responses		
Hand-operated plug insertion valve			NU-0010	B65-10050	01
M-FS-12019	B67-10466	05	Magnetic field controls carbon arc tail flame		
<b>PLUME</b>			MSC-139	B65-10108	01
Predicting surface heating rates and pressures resulting from hot exhaust gases			Range recording technique enables four-way polarization measurements		
MSC-971	B66-10633	05	M-FS-12447	B67-10460	01
<b>PLUTONIUM</b>			<b>POLARIZATION CHARACTERISTICS</b>		
Magnesium-zinc reduction is effective in preparation of metals			Antenna configurations provide polarization diversity		
ARG-10050	B67-10579	03	GSFC-74	B66-10066	01
<b>PNEUMATIC CONTROL</b>			<b>POLARIZED LIGHT</b>		
Electropneumatic transducer automatically limits motor current			Polarized light reveals stress in machined laminated plastics		
LEWIS-253	B66-10160	01	LEWIS-10018	B67-10383	03
Spool valve cycles at controlled frequency			<b>POLAROGRAPHY</b>		
MSC-143	B66-10495	05	New electrolyte may increase life of polarographic oxygen sensors		
Resilient bearing supports are gas controlled			MSC-1049	B67-10003	03
LEWIS-10109	B67-10364	05	<b>POLE</b>		
<b>PNEUMATIC EQUIPMENT</b>			Threading hook facilitates safe recovery of heavy loads		
Pneumatic power is transmitted through air bearing			MSC-46	B64-10185	05
MSC-8	B64-10141	05	<b>POLISHED METAL</b>		
Electropneumatic rheostat regulates high current			Metallographic holding fixture permits polishing of soft metals on vibratory lapping machine		
ARC-44	B65-10299	01	ARG-42	B66-10562	05
Pneumatic shutoff and time-delay valve operates at controlled rate			<b>POLISHING</b>		
M-FS-602	B66-10189	05	Improved technique for localizing electro-polishing features novel nozzles		
Pneumatic separator gives quick release to heavy loads			W00-101	B64-10271	01
KSC-66-10	B66-10294	05	Portable tool cleans pipes and tubing		
Automatic protective vent has fail-safe feature			MSC-238	B65-10375	05
LANGLEY-218	B66-10369	05	<b>POLYANIDE</b>		
Pneumatic binary encoder replaces multiple solenoid system			Aluminum alloys protected against stress-corrosion cracking		
M-FS-665	B66-10374	01	M-FS-235	B65-10172	03
Pneumatic wrench retains or discharges nuts or bolts as desired			<b>POLYCARBONATE</b>		
NU-0085	B66-10707	05	One-piece transparent shell improves design of helmet assembly		
Single wrench separates nuts from free-floating bolts			MSC-187	B66-10390	05
NUC-10013	B67-10158	05	Thermocouple-flexible cable connector insulator is highly reliable		
Study made of pneumatic high pressure piping materials /10,000 psi/			NU-0082	B66-10709	01
KSC-10133	B67-10437	03	<b>POLYESTER</b>		
<b>PNEUMOGRAPHY</b>			Irradiation improves properties of an aromatic polyester		
Electronic device simulates respiration rate and depth			LANGLEY-115	B65-10164	03
MSC-89	B64-10255	01	<b>POLYESTER RESIN</b>		
Pneumotachometer counts respiration rate of human subject			Modified filter prevents conduction of micro-wave signals along high-voltage power supply leads		
MSC-92	B64-10259	01	JPL-63	B63-10091	01
<b>POINT SOURCE</b>			Adhesive for polyester films cures at room temperature, has high initial tack		
Point-source detection system rejects spatially extended radiation sources			M-FS-938	B66-10487	03
GSFC-486	B66-10622	01	Metallographic samples mounted with room-temperature, curable, polyester casting resins		
<b>POLARIMETER</b>			ARG-10025	B67-10484	03
Polarimeter provides transient response in nanosecond range			<b>POLYMER</b>		
			Metals plated on fluorocarbon polymers		
			JPL-544	B63-10612	03

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# POSITION SERVO

Encapsulation process sterilizes and preserves surgical instruments JPL-484	B64-10066	05	<b>POLYURETHANE FOAM</b> Storage-stable foamable polyurethane is activated by heat LANGLEY-187	B66-10111	03
Low-cost seal compensates for surface irregularities NU-0016	B65-10160	05	Process produces chlorinated aromatic isocyanate in high yield M-FS-1658	B66-10646	03
Electronic modules easily separated from heat sink MSC-142	B65-10186	02	<b>POROSITY</b> Apparatus facilitates pressure-testing of metal tubing LEWIS-174	B65-10131	05
Polymer film exhibits thermal and radiation stability LANGLEY-100	B66-10043	03	Effect of welding position on porosity formation in aluminum alloy welds M-FS-2318	B67-10177	05
Polymer deformation gauge measures thickness change in tensile tests JPL-745	B66-10147	01	<b>POROUS MATERIAL</b> Porous glass makes effective substrate for ozone-sensing reagent GSFC-388	B65-10364	03
Composite gaskets are compatible with liquid oxygen, resist compression set M-FS-455	B66-10395	03	Process reduces pore diameters to produce superior filters WOO-093	B66-10037	03
Static electricity of polymers reduced by treatment with iodine NPO-10062	B67-10132	03	Composites of porous metal and solid lubricants increase bearing life LEWIS-307	B67-10007	03
Isostatic compression process converts polyaromatics into structural material JPL-892	B67-10168	03	<b>PORTABILITY</b> Portable flooring protects finished surfaces, is easily moved M-FS-15	B63-10387	05
Adhesives for laminating polyimide insulated flat conductor cable M-FS-12066	B67-10429	03	Portable display paneling has wide use, easy take down and assembly ARC-17	B63-10435	05
Concept for design of variable stiffness damper ARC-11225	B67-10483	05	Seismometer designed for remote operation in random orientation JPL-320	B66-10085	01
Photovoltaic effect in organic polymer-iodine complex NPO-10373	B67-10634	03	Mount makes liquid nitrogen-cooled gamma ray detector portable LEWIS-259	B66-10103	01
<b>POLYMETHYL METHACRYLATE</b> Spherical model provides visual aid for cubic crystal study LEWIS-108	B65-10065	03	Ultrasonic recording scanner used for nondestructive weld inspection M-FS-284	B66-10220	01
Small, high-intensity flasher permits continuous close-in photography NU-0043	B66-10119	03	Automated tester permits precise calibration of pressure transducers from 0 to 1050 psi NUC-10067	B67-10263	01
<b>POLYNOMIAL</b> Polynomial manipulator AP-168 MSC-1231	B67-10103	01	Portable machine welding head automatically controls arc M-FS-12763	B67-10272	05
<b>POLYSTYRENE</b> Small foamed polystyrene shield protects low-frequency microphones from wind noise M-FS-123	B63-10579	01	Portable spectrometer monitors inert gas shield in welding process M-FS-12144	B67-10326	02
Cryogenic waveguide window is sealed with plastic foam JPL-559	B63-10613	01	Ultrasonic hand tool allows convenient diagnostic scanning of bone integrity M-FS-14102	B67-10486	02
Polystyrene cryostat facilitates testing tensile specimens under liquid nitrogen NUC-10522	B67-10613	02	Variable-speed, portable routing skate M-FS-13772	B67-10525	05
<b>POLYTETRAFLUOROETHYLENE</b> PTFE-aluminum films serve as neutral density filters LANGLEY-189	B66-10017	02	Radiant heat source, vacuum bag, provide portable bonding oven MSC-11342	B67-10570	03
Polytetrafluoroethylene lubricates ball bearings in vacuum environment M-FS-379	B66-10081	03	<b>POSITION INDICATOR</b> Direction indicator system does not require complicated optics WOO-305	B66-10407	01
Dynamic valve seal is reliable at cryogenic temperatures M-FS-12987	B67-10526	05	Analog solar system model relates celestial bodies spatially JPL-195	B66-10413	01
<b>POLYURETHANE</b> Nonwoven glass fiber mat reinforces polyurethane adhesive M-FS-2309	B67-10113	03	Shaft encoder presents digital output JPL-SC-191	B66-10436	01
			<b>POSITION SERVO</b> Rotary valve controls multiple hydraulic		

## POSITIONING

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leveling cylinders M-FS-361	B66-10402	05	in cryogenic application W00-260	B66-10138	03
<b>POSITIONING</b>			Study made of destructive sectioning of complex structures for examination LEWIS-341	B66-10676	05
Three-position rocker switch actuator has positive centering MSC-261	B65-10376	01	Study made to control depth of potting compound for honeycomb sandwich fasteners LEWIS-370	B66-10677	05
Device facilitates centering of workpieces in lathe chuck M-FS-685	B66-10277	05	<b>POWDER METALLURGY</b>		
<b>POSITIONING EQUIPMENT</b>			Porous mandrels provide uniform deformation in hydrostatic powder metallurgy M-FS-1972	B67-10209	03
Screw locking cups quickly and neatly crimped NU-0009	B65-10049	05	<b>POWDERED METAL</b>		
Sheet metal strip unrolls to form circular boom GSFC-423	B66-10032	05	Modified filter prevents conduction of micro- wave signals along high-voltage power supply leads JPL-63	B63-10091	01
Thermal motor positions magnetometer sensors ARC-51	B66-10078	05	Eddy current probe measures size of cracks in nonmetallic materials M-FS-14059	B67-10645	03
Adjustable cutting guide aligns and positions stacks of material MSC-321	B66-10210	05	<b>POWER CONVERSION</b>		
Inflatable holding fixture permits X-rays to be taken of inner weld areas M-FS-856	B66-10327	03	Compact microwave mixer has high conversion efficiency GSFC-197	B66-10625	01
Alignment tool facilitates pin placement on irregular horizontal surfaces LANGLEY-219	B66-10410	05	<b>POWER DENSITY</b>		
Heavy duty precision leveling jacks expedite setup time on horizontal boring mill M-FS-1084	B66-10411	05	A power-spectral-density computer program NPO-10126	B67-10160	01
Adjustable, self-locking ladder includes optional work platform M-FS-1922	B67-10067	05	<b>POWER EFFICIENCY</b>		
Welding torch and wire feed manipulator M-FS-13102	B67-10385	05	Circuit exhibits power efficiency greater than 75 percent MSC-254	B66-10034	01
<b>POTABLE WATER</b>			Complementary monostable circuits achieve low power drain and high reliability GSFC-433	B66-10179	01
Analytical technique characterizes all trace contaminants in water MSC-11032	B67-10243	03	Control circuit maintains unity power factor of reactive load MSC-192	B66-10431	01
<b>POTASSIUM NITRATE</b>			<b>POWER GAIN</b>		
Hydrated multivalent cations are new class of molten salt mixtures ARG-211	B67-10033	03	New apparatus increases ion beam power density LEWIS-73	B63-10440	01
<b>POTASSIUM SILICATE</b>			<b>POWER SUPPLY</b>		
Inorganic paint is durable, fireproof, easy to apply GSFC-366	B65-10156	03	Igniting system for mercury vapor lamps pro- tects transistorized sustaining supply JPL-421	B63-10262	01
<b>POTENTIAL COLLECTOR</b>			Ptc thermistor protects multiloaded power supplies GSFC-236	B64-10281	01
Collector/collector guard ring balancing circuit eliminates edge effects JPL-SC-143	B66-10563	01	Zener diode is starter for transistor- regulated power supply NU-0015	B65-10052	01
<b>POTENTIOMETER</b>			Variable voltage supply uses zener diode as reference GSFC-262	B65-10097	01
Tension is servo controlled in film advance system LANGLEY-54	B65-10075	05	Variable load automatically tests dc power supplies GSFC-291	B65-10105	01
Light-sensitive potentiometer measures product of two variables GSFC-240	B65-10076	01	Dc to ac converter operates efficiency at low input voltages GSFC-130	B65-10178	01
Simple circuit reduces transistor switching time GSFC-314	B65-10234	01	Modular thermoelectric cell is easily packaged in various arrays GSFC-339	B65-10199	01
High voltage potential divider calibrated by simple device ARG-83	B66-10497	01	Improved wire memory matrix uses very little power JPL-SC-167	B65-10359	01
Double emitter suppressed carrier modulator uses commercially available components M-FS-2494	B67-10101	01	Low-power ring counter drives high-level loads GSFC-431	B66-10106	01
<b>POTTING COMPOUND</b>					
Bismuth alloy potting seals aluminum connector					

# SUBJECT INDEX

# PRESSURE DROP

Economical and maintenance-free gas system operates railroad switches NU-0045	B66-10124	05	PRESSING Rapid billet loader aids extrusion of refractory metals LEWIS-50	B63-10354	05
Linear signal noise summer accurately determines and controls S/N ratio JPL-SC-152	B66-10433	01	PRESSURE High-pressure regulating system prevents pressure surges JPL-231	B63-10170	05
Standard arc welders provide high amperage direct current source LANGLEY-267	B66-10441	01	Special pliers connect hose containing liquid under pressure JPL-IT-1003	B63-10291	05
Rectilinear accelerometer possesses self-calibration feature M-FS-1480	B66-10452	01	Device induces lungs to maintain known constant pressure MSC-50	B64-10108	04
Simple, one transistor circuit boosts pulse amplitude GSFC-501	B66-10480	01	Pulsed plasma accelerator operates repetitively without complex controls LANGLEY-48	B65-10062	01
Preregulator feedback circuit utilizes light actuated switch M-FS-1180	B66-10542	01	Electrically heated diaphragm eliminates use of pyrotechnics MSC-241	B65-10400	01
Multipulse current source offers low power losses and high reliability LANGLEY-68	B67-10603	01	Miniature capacitor functions as pressure sensor JPL-903	B67-10020	01
An improved magnetic tape recorder GSFC-08259	B67-10646	01	Computer program calculates sonic-boom pressure signatures LANGLEY-10096	B67-10489	06
Improved control system power unit for large parachutes MSC-12052	B67-10677	05	PRESSURE APPARATUS Upsetting butt edge increases weld-joint strength M-FS-175	B64-10164	05
POWER TRANSMISSION Laser beam transmits electric power GSFC-293	B65-10158	01	Apparatus facilitates pressure-testing of metal tubing LEWIS-174	B65-10131	05
System transmits mechanical vibration into hazardous environment NU-0025	B65-10248	05	Inflatable bladder provides accurate calibration of pressure switch M-FS-367	B65-10279	01
PREAMPLIFIER Auxiliary circuit enables automatic monitoring of EKG MSC-106	B65-10142	01	Diffusion bonding makes strong seal at flanged connector M-FS-637	B66-10250	05
Boron trifluoride nuclear detector preamplifier uses single-cable connection LEWIS-178	B65-10255	01	Closed loop operation eliminates need for auxiliary gas in high pressure pumping station M-FS-893	B66-10408	05
Electrometer preamplifier has drift correction feedback JPL-SC-074	B65-10267	01	Design concept for pressure switch calibrator HQ-36	B66-10598	01
Remote preamplifier circuit maintains stability over wide temperature range WOO-278	B66-10432	01	PRESSURE CHAMBER Vented piston seal prevents fluid leakage between two chambers JPL-179	B63-10141	05
Miniature electrometer preamplifier effectively compensates for input capacitance ARC-69	B66-10549	01	PRESSURE DISTRIBUTION Calibrated clamp facilitates pressure application MSC-298	B66-10059	05
PRECIPITATION Crack detection method is safe in presence of liquid oxygen M-FS-236	B65-10107	03	PRESSURE DROP Universal bellows joint restraint permits angular and offset movement WOO-102	B65-10371	05
Process for preparing dispersions of alkali metals JPL-734	B66-10639	03	Selective tube roughening increases heat transfer capability M-FS-599	B66-10610	05
PRECISION Standard surface grinder for precision machining of thin-wall tubing ARG-10014	B67-10400	05	Computer program provides steady state analysis for liquid propellant propulsion systems MSC-10064	B67-10414	06
Precision trimmer aids in preparing biomedical specimen blocks for ultrathin sectioning ARG-242	B67-10541	05	Computer program MCAP-TOSS calculates steady-state fluid dynamics of coolant in parallel channels and temperature distribution in surrounding heat-generating solid		
PREDICTION THEORY Mathematical relation predicts achievable densities of compacted particles ARG-10082	B67-10592	03			

NUC-10042	B67-10456	06	Rod and dish cathode improves Penning-type vacuum gauge GSFC-447	B66-10082	01
Study made of heat transfer and pressure drop through tubes with internal interrupted fins LEWIS-10280	B67-10555	05	Colloidal suspension simulates linear dynamic pressure profile WOO-266	B66-10214	05
<b>PRESSURE EFFECT</b>			Modified McLeod gage records automatically LEWIS-290	B66-10290	02
Pressure responsive seal handles static and dynamic loads GSFC-441	B65-10327	05	Acceleration-compensated pressure transducer has fast response LANGLEY-113	B66-10353	01
Fixture tests bellows reliability through repetitive pressure/temperature cycling MSC-1176	B67-10111	01	A piezo-bar pressure probe LEWIS-393	B67-10259	01
<b>PRESSURE FIELD</b>			Automatic transducer switching provides accurate wide range measurement of pressure differential NUC-10001	B67-10540	01
Volume-ratio calibration system for vacuum gages LEWIS-303	B66-10640	01	Gas pressure in sealed electrochemical cells measured externally GSFC-10004	B67-10551	03
<b>PRESSURE GAUGE</b>			<b>PRESSURE OSCILLATION</b>		
Rapid helium-air analyzer can measure other binary gas mixtures LANGLEY-16	B63-10557	03	Pressure levels and pulsation frequencies can be varied on high pressure/frequency testing device LEWIS-10205	B67-10360	05
Pickup device reads pressures from ports in rotating mechanisms LEWIS-158	B65-10021	05	<b>PRESSURE PROBE</b>		
Differential pressure gauge has fast response M-FS-358	B65-10285	05	Pressure probe compensates for dimensional tolerance variations LEWIS-302	B66-10599	01
<b>PRESSURE GRADIENT</b>			A piezo-bar pressure probe LEWIS-393	B67-10259	01
Packless valve with all-metal seal handles wide temperature, pressure range JPL-361	B63-10228	05	<b>PRESSURE RECORDER</b>		
Density trace made with computer printout GSFC-322	B65-10200	01	Pressure transducer system is force-balanced, has digital output M-FS-154	B65-10174	05
<b>PRESSURE MEASUREMENT</b>			Blood pressure reprogramming adapter assists signal recording MSC-265	B67-10475	01
Improved variable-reluctance transducer measures transient pressures LANGLEY-10	B63-10321	01	<b>PRESSURE REGULATOR</b>		
Fluid-pressure meter can be calibrated without removal from flow line M-FS-98	B63-10502	05	High-pressure regulating system prevents pressure surges JPL-231	B63-10170	05
Precision gage measures ultrahigh vacuum levels GSFC-114	B63-10597	01	Pressure transducer system is force-balanced, has digital output M-FS-154	B65-10174	05
Multiple port pressure scanner valve features greater accuracy, quicker data JPL-555	B64-10031	05	Ring valve responds to differential pressure changes WOO-247	B66-10022	05
Fluid-pressure measurement apparatus uses short-length manometer tubes LEWIS-28	B65-10027	05	Dual regulator controls two gases from a single reference MSC-227	B66-10167	05
Apparatus measures swelling of membranes in electrochemical cells GSFC-280	B65-10087	01	Pressure seal ring may be effective over wide temperature range M-FS-486	B66-10211	05
Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	Magnetic latches provide positive overpressure control NU-0057	B66-10279	05
Vapor pressure measured with inflatable plastic bag GSFC-281	B65-10136	03	Gas diffuser facilitates withdrawal of cryogenic liquids from tanks M-FS-915	B66-10342	05
Differential pressure gauge has fast response M-FS-358	B65-10285	05	Spool valve cycles at controlled frequency MSC-143	B66-10495	05
Remote rapidly varying pressures accurately measured FRC-28	B65-10301	01	Check valve installation in pilot operated relief valve prevents reverse pressurization M-FS-1925	B66-10655	05
Cold cathode ionization gauge has rigid metal housing GSFC-445	B66-10041	01	High speed blowdown system provides rapid pressure loss LEWIS-375	B67-10043	05
Transmission system isolates pressure transducer from severe environment WOO-239	B66-10064	01			

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# PRINTED CIRCUIT

Portable fixture facilitates pressure testing of instrumentation fittings M-FS-2032	B67-10121	03	Gas pressure in sealed electrochemical cells measured externally GSFC-10004	B67-10551	03
High impact pressure regulator withstands impacts of over 15,000 g NPD-10175	B67-10274	01	Ultraminiature manometer-tipped cardiac catheter ARC-10054	B67-10669	01
<b>PRESSURE RELIEF VALVE</b> One-shot valve may be remotely actuated WOO-195	B65-10266	05	<b>PRESSURE TUBE</b> Remote rapidly varying pressures accurately measured FRC-28	B65-10301	01
<b>PRESSURE TRANSDUCER</b> Improved variable-reluctance transducer measures transient pressures LANGLEY-10	B63-10321	01	O-rings with Mylar back-up provide high-pressure cryogenic seal M-FS-603	B66-10278	05
Welded pressure transducer made as small as 1/8th-inch in diameter ARC-11	B63-10429	03	High pressure cryogenic liquid flow sight assembly provides streamlined flow for easy observation LEWIS-310	B66-10394	01
Fluid-pressure meter can be calibrated without removal from flow line M-FS-98	B63-10502	05	Study made of pneumatic high pressure piping materials /10,000 psi/ KSC-10133	B67-10437	03
Pressure transducer 3/8-inch in size can be faired into surface WOO-065	B64-10021	05	<b>PRESSURE VESSEL</b> Method of welding joint in closed vessel improves quality of seam JPL-170	B63-10139	05
Multiple port pressure scanner valve features greater accuracy, quicker data JPL-555	B64-10031	05	Lightweight door seals cryogenic container against diaphragm type loading M-FS-476	B65-10402	05
Metal diaphragm used to calibrate miniature transducers M-FS-207	B65-10059	01	Pressure vessels fabricated with high-strength wire and electroformed nickel M-FS-580	B66-10218	05
Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	Preformed stiffeners used to fabricate structural components for pressurized tanks M-FS-1796	B66-10688	05
Pressure transducer system is force-balanced, has digital output M-FS-154	B65-10174	05	Lead plated aluminum ring provides static high pressure seal for large diameter pressure vessel NUC-10008	B67-10539	05
Pressure sensor responds only to shock wave M-FS-238	B65-10184	01	<b>PRESSURIZATION</b> Low-cost insulation system for cryostats eliminates need for a vacuum LEWIS-64	B63-10365	03
Direct force-measuring transducer used in blood pressure research ARC-53	B65-10325	01	Adapter assembly prevents damage to tubing during high pressure tests MSC-563	B66-10330	05
Special mount improves remote transducer accuracy LEWIS-269	B66-10021	01	Portable lightweight cell provides controlled environment MSC-648	B66-10370	05
Pressure transducers dynamically tested with sinusoidal pressure generator LEWIS-268	B66-10031	01	Investigation of pressurized toroidal shells HQ-27	B67-10117	05
Transmission system isolates pressure transducer from severe environment WOO-239	B66-10064	01	Propellant tank pressurization analysis program M-FS-1506	B67-10625	06
Indicator system provides complete data of engine cylinder pressure variation LEWIS-291	B66-10470	05	<b>PRIMER</b> White primer permits a corrosion-resistant coating of minimum weight M-FS-304	B66-10207	03
Miniature telemetry system accurately measures pressure ARC-74	B66-10624	01	<b>PRINTED CIRCUIT</b> Modular chassis simplifies packaging and interconnecting of circuit boards JPL-236A	B63-10174	01
System enables more complete calibrations of dynamic-pressure transducers M-FS-2063	B67-10099	01	Front and back printed circuit layouts presented on single sheet GSFC-93	B63-10596	01
Automated tester permits precise calibration of pressure transducers from 0 to 1050 psi NUC-10067	B67-10263	01	Compact coaxial connector for printed circuit adds reliability MSC-57	B64-10016	01
Design for high-temperature /1800 deg F/ liquid metal pressure transducer LEWIS-10144	B67-10458	01	Use of photographs speeds inspection of printed-circuit boards		

# PRINTER

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MSC-72	B64-10118	01	M-FS-369	B66-10062	01
Handtool bends component leads accurately			Blood pressure reprogramming adapter		
M-FS-308	B65-10181	05	assists signal recording		
Tool forms right angles in component leads			MSC-265	B67-10475	01
M-FS-722	B66-10346	05	PROJECTION		
Process produces accurate registry between			Use of photographs speeds inspection of		
circuit board prints			printed-circuit boards		
LANGLEY-288	B66-10660	02	MSC-72	B64-10118	01
Areas of irregular, discontinuous patterns			Disk calculator indicates legible lettering		
rapidly and accurately measured			size for slide projection		
GSFC-10184	B67-10674	01	GSFC-409	B65-10339	05
PRINTER			Optical projectors simulate human eyes to		
Density trace made with computer printout			establish operator's field of view		
GSFC-322	B65-10200	01	W00-250	B66-10010	02
Uppercase and lowercase computer printout			Single projector accommodates slides of		
increases readability			different size and format		
HQ-12	B65-10286	01	GSFC-439	B66-10016	02
One-count memory circuit prevents machine			PROPAGATION MODE		
mode interaction			Novel horn antenna reduces side lobes,		
ARG-90	B66-10559	01	improves radiation pattern		
Teleprinter uses thermal printing technique			JPL-425	B63-10264	01
MSC-11327	B67-10572	01	PROPAGATION VELOCITY		
PRISM			Improved circuit minimizes generation of		
Liquid-level meter has no moving parts			pseudonoise check bits		
M-FS-3	B63-10378	03	JPL-698	B65-10275	01
Special purpose reflectometer uses modified			PROPELLANT COMBUSTION		
Ulbricht sphere			Explosive-train initiated through solid		
MSC-1135	B67-10109	02	bulkhead by pressure cartridge		
Dielectric prisms would improve performance			MSC-11395	B67-10589	03
of quasi-optical microwave components			PROPELLANT TANK		
ERC-10011	B67-10416	01	Insulation for cryogenic tanks has reduced		
PROBABILITY			thickness and weight		
FM carrier deviation measured by			M-FS-326	B66-10183	02
differential probability method			Propellant tank pressurization analysis		
M-FS-2166	B67-10213	01	program		
PROBABILITY DISTRIBUTION			M-FS-1506	B67-10625	06
Hybrid computer technique yields random			PROPORTIONAL CONTROL		
signal probability distributions			Heater control circuit provides both fast		
ARC-34	B65-10208	01	and proportional control		
PROBE			M-FS-906	B67-10097	01
Cooling method prolongs life of hot-wire			PROPULSION SYSTEM		
transducer			Computer program provides steady state		
LEWIS-41	B63-10344	02	analysis for liquid propellant propulsion		
PROBLEM SOLVING			systems		
Computational procedure for finite difference			MSC-10064	B67-10414	06
solution of one-dimensional heat conduction			PROTECTION		
problems reduces computer time			Compact retractor protects cabling loops		
MSC-1120	B66-10566	01	M-FS-561	B66-10018	05
PRODUCT DEVELOPMENT			Seal surfaces protected during assembly		
Large seals fabricated from small segments			NU-0067	B66-10266	05
reduce procurement lead time			Impact- and puncture-resistant material		
M-FS-1117	B66-10464	05	protects parts from damage		
PROGRAM MANAGEMENT			MSC-747	B66-10375	05
Logic system aids in evaluation of project			Metal oxide silicon /MOS/ transistors		
readiness			protected from destructive damage by wire		
MSC-753	B66-10457	05	device		
GREMEX-A new management training concept			ARC-65	B66-10419	01
GSFC-574	B67-10092	01	Air sampler collects and protects minute		
KOPE /Kalendar Oriented Program			particles		
Efforts/ provides data for management			HQ-10037	B67-10661	01
decisions			PROTECTIVE CLOTHING		
M-FS-12331	B67-10478	06	Double gloves reduce contamination of dry box		
Graphic visualization of program performance			atmosphere		
aids management review			LEWIS-211	B65-10117	03
NUC-10011	B67-10568	06	Self-contained clothing system provides		
PROGRAMMING			protection against hazardous environments		
Fortran program flowchart is automatically			M-FS-536	B66-10201	05
produced			Flexible fastener effects airtight material		
			closure		



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# PULSE MODULATION

JPL-684	B66-10304	05	ARG-170	B67-10053	01
<b>PROTECTIVE COATING</b>			Logic circuit detects both present and missing negative pulses in superimposed wavetrains		
Solder flux leaves corrosion-resistant coating on metal			M-FS-12518	B67-10565	01
JPL-611	B64-10206	03	<b>PULSE CODE MODULATION /PCM/</b>		
Burnishing technique improves lubrication of threaded fasteners			Frequency-shift-keyer circuit improves PCM conversion for radio transmission	B63-10511	01
LEWIS-217	B65-10302	03	PCM magnetic tape system efficiently records and reproduces data	B65-10311	01
Flexible protective coatings made from silicon-nitrogen materials	B66-10027	03	Pn acquisition demodulator achieves automatic synchronization of a telemetry channel	B66-10271	01
M-FS-528			Digital system detects binary code patterns containing errors	B66-10516	01
Epoxy blanket protects milled part during explosive forming	B66-10029	03	<b>PULSE DURATION MODULATION /PDM/</b>		
M-FS-307			Novel circuit combines pulse stretcher with nor gate	B64-10150	01
Protective coating withstands high temperature in oxidizing atmosphere	B66-10044	03	GSFC-187		
M-FS-529			Circuit exhibits power efficiency greater than 75 percent	B66-10034	01
Run-in with chemical additive protects gear surface	B66-10069	05	MSC-254		
M-FS-548			High power dc/dc and dc/ac electrical power conversion techniques developed	B67-10390	01
Refractory coating protects intricate graphite elements from high-temperature hydrogen	B66-10084	01	<b>PULSE FREQUENCY MODULATION /PFM/</b>		
NU-0027			Simple circuit functions as frequency discriminator for PFM signals	B65-10102	01
Vapor grown silicon dioxide improves transistor base-collector junctions	B66-10091	01	Circuit exhibits power efficiency greater than 75 percent	B66-10034	01
GSFC-389			Fast-response frequency-to-analog converter	B67-10257	01
Coating permits use of strain gage in water and liquid hydrogen	B66-10192	01	<b>PULSE HEIGHT</b>		
M-FS-594			Pulse height analyzer operates at high repetition rates, low power	B65-10041	01
Electroless nickel plating on stainless steels and aluminum	B66-10479	03	Instrument performs nondestructive chemical analysis, data can be telemetered	B65-10317	01
GSFC-533			Circuit provides accurate four-quadrant multiplication	B66-10331	01
Coating protects magnesium-lithium alloys against corrosion	B67-10149	03	Single channel pulse-height analyzer operates in subnanosecond range	B66-10377	01
M-FS-2446			Multichannel pulse height analyzer is inexpensive, features low power requirements	B67-10258	01
Metal flame spray coating protects electrical cables in extreme environment	B67-10351	03	HQN-10020		
NUC-10077			Numerical least-square method for resolving complex pulse height spectra	B67-10480	06
<b>PROTRACTOR</b>			Versatile analog pulse height computer performs real-time arithmetic operations	B67-10626	06
Setting of angles on machine tools speeded by magnetic protractor	B63-10006	01	<b>PULSE MODULATION</b>		
ARC-5			Efficient circuit triggers high-current, high-voltage pulses	B64-10024	01
<b>PULLEY</b>			Frequency divider is free of spurious outputs	B65-10334	01
Chain friction system gives positive, reversible drive	B63-10009	05	Digitally controlled pulse-level discriminator operates over wide voltage range		
ARC-8					
Apparatus alters position of objects to facilitate demagnetization	B64-10277	05			
GSFC-234					
Mechanism continuously measures static and dynamic cable loads	B66-10107	05			
MSC-217					
<b>PULSE</b>					
Pulsed plasma accelerator operates repetitively without complex controls	B65-10062	01			
LANGLEY-48					
Auxiliary circuit enables automatic monitoring of EKG	B65-10142	01			
MSC-106					
<b>PULSE AMPLITUDE</b>					
Simple device produces accelerometer calibration pulse	B65-10269	01			
M-FS-363					
Pulse stretcher has improved dynamic range and linearity	B66-10509	01			
ARG-82					
Solid-state time-to-pulse-height converter developed					

GSFC-324	B66-10129	01	W00-227	B65-10367	05
Large capacitor performs as a distributed parameter pulse line			Closed loop operation eliminates need for auxiliary gas in high pressure pumping station		
LEWIS-176	B66-10291	01	M-FS-893	B66-10408	05
Circuit multiplies pulse width modulation, exhibits linear transfer function			Simple pump maintains liquid helium level in cryostat		
HQ-56	B67-10055	01	M-FS-1763	B67-10039	05
Laboratory pulse modulator uses minority carrier storage diodes			Visco seal design offers zero-leakage and wear-free characteristics		
M-FS-2442	B67-10226	01	W50-329	B67-10047	05
<b>PULSE MOTOR</b>			Negative feedback system reduces pump oscillations		
Magnetic-shift-register circuit controls step motor operations			M-FS-1852	B67-10064	05
GSFC-340	B65-10226	01	Pump simulator provides variable pressure-flow characteristics		
<b>PULSE RECORDER</b>			LEWIS-10122	B67-10453	05
Simple BCD circuit accurately counts to 24					
GSFC-317	B65-10225	01	<b>PUNCH</b>		
<b>PULSE TRANSMISSION SYSTEM</b>			Die and telescoping punch form convolutions in thin diaphragm		
Tiny sensor-transmitter can withstand extreme acceleration, gives digital output			JPL-SC-135	B65-10393	05
ARC-22	B63-10561	01	Forming tool improves quality of tubing flares		
Simple pulse counting circuit computes sum of squares			W00-231	B66-10001	05
GSFC-391	B65-10260	01	<b>PUNCHED TAPE</b>		
Frequency correction device uses digital circuitry			Tester automatically checks paper tape punch and reader after maintenance		
GSFC-268	B65-10307	01	ARC-66	B67-10267	01
Current pulse amplifier transmits detector signals with minimum distortion and attenuation			Pocket-size manual tape reader device aids computer tape checking		
NUC-10055	B67-10347	01	KSC-10058	B67-10361	01
<b>PULSE WIDTH</b>			<b>PURIFICATION</b>		
Simple circuit produces high-speed, fixed duration pulses			Cryogenic filter method produces super-pure helium and helium isotopes		
GSFC-285	B65-10228	01	JPL-374	B63-10235	03
Threshold detector produces narrow pulses at high repetition rates			Ceramic materials purified by experimental method		
GSFC-383	B65-10310	01	LEWIS-225	B65-10270	03
Circuit provides accurate four-quadrant multiplication			Purification train produces ultrapure hydrogen gas		
W00-272	B66-10331	01	M-FS-1913	B67-10078	03
Transient sensor development			<b>PUSH-PULL AMPLIFIER</b>		
M-FS-13370	B67-10471	01	Circuit provides overcurrent protection to push-pull amplifier		
<b>PULSED GENERATOR</b>			MSC-12033	B67-10300	01
Pulse generator permits nondestructive testing of component breakdown voltage			<b>PYROLYSIS</b>		
MSC-122	B65-10054	01	Nitrogen dioxide produced by self-sustained pyrolysis of nitrous oxide		
Synchronized pulse generator needs no external power			LANGLEY-32	B65-10074	05
GSFC-274	B65-10072	01	<b>PYROMETER</b>		
Hybrid circuit achieves pulse regeneration with low power drain			Nulling pyrometer uses Kerr cell shutter for fast responses		
GSFC-382	B65-10314	01	NU-0010	B65-10050	01
Multiphase clock-pulse generator uses simplified circuitry			A radiometer-pyrometer		
M-FS-297	B65-10353	01	LEWIS-284	B66-10606	01
<b>PUMP</b>			Self-balancing line-reversal pyrometer automatically measures gas temperatures		
Level of super-cold liquids automatically maintained by levelometer			LEWIS-348	B67-10268	01
JPL-397	B63-10250	01	<b>PYROMETRY</b>		
Fine-particle filter prevents damage to vacuum pumps			Rotating filters permit wide range of optical pyrometry		
LEWIS-106	B63-10489	05	LANGLEY-33	B65-10100	02
Heater decomposes oil backstreaming from high-vacuum pumps			<b>PYROTECHNICS</b>		
GSFC-356	B65-10224	02	Electrically heated diaphragm eliminates use of pyrotechnics		
Flexible plastic ring assembly makes durable shaft seal			MSC-241	B65-10400	01
			Improved system measures output energy of pyrotechnic devices		
			W00-256	B66-10159	01

## SUBJECT INDEX

## RADIATION DETECTOR

Combined attenuator and latch for  
cartridge powered actuator  
MSC-11242 B67-10488 05

Explosive-train initiated through solid  
bulkhead by pressure cartridge  
MSC-11395 B67-10589 03

## Q

Q-FACTOR  
RF inductor has high Q, is stable at  
higher temperatures  
JPL-1019 B67-10106 01

QUADRATURE  
Light-controlled resistors provide  
quadrature signal rejection for high-gain  
servo systems  
WSD-340 B67-10552 01

QUALITY CONTROL  
Design reliability goal developed from small  
sample  
M-FS-403 B66-10405 05

Quality control criteria for acceptance  
testing of cross-wire welds  
MSC-627 B66-10587 05

Study made of destructive sectioning of  
complex structures for examination  
LEWIS-341 B66-10676 05

Monitor assures availability and quality of  
communication channels  
KSC-66-38 B67-10028 01

Test and inspection for process control of  
monolithic circuits  
M-FS-13084 B67-10507 01

QUANTITATIVE ANALYSIS  
Crystal microbalance measures condensable  
molecular fluxes  
JPL-845 B67-10012 03

Separation technique provides rapid  
quantitative determination of cesium-137  
in irradiated nuclear fuel  
NUC-10047 B67-10194 03

Uranium isotopes quantitatively determined  
by modified method of atomic absorption  
spectrophotometry  
ARG-210 B67-10236 03

Prediction of radiation damage effects in  
transistors  
GSFC-10021 B67-10606 01

QUANTUM MECHANICS  
Quantum mechanical calculations of reactive  
scattering cross sections in bimolecular  
encounters  
M-FS-13594 B67-10527 03

QUARTZ  
Radon gas, useful for medical purposes,  
safely fixed in quartz  
ARG-2 B66-10468 04

Crystal microbalance measures condensable  
molecular fluxes  
JPL-845 B67-10012 03

Quartz crystals detect gas contaminants  
during vacuum chamber evacuation  
NPD-10144 B67-10205 01

QUATERNARY ALLOY  
Braze alloy holds bonding strength over wide  
temperature range  
LEWIS-337 B66-10519 03

QUEUE  
Queueing regisier uses fluid logic elements  
M-FS-317 B66-10100 05

## R

RACE FACTOR  
Improved rolling element bearings provide  
low torque and small temperature rise in  
ultrahigh vacuum environment  
LEWIS-359 B66-10678 05

RADAR EQUIPMENT  
Circuit converts AM signals to FM for  
magnetic recording  
GSFC-227 B65-10001 01

RADAR RANGE  
Precision CW laser automatic tracking  
system investigated  
M-FS-1606 B66-10629 01

RADAR SYSTEM  
FM/CW system measures aircraft attitude  
M-FS-276 B65-10290 01

RADIAL DISTRIBUTION  
Radial coolant channels fabricated by  
simplified method  
NU-0070 B66-10267 05

Radial furnace shows promise for growing  
straight boron carbide whiskers  
HQ-50 B67-10070 03

RADIANT ENERGY  
Wide-angle sensor measures radiant heat energy  
in corrosive atmospheres  
M-FS-228 B65-10019 05

Radiant heat source, vacuum bag, provide  
portable bonding oven  
MSC-11342 B67-10570 03

RADIANT HEATING  
Radiant heater for vacuum furnaces offers high  
structural rigidity, low heat loss  
LEWIS-39 B63-10342 01

Graphite element serves as radiant heat source  
M-FS-105 B65-10218 01

RADIATION  
Process sequence produces strong, lightweight  
reflectors of excellent quality  
LEWIS-331 B67-10010 05

RADIATION ABSORPTION  
Flange on microwave antenna subreflector cuts  
ground noise  
JPL-362 B63-10229 01

Technique for measuring absorptance and  
emittance by using cyclic incident radiation  
LEWIS-321 B66-10630 02

Method prevents secondary radiation in  
radiographic inspection  
M-FS-13383 B67-10391 02

RADIATION COUNTER  
Aluminized thin-window proportional-counter  
tube is stronger, more responsive in long  
wavelength region  
JPL-689 B67-10015 01

Radiation counting technique allows density  
measurement of metals in high-pressure -  
high-temperature environment  
ARG-124 B67-10316 02

RADIATION DETECTOR  
Radiation detector-optical hanging device is  
of simplified construction  
GSFC-251 B64-10299 01

Mount makes liquid nitrogen-cooled gamma ray  
detector portable  
LEWIS-259 B66-10103 01

Plastic scintillator converts standard  
photomultiplier to ultraviolet range

## RADIATION DISTRIBUTION

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ERC-9	B66-10108	02	Mechanisms of superconductivity investigated by nuclear radiation M-FS-1944	B67-10057	02
<b>RADIATION DISTRIBUTION</b>			<b>RADIATION SOURCE</b>		
Novel horn antenna reduces side lobes, improves radiation pattern JPL-425	B63-10264	01	Multiple element soft X-ray source produces wide range of radiation GSFC-286	B65-10082	02
Polychart contour plotter enables data extrapolation from multiple plotting charts M-FS-37	B64-10406	05	Radon gas, useful for medical purposes, safely fixed in quartz ARG-2	B66-10468	04
<b>RADIATION DOSE</b>			High intensity radiation heat source is capable of sustained operation ARC-61	B66-10547	02
SOC-DS computer code provides tool for design evaluation of homogeneous two- material nuclear shield NUC-10142	B67-10537	06	A continuously operating source of vacuum ultraviolet below 500 angstrom GSFC-545	B66-10576	01
Prediction of radiation damage effects in transistors GSFC-10021	B67-10606	01	Modified blackbody device emits high-density radiation M-FS-12744	B67-10388	02
<b>RADIATION EFFECT</b>			<b>RADIATOR</b>		
Irradiation improves properties of an aromatic polyester LANGLEY-115	B65-10164	03	Graphite element serves as radiant heat source M-FS-105	B65-10218	01
Dielectrometer design permits measurement in vacuum under irradiation M-FS-359	B66-10401	01	Ultraviolet photographic pyrometer used in rocket exhaust analysis M-FS-499	B66-10095	02
Test system accurately determines tensile properties of irradiated metals at cryogenic temperatures NUC-10521	B67-10617	02	<b>RADIO COMMUNICATION</b>		
<b>RADIATION EXPOSURE</b>			Comfortable, lightweight safety helmet holds radio transmitter, receiver MSC-53	B64-10015	05
Radiation used to temperature compensate semiconductor strain gages LANGLEY-207	B66-10186	02	<b>RADIO EQUIPMENT</b>		
<b>RADIATION FIELD</b>			Added diodes increase output of balanced mixer circuit GSFC-354	B65-10276	01
Fluid pressure used to test turbopump bearings NU-0001	B65-10024	03	<b>RADIO FILTER</b>		
<b>RADIATION HAZARD</b>			Helical coaxial-resonator makes excellent RF filter GSFC-243	B65-10012	01
Training course for radiation safety technicians ARG-216	B67-10477	02	<b>RADIO FREQUENCY</b>		
<b>RADIATION INTENSITY</b>			Modified RF coaxial connector ends vacuum chamber wiring problem GSFC-150	B64-10010	01
Improved cavity-type absolute total- radiation radiometer JPL-807	B67-10557	01	Solid-state laser transmitter is amplitude modulated MSC-121	B65-10238	01
<b>RADIATION MEASUREMENT</b>			Auxiliary coil controls temperature of RF induction heater GSFC-428	B66-10067	01
Ion chambers simplify absolute intensity measurements in the vacuum ultraviolet ERC-10	B66-10439	01	Feed-through connector couples RF power into vacuum chamber NU-0096	B67-10027	01
Detector measures power in 50 to 30,000 GHz radiation band ERC-26	B66-10581	01	RF inductor has high Q, is stable at higher temperatures JPL-1019	B67-10106	01
<b>RADIATION PROTECTION</b>			Coaxial cable stripping device facilitates RF cabling fabrication NPD-10315	B67-10419	05
Method prevents secondary radiation in radiographic inspection M-FS-13383	B67-10391	02	<b>RADIO FREQUENCY DISCHARGE</b>		
<b>RADIATION RESISTANCE</b>			Ferroelectric bolometer measures RF absolute power at submillimeter wavelengths GSFC-422	B66-10051	01
Simplified method introduces drift fields into cells GSFC-572	B67-10102	03	<b>RADIO FREQUENCY MONITORING</b>		
<b>RADIATION SHIELDING</b>			Mechanical device accurately measures RF phase differences in VHF or UHF ranges M-FS-1738	B66-10694	05
Refractory metal shielding /insulation/ increases operating range of induction furnace LEWIS-202	B65-10188	02			
Carriage system remotely moves drawer over extended distance NU-0092	B66-10711	05			
Simple motor drive system operates heavy hinged door NU-0093	B66-10712	05			
Swing-out rail system separates overhead crane rails NU-0094	B66-10713	05			

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## RANKINE CYCLE

Movable RF probe eliminates need for calibration in plasma accelerators LEWIS-10127	B67-10362	01	radiographic inspection M-FS-13383	B67-10391	02
<b>RADIO FREQUENCY SHIELDING</b> Shrinkable sleeve eliminates shielding gap in RF cable WOO-207	B65-10387	01	Mechanizes X-ray inspection system for large tanks M-FS-12867	B67-10564	02
<b>RADIO NOISE</b> Low input voltage converter/regulator minimizes external disturbances GSFC-527	B66-10689	01	<b>RADIOLOGY</b> Radon gas, useful for medical purposes, safely fixed in quartz ARG-2	B66-10468	04
<b>RADIO PROBING</b> Glow discharge density sensor probe life is extended M-FS-1707	B67-10229	01	<b>RADIOLYSIS</b> Polymer film exhibits thermal and radiation stability LANGLEY-100	B66-10043	03
<b>RADIO RECEIVER</b> Comfortable, lightweight safety helmet holds radio transmitter, receiver MSC-53	B64-10015	05	<b>RADIOMETER</b> A radiometer-pyrometer LEWIS-284	B66-10606	01
Automatic gain control circuit handles wide input range MSC-166	B66-10089	01	Infrared radiometer M-FS-13373	B67-10422	01
<b>RADIO TRANSMITTER</b> Comfortable, lightweight safety helmet holds radio transmitter, receiver MSC-53	B64-10015	05	Foil radiometer accessory improves measurements M-FS-12684	B67-10448	01
<b>RADIOACTIVE ISOTOPE</b> Ion exchange determines iodine-131 concentration in aqueous samples ARG-208	B67-10129	04	Improved cavity-type absolute total-radiation radiometer JPL-807	B67-10557	01
Uranium isotopes quantitatively determined by modified method of atomic absorption spectrophotometry ARG-210	B67-10236	03	<b>RADON</b> Radon gas, useful for medical purposes, safely fixed in quartz ARG-2	B66-10468	04
Low-energy gamma ray inspection of brazed aluminum joints MSC-1189	B67-10337	02	<b>RAFT</b> New inflatable liferaft is nontippable MSC-4A	B64-10001	05
Review of physics, instrumentation and dosimetry of radioactive isotopes ARG-10037	B67-10640	02	<b>RAMP</b> Simple first order data compression processor concept NPO-10338	B67-10553	01
<b>RADIOACTIVE MATERIAL</b> Radioactive method enables determination of surface areas rapidly and accurately NU-0088	B66-10710	03	<b>RANDOM NOISE</b> A power-spectral-density computer program NPO-10126	B67-10160	01
Practical new method of measuring thermal-neutron fluence NUC-10086	B67-10352	02	<b>RANDOM PROCESS</b> Computer program performs statistical analysis for random processes M-FS-723	B66-10525	01
<b>RADIOACTIVE PARTICLE</b> Apparatus for fabrication of americium-beryllium neutron sources prevents capsule contamination ARG-184	B67-10202	05	Study of random process theory aids digital data processing M-FS-1475	B67-10309	06
<b>RADIOACTIVITY</b> Radioactive tracer system detects oil contaminants in fluid lines M-FS-512	B66-10090	03	New technique for determination of cross-power spectral density with damped oscillators M-FS-14022	B67-10602	02
Computer program calculates gamma ray source strengths of materials exposed to neutron fluxes NUC-10143	B67-10665	06	Development of Curie point switching for thin film, random access, memory device NPO-10402	B67-10633	02
<b>RADIOCHEMISTRY</b> Effect of preparation procedures on intensity of radioautographic labeling is studied ARG-10032	B67-10500	04	<b>RANDOM SIGNAL</b> Hybrid computer technique yields random signal probability distributions ARC-34	B65-10208	01
<b>RADIOGRAPHY</b> Thermal neutron image intensifier tube provides brightly visible radiographic pattern ARG-120	B67-10296	02	<b>RANDOM VIBRATION</b> A power-spectral-density computer program NPO-10126	B67-10160	01
Method prevents secondary radiation in			<b>RANGE CONTROL</b> SiC/Si diode trigger circuit provides automatic range switching for log amplifier M-FS-1879	B67-10314	01
			<b>RANGE MEASUREMENT</b> Range recording technique enables four-way polarization measurements M-FS-12447	B67-10460	01
			<b>RANKINE CYCLE</b> Pump simulator provides variable pressure-		

## RARE EARTH

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flow characteristics LEWIS-10122	B67-10453	05	GSFC-391	B65-10260	01
<b>RARE EARTH</b>			Digital frequency counter permits readout without disturbing counting process JPL-906	B66-10658	01
Improved carbon electrode reduces arc sputtering MSC-219	B66-10026	01	Digital servo readout system increases recording accuracy of servo-balance scales NUC-10125	B67-10496	01
<b>RARE GAS</b>			<b>REAL TIME</b>		
Tool provides constant purge during tube welding M-FS-547	B66-10093	05	Versatile analog pulse height computer performs real-time arithmetic operations ARG-10052	B67-10626	06
Portable spectrometer monitors inert gas shield in welding process M-FS-12144	B67-10326	02	<b>RECEIVER</b>		
<b>RAY TRACING</b>			Tunnel-diode circuit features zero-level clipping GSFC-241	B65-10002	01
Computer programs simplify optical system analysis GSFC-306	B65-10093	01	Helical coaxial-resonator makes excellent RF filter GSFC-243	B65-10012	01
Computer program for optical systems ray tracing FRC-10017	B67-10549	06	System locates randomly placed remote objects LANGLEY-209	B66-10315	01
<b>RC NETWORK</b>			Transient sensor development M-FS-13370	B67-10471	01
High-performance RC bandpass filter is adapted to miniaturized construction ARC-60	B66-10309	01	Apparatus makes klystron operating frequency adjustable from remote point NPO-09831	B67-10514	01
<b>REACTION CONTROL</b>			Reflectometer for receiver input system NPO-10843	B67-10657	01
Control circuit maintains unity power factor of reactive load MSC-192	B66-10431	01	<b>RECORDING INSTRUMENT</b>		
Development of detonation reaction engine M-FS-14020	B67-10652	01	Small digital recording head has parallel bit channels, minimizes cross talk JPL-0029	B63-10284	01
<b>REACTOR</b>			Improved electrode gives high-quality biological recordings MSC-17	B64-10025	04
Study made of corrosion resistance of stainless steel and nickel alloys in nuclear reactor superheaters ARG-230	B67-10051	03	Manual-feed adapter permits microfilming of continuous oscillograph output NU-0029	B65-10249	01
<b>REACTOR FUEL</b>			Tester periodically registers dc amplifier characteristics MSC-190	B66-10148	01
Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys ARG-199	B66-10594	03	Ultrasonic recording scanner used for nondestructive weld inspection M-FS-284	B66-10220	01
Fluid-bed fluoride volatility process recovers uranium from spent uranium alloy fuels ARG-232	B67-10032	03	Modified McLeod gage records automatically LEWIS-290	B66-10290	02
Computer program predicts thermal and flow transients experienced in a reactor loss- of-flow accident NUC-10054	B67-10281	06	Film coating permits low-force scribing MSC-990	B66-10609	03
Computer program FPIP-REV calculates fission product inventory for U-235 fission NUC-10089	B67-10450	06	Technique for strip chart recorder time notation GSFC-473	B67-10196	01
<b>READING MACHINE</b>			Instrumentation monitors transported material through variety of parameters M-FS-12938	B67-10545	01
Tester automatically checks paper tape punch and reader after maintenance ARC-66	B67-10267	01	<b>RECOVERY</b>		
Pocket-size manual tape reader device aids computer tape checking KSC-10058	B67-10361	01	Organic reactants rapidly produce plastic foam LANGLEY-37	B65-10288	03
<b>READOUT</b>			Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys ARG-199	B66-10594	03
Optics used to measure torque at high rotational speeds LEWIS-13	B63-10338	01	Silver-palladium braze alloy recovered from masking materials M-FS-1845	B66-10631	03
Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01	Concept for cryogenic liquid reclamation system NPO-10322	B67-10420	02
Compact cartridge drives coded tape at constant readout speed JPL-472	B64-10222	01	Long time constant timer requires no		
Simple pulse counting circuit computes sum of squares					

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## REFLECTOR

recovery time GSFC-10091	B67-10487	01		
<b>RECOVERY DEVICE</b>				
Scoop attachment makes helicopter recoveries easier and safer MSC-130	B65-10229	05		
System locates randomly placed remote objects LANGLEY-209	B66-10315	01		
<b>RECTIFIER</b>				
Emission tester for high-power vacuum tubes JPL-628	B64-10158	01		
Dual-voltage power supply has increased efficiency LEWIS-107A	B66-10002	01		
Thin-film semiconductor rectifier has improved properties MSC-207	B66-10012	01		
Substituting transistor for diode improves rectifying means GSFC-474	B66-10295	01		
Feedback loop compensates for rectifier nonlinearity M-FS-384	B66-10382	01		
<b>REDUCTION</b>				
Metal tube reducer is inexpensive and simple to operate ARG-49	B67-10401	05		
Magnesium-zinc reduction is effective in preparation of metals ARG-10050	B67-10579	03		
<b>REDUNDANT STRUCTURE</b>				
Improved computer program for elastic analysis of highly redundant structural configurations M-FS-13087	B67-10330	06		
<b>REDUNDANT SYSTEM</b>				
Logic redundancy improves digital system reliability JPL-SC-069	B65-10025	01		
Triple Modular Redundancy /TMR/ computer operation improved MSC-831	B67-10085	01		
Automatic channel switching device MSC-832	B67-10086	01		
Logic realization of simple majority voting connectives JPL-727	B67-10511	06		
<b>REEL</b>				
Dispensing system eliminates torsion in deployed hoses MSC-80	B65-10185	05		
Automatic reel controls filler wire in welding machines MSC-416	B66-10236	05		
Expandable takeup reel facilitates paper tape removal WOO-271	B66-10399	05		
An improved magnetic tape recorder GSFC-08259	B67-10646	01		
<b>REENTRY CONDITION</b>				
Colloidal suspension simulates linear dynamic pressure profile WOO-266	B66-10214	05		
<b>REENTRY EFFECT</b>				
Accurate depth control provided for thermocouple junction locations LANGLEY-289	B66-10632	01		
			<b>REENTRY SHIELD</b>	
			Sensors measure surface ablation rate of reentry vehicle heat shield LANGLEY-287	B66-10592 01
			<b>REFERENCE SYSTEM</b>	
			Reference black body is compact, convenient to use ARC-3	B63-10004 03
			Instrument quickly transposes ground reference target to eye level MSC-275	B66-10061 05
			Multiple temperatures sampled using only one reference junction GSFC-485	B66-10260 01
			<b>REFLECTED RAY</b>	
			Fatigue zones in metals identified by polarized light photography WOO-286	B67-10082 02
			<b>REFLECTED WAVE</b>	
			Concept for using laser beams to measure electron density in plasmas M-FS-965	B66-10645 01
			<b>REFLECTION</b>	
			Attachment converts microscope to point source autocollimator JPL-499	B64-10124 05
			<b>REFLECTOMETER</b>	
			Special purpose reflectometer uses modified Ulbricht sphere MSC-1135	B67-10109 02
			Ellipsoidal-mirror reflectometer accurately measures infrared reflectance of materials GSFC-566	B67-10444 01
			Reflectometer for receiver input system NPD-10843	B67-10657 01
			<b>REFLECTOR</b>	
			Flange on microwave antenna subreflector cuts ground noise JPL-362	B63-10229 01
			Test device prevents molecular bounce-back GSFC-82	B63-10546 03
			Ellipsoidal optical reflectors reproduced by electroforming GSFC-92	B63-10547 05
			Plastic films for reflective surfaces reproduced from masters GSFC-188	B64-10151 03
			Optical arrangement increases useful light output of semiconductor diodes JPL-SC-064	B65-10020 05
			Oil-damped mercury pool makes precise optical alignment tool GSFC-353	B65-10253 02
			Nickel solution prepared for precision electroforming WOO-070	B65-10303 03
			Communication system uses modulated laser beam GSFC-377	B65-10333 01
			Reflective insulator layers separated by bonded silica beads MSC-215	B66-10070 03
			Process sequence produces strong, lightweight reflectors of excellent quality LEWIS-331	B67-10010 05
			Scanning means for Cassegrainian antenna JPL-946	B67-10174 05
			Cone and column solar energy concentrator LANGLEY-210	B67-10517 01

Telescope mount with azimuth-only primary NPO-10468	B67-10671	02	high reliability refrigeration system GSFC-10188	B67-10644	02
<b>REFRACTORY ALLOY</b>			<b>REFRIGERATION</b>		
New cobalt alloys have high-temperature strength and long life in vacuum environments LEWIS-47	B63-10351	03	New nut and sleeve improve flared connections M-FS-194	B65-10180	05
New tungsten alloy has high strength at elevated temperatures LEWIS-336	B66-10551	03	Improved cryogenic refrigeration system JPL-731	B67-10128	02
<b>REFRACTORY MATERIAL</b>			<b>REGENERATION</b>		
Apparatus facilitates high-temperature tensile testing in vacuum LEWIS-42	B63-10345	03	Chemical regeneration of emitter surface increases thermionic diode life LEWIS-17	B66-10435	02
Refractory ceramic has wide usage, low fabrication cost M-FS-67	B63-10481	03	<b>REGENERATOR</b>		
Refractory thermal insulation for smooth metal surfaces M-FS-160	B64-10099	03	Hybrid circuit achieves pulse regeneration with low power drain GSFC-382	B65-10314	01
Refractory oxides evaluated for high-temperature use LANGLEY-121	B65-10167	03	<b>REGULATOR</b>		
Refractory coating protects intricate graphite elements from high-temperature hydrogen NU-0027	B66-10084	01	Elastic orifice automatically regulates gas bearings JPL-135	B63-10123	05
Fibers of newly developed refractory ceramics produced by improved process WOO-169	B66-10196	03	High-pressure regulating system prevents pressure surges JPL-231	B63-10170	05
Improved thermal insulation materials made of foamed refractory oxides M-FS-735	B66-10288	03	Zener diode is starter for transistor- regulated power supply NU-0015	B65-10052	01
Crucible cast from beryllium oxide and refractory cement is impervious to flux and molten metal ARG-22	B66-10527	03	Electropneumatic transducer automatically limits motor current LEWIS-253	B66-10160	01
Multilayer refractory nozzles produced by plasma-spray process WOO-318	B66-10611	05	<b>REINFORCEMENT</b>		
<b>REFRACTORY METAL</b>			Reinforcement core facilitates O-ring installation WOO-228	B65-10378	05
Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss LEWIS-39	B63-10342	01	Pipe joints reinforced in place with fitted aluminum sleeves MSC-11109	B67-10271	05
Rapid billet loader aids extrusion of refractory metals LEWIS-50	B63-10354	05	<b>REINFORCING FIBER</b>		
Ceramic-coated boat is chemically inert, provides good heat transfer LANGLEY-90	B65-10063	05	Boron carbide whiskers produced by vapor deposition HQ-24	B65-10261	03
Apparatus facilitates pressure-testing of metal tubing LEWIS-174	B65-10131	05	Nonwoven glass fiber mat reinforces polyurethane adhesive M-FS-2309	B67-10113	03
Brazing method produces solid-solution bond between refractory metals LEWIS-212	B65-10370	05	<b>REJECTION</b>		
Copper-acrylic enamel serves as lubricant for cold drawing of refractory metals ARG-54	B66-10471	05	Simple circuit provides reliable multiple signal average and reject capability NU-0069	B66-10282	01
Hydraulic fluid serves as mandrel for small diameter refractory tube drawing ARG-44	B66-10523	05	Composite filter steepens rejection slopes in microwave application GSFC-480	B66-10393	01
Combustion chamber struts can be effectively transpiration cooled M-FS-1830	B66-10643	03	<b>RELAY</b>		
Welding, bonding, and sealing of refractory metals by vapor deposition LEWIS-123	B67-10232	03	Circuit switches latching relay in response to signals of different polarity WOO-055	B63-10508	01
<b>REFRIGERATING EQUIPMENT</b>			Solid state detectors monitor relay contacts JPL-785	B66-10396	01
Development of dual solid cryogenics for			Solid-state switch increases switching speed WOO-298	B66-10430	01
			Trisphere spark gap actuates overvoltage relay ARC-68	B66-10557	01
			Electronic circuit provides accurate sensing and control of dc voltage NU-0089	B66-10591	01
			Magnetoresistor monitors relay performance M-FS-1754	B66-10650	01
			<b>RELEASE DEVICE</b>		
			Simple mechanism combines positive locking and quick-release features		



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# REPRODUCTION

W00-4	B63-10420	05	and assures restarting FRC-17	B63-10024	01
Instrument adjustment knob locks to prevent accidental maladjustment M-FS-190	B64-10249	05	Liquid switch is remotely operated by low dc voltage GSFC-119	B63-10599	01
One-shot valve may be remotely actuated W00-195	B65-10266	05	Knob linkage permits one-hand control of several operations MSC-30	B65-10022	05
Cylindrical claw clamp has quick release feature M-FS-513	B66-10213	05	Remotely operated clamping tool has positive grip NU-0020	B65-10254	05
Fastener provides for bolt misalignment and quick release of flange NU-0074	B66-10275	05	Remote control electrical switching system has 1000-output capability M-FS-380	B65-10318	01
Pneumatic separator gives quick release to heavy loads KSC-66-10	B66-10294	05	Threaded split ring connector separates structural sections LANGLEY-145	B65-10383	05
Flexible fastener effects airtight material closure JPL-684	B66-10304	05	Economical and maintenance-free gas system operates railroad switches NU-0045	B66-10124	05
Quick attach and release fluid coupling assembly is self-aligning, self-sealing KSC-66-8	B66-10627	05	Electric arc heater is self starting LANGLEY-208	B66-10230	03
Controlled release device prevents damage from dynamic stresses KSC-66-14	B66-10628	05	Quick-closing valve is actuated by explosive discharge ARC-55	B66-10233	05
<b>RELIABILITY</b>			Remotely controlled system couples and decouples large diameter pipes NU-0062	B66-10276	05
Increased performance reliability obtained with dual /redundant/ oscillator system GSFC-36	B63-10027	01	Remote preamplifier circuit maintains stability over wide temperature range W00-278	B66-10432	01
Circuit reliability boosted by soldering pins of disconnect plugs to sockets JPL-447	B64-10002	01	Remotely operated high pressure valve protects test personnel MSC-11010	B67-10291	05
Compact coaxial connector for printed circuit adds reliability MSC-57	B64-10016	01	Improved head-controlled TV system produces high-quality remote image ARG-128	B67-10317	01
Circuit improvement produces monostable multivibrator with load-carrying capability GSFC-34A	B65-10011	01	Apparatus makes klystron operating frequency adjustable from remote point NPO-09831	B67-10514	01
Program computes single-point failures in critical system designs MSC-603	B67-10001	01	Reconnect mechanism M-FS-12968	B67-10670	05
Computer program detects transient malfunctions in switching circuits MSC-604	B67-10002	01	<b>RENDEZVOUS TRAJECTORY</b>		
Triple Modular Redundancy /TMR/ computer operation improved MSC-831	B67-10085	01	Fortran IV program for two-impulse rendezvous analysis M-FS-13971	B67-10479	06
Fixture tests bellows reliability through repetitive pressure/temperature cycling MSC-1176	B67-10111	01	<b>REPAIR</b>		
<b>RELIEF VALVE</b>			Inert gas spraying device aids in repair of hazardous systems LEWIS-88	B65-10115	05
Sensitive low-pressure relief valve has positive seating against leakage W00-041	B64-10278	05	Abraded cadmium-plated cable connectors repaired by conversion coating M-FS-1424	B67-10014	03
Check valve installation in pilot operated relief valve prevents reverse pressurization M-FS-1925	B66-10655	05	Portable machine welding head automatically controls arc M-FS-12763	B67-10272	05
Improved cryogenic refrigeration system JPL-731	B67-10128	02	<b>REPEATER</b>		
Aspirator increases relief valve poppet stroke HQ-77	B67-10154	05	Pulsed plasma accelerator operates repetitively without complex controls LANGLEY-48	B65-10062	01
<b>RELUCTIVITY</b>			<b>REPRODUCTION</b>		
Variable reluctance switch avoids contact corrosion and contact bounce MSC-1178	B67-10137	01	Front and back printed circuit layouts presented on single sheet GSFC-93	B63-10596	01
<b>REMOTE CONTROL</b>			Plastic films for reflective surfaces reproduced from masters GSFC-188	B64-10151	03
Solenoid permits remote control of stop watch					

PCM magnetic tape system efficiently records and reproduces data GSFC-375	B65-10311	01	RESISTANCE HEATING		
			Removable preheater elements improve oxide induction furnace JPL-288	B63-10193	01
REPRODUCTIVE SYSTEM			Apparatus facilitates high-temperature tensile testing in vacuum LEWIS-42	B63-10345	03
Modified procedure speeds camera copy layout for offset printing GSFC-424	B65-10373	02	Electrically heated diaphragm eliminates use of pyrotechnics MSC-241	B65-10400	01
RESIDUAL STRESS			Electrical upsetting of metal sheet forms weld edge M-FS-720	B66-10248	05
Glass bead shot peening retards stress corrosion failure of titanium tanks LANGLEY-319	B67-10198	05	Resistance heating releases structural adhesive M-FS-1607	B67-10045	05
Ultrasonics used to measure residual stress M-FS-12449	B67-10428	02	RESISTANCE THERMOMETER		
RESIDUE			Flow-test device fits into restricted access passages MSC-1078	B67-10074	01
Solvent residue content measured by light scattering technique M-FS-850	B66-10320	01	RESISTIVITY		
Film coating permits low-force scribing MSC-990	B66-10609	03	Aluminum doping improves silicon solar cells LEWIS-206	B66-10181	02
RESIN			RESISTOR		
Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application LANGLEY-6A	B63-10318	03	Highly efficient square-wave oscillator operator at high power levels GSFC-112	B63-10554	01
Plastic molds reduce cost of encapsulating electric cable connectors M-FS-69	B63-10568	05	Temperature-sensitive network drives astable multivibrator GSFC-137	B63-10609	01
Servo system facilitates photoelastic strain measurements on resins JPL-504	B64-10280	01	Efficient circuit triggers high-current, high-voltage pulses MSC-14	B64-10024	01
Compact assembly generates plastic foam, inflates flotation bag LANGLEY-96	B65-10090	05	Field effect transistors used as voltage-controlled resistors M-FS-174	B64-10163	01
Self-supported aluminum thin films produced by vacuum deposition process ARC-58	B66-10387	03	Microparticle impact sensor measures energy directly GSFC-252	B65-10048	01
Reusable chelating resins concentrate metal ions from highly dilute solutions JPL-758	B66-10451	03	Electropneumatic rheostat regulates high current ARC-44	B65-10299	01
RESISTANCE			Thin-film resistors used in functional electronic blocks GSFC-380	B65-10305	01
Refractory ceramic has wide usage, low fabrication cost M-FS-67	B63-10481	03	Diffusion technique stabilizes resistor values MSC-205	B66-10142	01
Adhesive for vacuum environments resists shock and vibration MSC-56	B65-10016	03	Concept for passive system to control gas flow independently of temperature M-FS-982	B66-10343	05
Selenium bond decreases on resistance of light-activated switch JPL-SC-101	B65-10324	01	Resistor monitors transfer of liquid helium LANGLEY-229	B66-10580	01
Pigmented coating resists thermal shock JPL-SC-083	B65-10354	03	RESOLUTION		
Minimum permissible leakage resistance established for instrumentation systems M-FS-848	B66-10397	01	Modified developer increases line resolution in photosensitive resist GSFC-386	B65-10278	01
Thermocouples electrically checked while connected to data system LANGLEY-182	B66-10623	01	Means for improving apparent resolution of television ERC-65	B67-10152	01
RESISTANCE COEFFICIENT			RESONANCE		
Radiation used to temperature compensate semiconductor strain gages LANGLEY-207	B66-10186	02	Calculation of resonance neutron absorption in two-region problems /the GAROL code/ NUC-10045	B67-10223	06
Resistance thermometer has linear resistance-temperature coefficient at low temperatures WOO-190	B66-10612	01	RESONANT FREQUENCY		
RESISTANCE DEVICE			Welded pressure transducer made as small as 1/8th-inch in diameter ARC-11	B63-10429	03
High voltage potential divider calibrated by simple device ARG-83	B66-10497	01			

# SUBJECT INDEX

# RING

Friction device damps linear motion of rotating shaft WOO-214	B66-10030	05	isolate temperature sensor GSFC-456	B66-10349	01
Pressure transducers dynamically tested with sinusoidal pressure generator LEWIS-268	B66-10031	01	<b>RIGID STRUCTURE</b> Bellows design features low spring rate and long life MSC-521	B66-10190	05
Resonant frequency can be adjusted on vibration mount JPL-SC-134	B66-10672	05	<b>RIGIDITY</b> Extendible column can be stowed on drum JPL-686	B65-10191	05
Vibration damping composition has flush-away feature M-FS-597	B67-10432	03	<b>RING</b> Hot-air soldering technique prevents overheating of electrical components GSFC-91	B63-10536	01
<b>RESONANT VIBRATION</b> Study made of large amplitude fuel sloshing M-FS-12381	B67-10439	03	Ring counter may be advanced or retarded by command signal GSFC-101	B64-10144	01
<b>RESPIRATION</b> Device induces lungs to maintain known constant pressure MSC-50	B64-10108	04	Ring valve responds to differential pressure changes WOO-247	B66-10022	05
<b>RESPIRATORY RATE</b> Pneumotachometer counts respiration rate of human subject MSC-92	B64-10259	01	Angular acceleration measured by deflection in sensing ring MSC-250	B66-10105	01
Plant respirometer enables high resolution of oxygen consumption rates HQ-47	B66-10406	04	Intermediate rotating ring improves reliability of dynamic shaft seal M-FS-575	B66-10197	05
<b>RESTRAINT</b> A technique for making animal restraints ARC-25	B63-10564	05	Pressure seal ring may be effective over wide temperature range M-FS-486	B66-10211	05
Safety restrainer prevents whipping of ruptured high-pressure hose LEWIS-99	B64-10348	05	Electron beam welding of copper-MONEL facilitated by circular magnetic shields M-FS-569	B66-10215	05
Lightweight hinged bellows restraint has high load capacity WOO-151	B65-10341	03	Flow ring valve is simple, quick-acting M-FS-752	B66-10255	05
Universal bellows joint restraint permits angular and offset movement WOO-102	B65-10371	05	Differential expansion provides pressure for diffusion bonding of large diameter rings M-FS-588	B66-10269	05
<b>RETAINER</b> New package for belleville spring permits rate change, easy disassembly JPL-392	B63-10247	05	O-rings with Mylar back-up provide high-pressure cryogenic seal M-FS-603	B66-10278	05
Simple mechanism combines positive locking and quick-release features WOO-4	B63-10420	05	Lateral ring metal elastic wheel absorbs shock loading M-FS-1312	B66-10663	05
<b>REVERSED FLOW</b> Check valve installation in pilot operated relief valve prevents reverse pressurization M-FS-1925	B66-10655	05	Environmental study of miniature slip rings M-FS-2443	B67-10210	05
<b>REVERSER</b> Novel clamps align large rocket cases, eliminate back-up bars M-FS-1	B63-10376	05	Wear studies made of slip rings and gas bearing components M-FS-12882	B67-10403	05
<b>RHENIUM</b> High temperature thermocouple operates in reduction atmosphere NU-0046	B66-10134	01	Torque meter aids study of hysteresis motor rings M-FS-12219	B67-10412	01
<b>RHENIUM ALLOY</b> Lower-cost tungsten-rhenium alloys LEWIS-332	B66-10528	03	Aluminum and stainless steel tubes joined by simple ring and welding process M-FS-13120	B67-10472	05
<b>RHENIUM COMPOUND</b> Tungsten wire and tubing joined by nickel brazing M-FS-394	B65-10391	05	Dynamic valve seal is reliable at cryogenic temperatures M-FS-12987	B67-10526	05
<b>RIGID MOUNTING</b> Compact actuator converts rotary to linear motion JPL-786	B66-10265	05	Lead plated aluminum ring provides static high pressure seal for large diameter pressure vessel NUC-10008	B67-10539	05
Electrically conductive fibers thermally			Fluorocarbon seal replaces metal piston ring in low density gas environment LEWIS-10277	B67-10591	05
			Cryogenic seal concept for static and dynamic conditions M-FS-12986	B67-10673	05

## RING STRUCTURE

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## RING STRUCTURE

Combination spacer and gasket provides effective static seal  
M-FS-1397 B66-10485 05

High-reluctance rotor rings improve homopolar generator performance  
ARG-104 B66-10543 01

## RIVET

Jig and fixture aid fabrication of tungsten rivets  
LEWIS-185 B65-10101 05

## RLC CIRCUIT

Voltage variable oscillator has high phase stability  
LANGLEY-123 B65-10204 01

## ROCK

Rock bit requires no flushing medium to maintain drilling speed  
JPL-W00-031 B65-10109 05

## ROCKET

Novel clamps align large rocket cases, eliminate back-up bars  
M-FS-1 B63-10376 05

## ROCKET CHAMBER

New method used to fabricate light-weight heat exchanger for rocket motor  
LEWIS-43 B63-10346 02

## ROCKET ENGINE DESIGN

Development of detonation reaction engine  
M-FS-14020 B67-10652 01

## ROCKET EXHAUST

Air-cured ceramic coating insulates against high heat fluxes  
M-FS-150 B65-10357 03

Ultraviolet photographic pyrometer used in rocket exhaust analysis  
M-FS-499 B66-10095 02

Predicting surface heating rates and pressures resulting from hot exhaust gases  
MSC-971 B66-10633 05

## ROCKET MOTOR CASE

New method used to fabricate light-weight heat exchanger for rocket motor  
LEWIS-43 B63-10346 02

Novel clamps align large rocket cases, eliminate back-up bars  
M-FS-1 B63-10376 05

## ROCKET NOZZLE

Multilayer refractory nozzles produced by plasma-spray process  
W00-318 B66-10611 05

Digital program analyzes supersonic flow field within bell-shaped rocket nozzles  
M-FS-14292 B67-10664 06

## ROCKET TEST STATION

Computer program determines performance efficiency of remote measuring systems  
M-FS-1137 B66-10503 01

## ROCKET THRUST

Device measures reaction engine thrust vector deviations  
JPL-SC-163 B66-10642 05

## ROD

Cooling method prolongs life of hot-wire transducer  
LEWIS-41 B63-10344 02

Threading hook facilitates safe recovery of heavy loads  
MSC-46 B64-10185 05

Mounting facilitates removal and installation

of flame-detector rods  
M-FS-555 B66-10150 05

Bypass rod transfers heat developed in thermionic diode  
JPL-SC-136 B66-10303 05

Ultrasonic water column probe speeds up testing of welds  
HQ-58 B66-10577 01

## ROLL FORMING

Metal bellows custom-fabricated from tubing  
LEWIS-192 B65-10150 05

## ROLLER BEARING

Apparatus of small size can be extended into long, rigid boom  
JPL-305 B63-10200 05

Control of component differential hardness increases bearing life  
LEWIS-190 B65-10251 05

Damages in rolling element bearings may be detected early  
HQ-10031 B67-10658 01

## ROLLING

Apparatus of small size can be extended into long, rigid boom  
JPL-305 B63-10200 05

## ROOM TEMPERATURE

Improved adhesive for cryogenic applications cures at room temperature  
W00-132 B66-10185 03

Environmental control system for cryogenic testing of tensile specimens  
NUC-10523 B67-10618 02

## ROTARY DRIVE

Device transmits rotary motion through hermetically sealed wall  
JPL-303 B63-10198 05

Fine-particle filter prevents damage to vacuum pumps  
LEWIS-106 B63-10489 05

Braking mechanism is self actuating and bidirectional  
M-FS-1299 B66-10484 05

Eccentric drive mechanism is adjustable during operation  
M-FS-2576 B67-10373 05

## ROTATING BODY

Dispensing system eliminates torsion in deployed hoses  
MSC-80 B65-10185 05

Cryostat modified to aid rotating beam fatigue test  
M-FS-435 B66-10083 03

Rotary valve controls multiple hydraulic leveling cylinders  
M-FS-361 B66-10402 05

Rotational fluid coupling eliminates hose entanglements  
MSC-312 B66-10585 05

## ROTATING MACHINE

Shock absorber protects motive components against overloads  
W00-092 B65-10008 05

Pickup device reads pressures from ports in rotating mechanisms  
LEWIS-158 B65-10021 05

Rotating holder permits accurate grinding of metallurgical microsamples  
LEWIS-131 B65-10262 05

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# SAFETY DEVICE

Computer program simplifies design of rotating components of turbomachinery NUC-10046	B67-10235	06	ARG-104	B66-10543	01
<b>ROTATING MIRROR</b> Twin helix system produces fast scan in infrared detector M-FS-1598	B66-10638	02	<b>RUBBER</b> Frictional wedge shock mount is inexpensive, has good damping characteristics JPL-IT-1001	B63-10289	05
<b>ROTATING SHAFT</b> Apparatus alters position of objects to facilitate demagnetization GSFC-234	B64-10277	05	Rubber-coated bellows improves vibration damping in vacuum lines LEWIS-273	B66-10187	02
Flexible plastic ring assembly makes durable shaft seal WOO-227	B65-10367	05	Thermoplastic rubberlike material produced at low cost JPL-793	B66-10453	03
Friction device damps linear motion of rotating shaft WOO-214	B66-10030	05	<b>RUBIDIUM</b> Magnetometer measures orthogonal components of magnetic fields GSFC-395	B65-10315	01
Noncontacting transducer measures shaft torque M-FS-474	B66-10048	01	<b>RUPTURE</b> Safety restrainer prevents whipping of ruptured high-pressure hose LEWIS-99	B64-10348	05
Intermediate rotating ring improves reliability of dynamic shaft seal M-FS-575	B66-10197	05	Universal bellows joint restraint permits angular and offset movement WOO-102	B65-10371	05
Flexible arms provide constant force for pressure switch calibration HQ-38	B66-10317	05	Hand-held instrument should relieve hematoma pressure MSC-599	B67-10332	04
Rocket engine vibration accurately measured by photography M-FS-1916	B66-10652	02	<b>S</b>		
Segmented, arch-bound carbon seal is pressure loaded M-FS-12777	B67-10325	05			
<b>ROTATION</b> Bearing transmits rotary and axial motion LANGLEY-27	B64-10130	05	<b>S-BAND</b> Experimental coherent fractional frequency multiplier at S-band M-FS-2427	B67-10250	01
Ring counter circuit switches multiphase motor direction of rotation JPL-SC-166	B66-10101	01	<b>SAFETY</b> Apparatus for fabrication of americium-beryllium neutron sources prevents capsule contamination ARG-184	B67-10202	05
Compact actuator converts rotary to linear motion JPL-786	B66-10265	05	<b>SAFETY DEVICE</b> Self-balancing beam permits safe, easy load handling under overhang M-FS-84	B63-10571	05
<b>ROTOR</b> Rotor position sensor switches currents in brushless dc motors GSFC-315	B65-10151	01	Comfortable, lightweight safety helmet holds radio transmitter, receiver MSC-53	B64-10015	05
Brushless dc motor uses electron beam switching tube as commutator GSFC-345	B65-10237	01	Safety restrainer prevents whipping of ruptured high-pressure hose LEWIS-99	B64-10348	05
Hollow spherical rotors fabricated by electroplating JPL-SC-117	B66-10366	05	Fluid check valve has fail-safe feature JPL-0019	B65-10207	05
Valve effectively controls amount of contaminant in flow stream M-FS-1771	B66-10683	05	Single connector provides safety fuses for multiple lines MSC-199	B66-10050	01
Torque meter aids study of hysteresis motor rings M-FS-12219	B67-10412	01	Nylon shock absorber prevents injury to parachute jumpers MSC-226	B66-10080	05
<b>ROTOR BLADE</b> Simple key locks turbine rotor blades WOO-103	B66-10023	05	Dispenser leak-tests and sterilizes rubber gloves MSC-285	B66-10166	03
Noise study of single stage compressor rotor-stator interaction LANGLEY-137	B67-10516	02	Safety switch permits emergency bridge crane shutdown M-FS-549	B66-10168	05
<b>ROTOR SYSTEM</b> Switching mechanism senses angular acceleration GSFC-462	B66-10158	01	Lifting clamp positively grips structural shapes M-FS-593	B66-10176	05
High-reluctance rotor rings improve homopolar generator performance			Self-inflating lifevest stores in small package MSC-5A	B66-10184	04
			Body-fitted harness provides safe and easy component handling M-FS-533	B66-10202	05

## SAFETY FACTOR

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Adjustable cutting guide aligns and positions stacks of material MSC-321	B66-10210	05	Probe samples components of rocket engine exhaust M-FS-485	B65-10384	03
Key-locked guard prevents accidental switch actuation MSC-419	B66-10235	05	Multiple temperatures sampled using only one reference junction GSFC-485	B66-10260	01
Lathe chuck key incorporates safety feature MSC-506	B66-10243	05	Cryogenic fluid sampling device permits testing under hazardous conditions M-FS-1927	B66-10654	02
Magnetic latches provide positive overpressure control NU-0057	B66-10279	05	Two techniques enable sampling of filtered and unfiltered molten metals ARG-150	B67-10034	03
Adapter assembly prevents damage to tubing during high pressure tests MSC-563	B66-10330	05	System automatically supplies precise analytical samples of high-pressure gases M-FS-1814	B67-10090	01
Sniffer used as portable hydrogen leak detector M-FS-846	B66-10356	01	Automated microsyringe is highly accurate and reliable NPD-10142	B67-10203	01
One-piece transparent shell improves design of helmet assembly MSC-187	B66-10390	05	Self-sealing closure enables access to several fluid containers NPD-10123	B67-10207	04
Emergency escape system protects personnel from explosion and fire KSC-66-12	B66-10634	05	Improved ultrasonic TV images achieved by use of Lamb-wave orientation technique ARG-203	B67-10295	02
Toroidal ring prevents gas ignition at vent stack outlet M-FS-2042	B67-10098	05	Tool samples subsurface soil free of surface contaminants MSC-10988	B67-10473	05
Safety yoke would protect construction workers from falling KSC-10075	B67-10445	05	<b>SANDWICH CONSTRUCTION</b>		
<b>SAFETY FACTOR</b>			Apparatus permits flexure testing of specimens at cryogenic temperatures M-FS-257	B65-10129	02
Self-contained clothing system provides protection against hazardous environments M-FS-536	B66-10201	05	Fastener distributes stress evenly from sandwich-panel-hung items MSC-236	B65-10358	05
Nonhazardous acid etches weld samples M-FS-975	B66-10378	05	Heavy-gage bonded honeycomb sandwich as primary load-bearing structure M-FS-12060	B67-10427	05
Remotely operated high pressure valve protects test personnel MSC-11010	B67-10291	05	<b>SATELLITE COMMUNICATION</b>		
Training course for radiation safety technicians ARG-216	B67-10477	02	Communication system uses modulated laser beam GSFC-377	B65-10333	01
<b>SALT</b>			<b>SATELLITE TRACKING</b>		
Crucible cast from beryllium oxide and refractory cement is impervious to flux and molten metal ARG-22	B66-10527	03	GMT/local-time conversion chart GSFC-10521	B67-10548	01
<b>SAMPLED DATA</b>			<b>SATURATION</b>		
Computer program provides linear sampled-data analysis for high order systems M-FS-12821	B67-10287	06	Blood oxygen saturation determined by transmission spectrophotometry of hemolyzed blood samples MSC-11018	B67-10252	04
<b>SAMPLED DATA SYSTEM</b>			Thermodynamic properties of saturated liquid parahydrogen charted for important temperature range NUC-10018	B67-10346	03
Multiplexing control device enables handling of wide variations in sampling rates M-FS-1871	B67-10150	01	Adaptive control circuit prevents amplifier saturation ERC-10026	B67-10648	02
<b>SAMPLING</b>			<b>SATURN V LAUNCH VEHICLE</b>		
Design reliability goal developed from small sample M-FS-403	B66-10405	05	System automatically provides dynamic launch decision criteria M-FS-13063	B67-10363	01
<b>SAMPLING DEVICE</b>			Earth orbit rendezvous evaluation program M-FS-13016	B67-10407	06
Rock bit requires no flushing medium to maintain drilling speed JPL-W00-031	B65-10109	05	<b>SATURN LAUNCH VEHICLE</b>		
Plastic bags in evacuated chamber make lightweight gas sampling system FRC-31	B65-10264	01	Continuous wave detector has wide frequency range M-FS-1849	B67-10386	01
Frequency correction device uses digital circuitry GSFC-268	B65-10307	01	Computer program performs rectangular fitting stress analysis M-FS-13010	B67-10520	06



Packless valve with all-metal seal handles wide temperature, pressure range JPL-361	B63-10228	05	Electroplating eliminates gas leakage in brazed areas M-FS-923	B66-10415	05
Design of valve permits sealing even if the stem is misaligned LEWIS-38	B63-10341	05	Large diameter metal ring seal prevents gas leakage at 5000 psi M-FS-1064	B66-10422	05
Vacuum-type backup bar speeds weld repairs M-FS-12	B63-10384	05	Seal-off assembly permits rapid evacuation of air from containers GSFC-513	B66-10446	05
Tool facilitates sealing of metal fill tubes MSC-24	B63-10519	05	Large seals fabricated from small segments reduce procurement lead time M-FS-1117	B66-10464	05
Connector seals fluid lines at cryogenic temperatures and high vacuums GSFC-253	B64-10327	05	Combination spacer and gasket provides effective static seal M-FS-1397	B66-10485	05
Use of tear ring permits repair of sealed module circuitry M-FS-210	B65-10014	05	Plug replaces weld filler as seal in complex casting NU-0049	B66-10489	05
Seal allows blind assembly and thermal expansion of components NU-0005	B65-10053	05	Feed-thru flange is useful in vacuum applications to cryogenic temperatures JPL-846	B66-10615	02
Low-cost seal compensates for surface irregularities NU-0016	B65-10160	05	Silver plating technique seals leaks in thin wall tubing joints NU-0090	B66-10703	05
Improved poppet valve provides positive damageproof seal M-FS-293	B65-10346	05	Visco seal design offers zero-leakage and wear-free characteristics WSO-329	B67-10047	05
Electron beam seals outer surfaces of porous bodies M-FS-562	B66-10033	03	Vacuum chamber is remotely sealed by eutectic metal NU-0091	B67-10059	05
Rotating mandrel speeds assembly of plastic inflatables LANGLEY-155	B66-10137	05	Undercoat prevents blistering of silver plating at elevated temperatures M-FS-2049	B67-10096	05
Bismuth alloy potting seals aluminum connector in cryogenic application WOO-260	B66-10138	03	Cryogenic seal remains leaktight during thermal displacement ARG-96	B67-10134	02
Intermediate rotating ring improves reliability of dynamic shaft seal M-FS-575	B66-10197	05	Welding, bonding, and sealing of refractory metals by vapor deposition LEWIS-123	B67-10232	03
Special tool seals conductors with combination of plastic sleeves M-FS-579	B66-10209	05	Static seal concept to accommodate seat tolerances M-FS-1854	B67-10285	05
Pressure seal ring may be effective over wide temperature range M-FS-486	B66-10211	05	Segmented, arch-bound carbon seal is pressure loaded M-FS-12777	B67-10325	05
Soft-seal valve holds hazardous fluids safely LEWIS-275	B66-10216	05	Soft metal plating enables hard metal seal to operate successfully in low temperature, high pressure environment NUC-10083	B67-10350	03
Pressure-welded flange assembly provides leaktight seal at reduced bolt loads M-FS-640	B66-10247	05	Hand-operated plug insertion valve M-FS-12019	B67-10466	05
Fluid damping reduces bellows seal fatigue failures M-FS-565	B66-10249	05	Dynamic valve seal is reliable at cryogenic temperatures M-FS-12987	B67-10526	05
Diffusion bonding makes strong seal at flanged connector M-FS-637	B66-10250	05	Fluorocarbon seal replaces metal piston ring in low density gas environment LEWIS-10277	B67-10591	05
Seal surfaces protected during assembly NU-0067	B66-10266	05	Development of helical seal for high temperature /2000 degrees F/ application M-FS-13304	B67-10655	05
Bi-metallic devices help maintain constant sealing forces down to cryogenic temperatures M-FS-800	B66-10325	02	Cryogenic seal concept for static and dynamic conditions M-FS-12986	B67-10673	05
External linkage tie permits reduction in ducting system flange thickness M-FS-823	B66-10326	05			
Portable lightweight cell provides controlled environment MSC-648	B66-10370	05			

SEAT

Valve designed with elastic seat JPL-442	B65-10040	05
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SECONDARY EMISSION

Lightweight coaxial cable connector reduces signal loss  
JPL-720 B65-10244 01

SECURITY

Security warning system monitors up to fifteen remote areas simultaneously  
KSC-66-39 B66-10548 01

SEEBECK EFFECT

Thermoelectric metal comparator determines composition of alloys and metals  
ARG-235 B67-10035 01

SEISMOMETER

Unmanned seismometer levels self, corrects drift errors  
GSFC-100 B63-10551 01

Seismic transducer measures small horizontal displacements  
M-FS-81 B65-10029 05

Seismometer designed for remote operation in random orientation  
JPL-320 B66-10085 01

SELENIDE

Cuprous selenide and sulfide form improved photovoltaic barriers  
WOO-212 B66-10025 01

SELENIUM

Selenium bond decreases on resistance of light-activated switch  
JPL-SC-101 B65-10324 01

SELF-LUBRICATING MATERIAL

Composites of porous metal and solid lubricants increase bearing life  
LEWIS-307 B67-10007 03

SELF-OSCILLATION

Voltage regulator/amplifier is self-regulated  
MSC-1240 B67-10156 01

SELF-SEALING

Self sealing disconnect for tubing forms metal seal after breakaway  
JPL-354 B63-10226 05

Quick attach and release fluid coupling assembly is self-aligning, self-sealing  
KSC-66-8 B66-10627 05

Self-sealing closure enables access to several fluid containers  
NPO-10123 B67-10207 04

SEMICONDUCTOR

Radiation detector-optical hanging device is of simplified construction  
GSFC-251 B64-10299 01

Optical arrangement increases useful light output of semiconductor diodes  
JPL-SC-064 B65-10020 05

Impurity diffusion process for silicon semiconductors is fast and precise  
GSFC-397 B65-10300 01

Single-crystal semiconductor films grown on foreign substrates  
WOO-076 B66-10225 01

System for etching thick aluminum layers minimizes bridging and undercutting  
M-FS-1366 B66-10400 03

Semiconductors can be tested without removing them from circuitry  
M-FS-1163 B66-10447 01

Computer program searches characteristic data of diodes and transistors  
GSFC-493 B66-10529 01

Simple technique determines ac properties of hard superconductive materials  
M-FS-1818 B66-10657 02

Status of ultrachemical analysis for semiconductors  
M-FS-2254 B67-10138 03

Thin film process forms effective electrical contacts on semiconductor crystals  
M-FS-2343 B67-10142 01

SEMICONDUCTOR DEVICE

Thermocompression bonding produces efficient surface-barrier diode  
JPL-SC-066 B65-10007 05

Photoelectric semiconductor switch operates with low level inputs  
JPL-SC-068 B65-10033 01

Thin-film semiconductor rectifier has improved properties  
MSC-207 B66-10012 01

Radiation used to temperature compensate semiconductor strain gages  
LANGLEY-207 B66-10186 02

Apparatus presents visual display of semiconductor surface characteristics  
JPL-665 B66-10200 01

Process facilitates photoresist mask alignment on SiC crystals  
M-FS-2394 B67-10144 01

Development of reliability prediction technique for semiconductor diodes  
GSFC-10231 B67-10651 06

Thermionic diode switching has high temperature application  
NPO-10404 B67-10672 01

SENSING

Transistor voltage comparator performs own sensing  
GSFC-228 B65-10028 01

Averaging probe reduces static-pressure sensing errors  
LANGLEY-36 B65-10114 05

SENSITIVITY

Ultra-sensitive transducer advances micro-measurement range  
ARC-26 B64-10004 01

Noncontacting vibration transducer has constant sensitivity  
LANGLEY-99 B65-10392 01

Computer program simulates design, test, and analysis phases of sensitivity experiments  
M-FS-1496 B67-10077 01

Compilation of detection sensitivities in thermal-neutron activation  
ARG-10068 B67-10641 03

SENSOR

Solar-angle sensor has no moving parts  
JPL-418 B63-10260 02

Improved sensor counts micrometeoroid penetrations  
LEWIS-76 B63-10443 01

Tiny sensor-transmitter can withstand extreme acceleration, gives digital output  
ARC-22 B63-10561 01

Simple circuit continuously monitors thermocouple sensor  
M-FS-61 B63-10567 01

Speed-sensing device aids crane operators

## SEPARATION

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WS-4	B64-10006	05	during fusion welding		
Ohmmeter senses depletion of lubricant in journal bearings			M-FS-937	B67-10091	01
LEWIS-37	B64-10042	01	Sensing disks for slug-type calorimeters have higher temperature stability	B67-10161	01
Apparatus measures very small thrusts			M-FS-1867		
WOO-048	B64-10284	05	Substituting gold for silver improves electrical connections	B67-10228	03
Explosives actuate nonmagnetic indexing device			M-FS-2390		
GSFC-237	B65-10017	05	Glow discharge density sensor probe life is extended	B67-10229	01
Wide-angle sensor measures radiant heat energy in corrosive atmospheres			M-FS-1707		
M-FS-228	B65-10019	05	Temperature-sensed cryogenic bleed maintains liquid state in transfer line	B67-10424	01
Microparticle impact sensor measures energy directly			M-FS-12681		
GSFC-252	B65-10048	01	Conceptual nonorthogonal gyro configuration for guidance and navigation	B67-10433	01
Sensitive level sensor made with spirit level, gives electrical output			MSC-11363		
LANGLEY-49	B65-10067	01	Design for high-temperature /1800 deg F/ liquid metal pressure transducer	B67-10458	01
Photoelectric sensor output controlled by eyeball movements			LEWIS-10144		
M-FS-274	B65-10079	01	Transient sensor development	B67-10471	01
Transducer senses displacements of panels subjected to vibration			M-FS-13370		
ARC-37	B65-10085	01	Review of biological mechanisms for application to instrument design	B67-10663	04
Rotor position sensor switches currents in brushless dc motors			HQ-33		
GSFC-315	B65-10151	01	SEPARATION		
Internal cooling increases range of immersion-type temperature probe			Self sealing disconnect for tubing forms metal seal after breakaway	B63-10226	05
LEWIS-171	B65-10157	02	JPL-354		
Pressure sensor responds only to shock wave			Splice plate design assures structural separation by mild explosive	B65-10166	05
M-FS-238	B65-10184	01	MSC-137		
Frequency correction device uses digital circuitry			Threaded split ring connector separates structural sections	B65-10383	05
GSFC-268	B65-10307	01	LANGLEY-145		
Photosensors used to maintain welding electrode-to-joint alignment			Resistance heating releases structural adhesive	B67-10045	05
MSC-243	B65-10401	05	M-FS-1607		
Control system maintains selected liquid level			Separation technique provides rapid quantitative determination of cesium-137 in irradiated nuclear fuel	B67-10194	03
M-FS-470	B66-10039	01	NUC-10047		
Sensor detects hydrocarbon oil contaminants in fluid lines			Large volume continuous counterflow dialyzer has high efficiency	B67-10395	04
M-FS-522	B66-10068	01	HQ-10055		
Thermal motor positions magnetometer sensors			SEPARATOR		
ARC-51	B66-10078	05	Centrifugal device separates liquid from gas	B65-10394	05
New television camera eliminates vidicon tube			MSC-282		
M-FS-472	B66-10112	01	Automatic fluid separator supplies own driving power	B66-10008	02
Optical gyro pickoff operates at cryogenic temperatures			WOO-085		
M-FS-407	B66-10128	01	Tool separates sleeve-type unions without heat	B66-10253	05
Sniffer used as portable hydrogen leak detector			MSC-497		
M-FS-846	B66-10356	01	Pneumatic separator gives quick release to heavy loads	B66-10294	05
Heat flux sensor design reduces extraneous source effects			KSC-66-10		
MSC-400	B66-10531	01	SEQUENTIAL CONTROL		
Sensors measure surface ablation rate of reentry vehicle heat shield			Ring counter may be advanced or retarded by command signal	B64-10144	01
LANGLEY-287	B66-10592	01	GSFC-101		
Miniature capacitor functions as pressure sensor			Current steering commutator offers versatility	B67-10410	01
JPL-903	B67-10020	01	JPL-812		
Flow-test device fits into restricted access passages			SEQUENTIAL DETECTION		
MSC-1078	B67-10074	01	Binary sequence detector uses minimum number of decision elements	B66-10264	01
System maintains constant penetration			JPL-673		

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# SHELL

<b>SERVO LOOP</b>				Plugged hollow shaft makes fatigue-resistant shear pin			
System maintains constant penetration during fusion welding				LANGLEY-195	B66-10077	05	
M-FS-937	B67-10091	01					
Hydraulic servo system increases accuracy in fatigue testing				Torque wrench allows readings from inaccessible locations			
LANGLEY-217	B67-10637	01		M-FS-598	B66-10204	05	
<b>SERVOAMPLIFIER</b>				Extensometer automatically measures elongation in elastomers			
Apparatus measures very small thrusts				M-FS-517	B66-10284	05	
WOO-048	B64-10284	05					
Tension is servo controlled in film advance system				Shaft encoder presents digital output			
LANGLEY-54	B65-10075	05		JPL-SC-191	B66-10436	01	
Servo calorimeter measures material heating rate				<b>SHEATH</b>			
NU-0024	B65-10247	01		Metal sheath improves thermocouple using graphite in one leg			
<b>SERVOCONTROL</b>				NU-0011	B65-10051	01	
Crystal measures short-term, large-magnitude forces				Double copper sheath multiconductor instrumentation cable is durable and easily installed in high thermal or nuclear radiation area			
JPL-77	B65-10187	01		NUC-10007	B67-10538	01	
Quick-response servo amplifies small hydraulic pressure differences				Thoriated tungsten tube provides improved high temperature thermocouple sheath			
ARG-99	B66-10498	05		NUC-10145	B67-10627	03	
Conceptual servo technique for controlling tape drivers				<b>SHEET</b>			
M-FS-12955	B67-10595	01		Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns			
<b>SERVOMECHANISM</b>				ARC-7	B63-10008	05	
Optics used to measure torque at high rotational speeds				Machine tests crease durability of sheet materials			
LEWIS-13	B63-10338	01		JPL-604	B64-10178	05	
Servo system facilitates photoelastic strain measurements on resins				<b>SHEET METAL</b>			
JPL-504	B64-10280	01		Apparatus of small size can be extended into long, rigid boom			
High-gain amplifier has excellent stability and low power consumption				JPL-305	B63-10200	05	
GSFC-272	B65-10138	01		Built-in templates speed up process for making accurate models			
Digital servo readout system increases recording accuracy of servo-balance scales				LANGLEY-23	B63-10526	05	
NUC-10125	B67-10496	01		Collar positions strip stock used to form coil on mandrel			
Light-controlled resistors provide quadrature signal rejection for high-gain servo systems				JPL-198	B65-10130	05	
WSO-340	B67-10552	01		Metal bellows custom-fabricated from tubing			
Phase plane displays detect incipient failure in servo system testing				LEWIS-192	B65-10150	05	
HQ-10018	B67-10662	01		Infrared shield facilitates optical pyrometer measurements			
<b>SERVOMOTOR</b>				LANGLEY-133	B65-10272	02	
Hydraulic device provides accurate displacements to microinches				Sheet metal strip unrolls to form circular boom			
MSC-112	B65-10230	05		GSFC-423	B66-10032	05	
<b>SEXTANT</b>				Bellows design features low spring rate and long life			
Sextant measures spacecraft altitude without gravitational reference				MSC-521	B66-10190	05	
MSC-200	B66-10143	02		Electrical upsetting of metal sheet forms weld edge			
Star/horizon simulator used to test space guidance system				M-FS-720	B66-10248	05	
MSC-407	B67-10110	02		Strippable grid facilitates removal of grid-surfaced conical workpiece from die			
<b>SHAFT</b>				M-FS-716	B66-10334	05	
Device transmits rotary motion through hermetically sealed wall				Gage of 6.5 per cent Si-Fe sheet is chemically reduced			
JPL-303	B63-10198	05		MSC-537	B66-10454	03	
Bearing transmits rotary and axial motion				Development of technology for hot-drape forming of large torus sections			
LANGLEY-27	B64-10130	05		M-FS-12141	B67-10341	05	
Shock absorber protects motive components against overloads				<b>SHELL</b>			
WOO-092	B65-10008	05		A technique for making animal restraints			
New coupling compensates for shaft misalignment				ARC-25	B63-10564	05	
NU-0013	B65-10077	05		Fiberglass container shells form contamination-free storage units			

## SHIELDING

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WOO-275	B66-10217	05		
<b>SHIELDING</b>				
Small foamed polystyrene shield protects low-frequency microphones from wind noise				
M-FS-123	B63-10579	01		
Flexible curtain shields equipment from intense heat fluxes				
M-FS-48	B65-10044	03		
Infrared shield facilitates optical pyrometer measurements				
LANGLEY-133	B65-10272	02		
Superconductor shields test chamber from ambient magnetic fields				
JPL-627	B65-10297	02		
Logic circuitry used to automatically test shielded cables				
HQ-60	B66-10659	01		
<b>SHIFT REGISTER</b>				
Ring counter may be advanced or retarded by command signal				
GSFC-101	B64-10144	01		
Magnetic-shift-register circuit controls step motor operations				
GSFC-340	B65-10226	01		
Electronic frequency discriminator				
M-FS-2434	B67-10151	01		
<b>SHOCK</b>				
Frictional wedge shock mount is inexpensive, has good damping characteristics				
JPL-IT-1001	B63-10289	05		
Adhesive for vacuum environments resists shock and vibration				
MSC-56	B65-10016	03		
Tensile-strength apparatus applies high strain-rate loading with minimum shock				
JPL-28	B66-10063	05		
Perforations in jet engine supersonic inlet increase shock stability				
NEO-8	B66-10530	05		
<b>SHOCK ABSORBER</b>				
Thermally conductive metal wool-silicone rubber material can be used as shock and vibration damper				
JPL-321	B63-10207	03		
Frictional wedge shock mount is inexpensive, has good damping characteristics				
JPL-IT-1001	B63-10289	05		
Break-up of metal tube makes one-time shock absorber, bars rebound				
LANGLEY-1A	B63-10304	05		
Novel shock absorber features varying yield strengths				
MSC-63A	B64-10138	03		
Shock absorber protects motive components against overloads				
WOO-092	B65-10008	05		
Shock mount isolates pressure transducers from vibration				
JPL-631	B65-10113	05		
Wire mesh isolator protects sensitive electronic components				
GSFC-347	B65-10216	05		
Nylon shock absorber prevents injury to parachute jumpers				
MSC-226	B66-10080	05		
Lateral ring metal elastic wheel absorbs shock loading				
M-FS-1312	B66-10663	05		
<b>SHOCK LOAD</b>				
Design concept for pressure switch calibrator				
HQ-36	B66-10598	01		
<b>SHOCK SENSITIVITY</b>				
Rugged switch responds to minute pressure differentials				
M-FS-12704	B67-10389	01		
<b>SHOCK WAVE</b>				
Pressure sensor responds only to shock wave				
M-FS-238	B65-10184	01		
<b>SHOE</b>				
Plastic shoe facilitates ultrasonic inspection of thin wall metal tubing				
NUC-10010	B67-10542	02		
<b>SHOT PEENING</b>				
Glass bead shot peening retards stress corrosion failure of titanium tanks				
LANGLEY-319	B67-10198	05		
<b>SHUTTER</b>				
Nulling pyrometer uses Kerr cell shutter for fast responses				
NU-0010	B65-10050	01		
Magnetic latches provide positive overpressure control				
NU-0057	B66-10279	05		
Electronic shutter gates image orthicon on and off				
HQ-96	B67-10270	01		
Use of color-coded sleeve shutters accelerates oscillograph channel selection				
KSC-10092	B67-10382	01		
<b>SIDELobe REDUCTION</b>				
Novel horn antenna reduces side lobes, improves radiation pattern				
JPL-425	B63-10264	01		
<b>SIEVE</b>				
Strainer fits inside flared-tube fittings				
LANGLEY-180	B65-10388	05		
<b>SIGHT LINE</b>				
Mirror device aligns machine surface perpendicular to sight lines				
WOO-5	B63-10421	02		
<b>SIGNAL</b>				
Modified filter prevents conduction of microwave signals along high-voltage power supply leads				
JPL-63	B63-10091	01		
Circuit switches latching relay in response to signals of different polarity				
WOO-055	B63-10508	01		
Computer determines high-frequency phase stability				
GSFC-113	B63-10555	01		
Ring counter may be advanced or retarded by command signal				
GSFC-101	B64-10144	01		
<b>SIGNAL ANALYZER</b>				
Multichannel pulse height analyzer is inexpensive, features low power requirements				
HQN-10020	B67-10258	01		
Solid state circuit averages multiple signals and rejects those varying significantly from the average				
NUC-10066	B67-10262	01		
<b>SIGNAL DETECTION</b>				
Gapped toroid provides infinite resolution of delay-line pickup				
GSFC-370	B65-10258	01		

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# SILICATE

## SIGNAL DETECTOR

Detector circuit compensates for vidicon beam current variations  
GSFC-310 B65-10212 01

Instrument automatically selects peak acceleration signal from several accelerometers  
JPL-816 B66-10462 01

Continuous wave detector has wide frequency range  
M-FS-1849 B67-10386 01

## SIGNAL DISCRIMINATOR

Frequency discriminator with binary output eliminates tuned circuits  
M-FS-376 B65-10349 01

Digitally controlled pulse-level discriminator operates over wide voltage range  
GSFC-324 B66-10129 01

Simple circuit provides reliable multiple signal average and reject capability  
NU-0069 B66-10282 01

Electronic circuit delivers pulse of high interval stability  
MSC-673 B66-10501 01

Electronic frequency discriminator  
M-FS-2434 B67-10151 01

Transistor biased amplifier minimizes diode discriminator threshold attenuation  
ARG-163 B67-10311 01

Accuracy of laser measurements improved by pulse autocorrelator electronic system  
MSC-10033 B67-10338 01

New technique for determination of cross-power spectral density with damped oscillators  
M-FS-14022 B67-10602 02

## SIGNAL DISTORTION

Frequency offset in linear FM/CW transponder eliminates clutter  
M-FS-249 B65-10146 01

Detector circuit compensates for vidicon beam current variations  
GSFC-310 B65-10212 01

Electronic bidirectional valve circuit prevents crossover distortion and threshold effect  
MSC-193 B66-10420 01

TV synchronization system features stability and noise immunity  
JPL-915 B67-10118 01

## SIGNAL ENCODING

Optical output enhances flowmeter accuracy  
M-FS-482 B65-10395 02

## SIGNAL FADEOUT

Lightweight coaxial cable connector reduces signal loss  
JPL-720 B65-10244 01

## SIGNAL GENERATOR

Electronic test instrument generates extremely small current signals  
ARG-276 B67-10318 01

Signal generator converts direct current to multiphase supplies  
MSC-11043 B67-10368 01

Circuit automatically calibrates flowmeter against liquid-level gage reference  
M-FS-2194 B67-10376 01

Digital voltage-controlled oscillator  
GSFC-512 B67-10449 01

## SIGNAL MEASUREMENT

Range recording technique enables four-way polarization measurements  
M-FS-12447 B67-10460 01

## SIGNAL MIXING

Linear signal noise summer accurately determines and controls S/N ratio  
JPL-SC-152 B66-10433 01

## SIGNAL NOISE

Variable word length encoder reduces TV bandwidth requirements  
LANGLEY-87 B65-10345 01

Damper reduces effects of resonance on force transducer  
WSD-321 B66-10550 05

## SIGNAL PROCESSING

System proportions fluid-flow in response to demand signals  
GSFC-457 B66-10094 01

Feedback loop compensates for rectifier nonlinearity  
M-FS-384 B66-10382 01

Video signal processing system uses gated current mode switches to perform high speed multiplication and digital-to-analog conversion  
MSC-781 B66-10429 01

Single-sideband modulator accurately reproduces phase information in 2-mc signals  
M-FS-664 B66-10437 01

Improved television signal processing system  
NPD-10140 B67-10246 01

## SIGNAL RECEPTION

Blood pressure reprogramming adapter assists signal recording  
MSC-265 B67-10475 01

## SIGNAL TO NOISE RATIO

Linear signal noise summer accurately determines and controls S/N ratio  
JPL-SC-152 B66-10433 01

Personal communication system combines high performance with miniaturization  
MSC-720 B67-10119 01

Video synchronization processor overcomes poor signal-to-noise ratio  
KSC-10002 B67-10515 01

## SIGNAL TRANSMISSION

Modified filter prevents conduction of microwave signals along high-voltage power supply leads  
JPL-63 B63-10091 01

Digital system accurately controls velocity of electromechanical drive  
GSFC-287 B65-10096 01

Added diodes increase output of balanced mixer circuit  
GSFC-354 B65-10276 01

## SILAZANE

Silazane polymers show promise for high-temperature application  
M-FS-466 B66-10194 03

Silazane elastomer remains resilient at 400 deg C  
M-FS-1144 B66-10667 05

## SILICATE

Standards for electron probe microanalysis of silicates prepared by convenient method  
GSFC-469 B66-10234 03

Study made of far infrared spectra of silicate minerals

M-FS-1811	B67-10075	02	GSFC-397	B65-10300	01
<b>SILICON</b>			<b>SILICON OXIDE</b>		
Computer circuit will fit on single silicon chip			Refractory ceramic has wide usage, low fabrication cost		
JPL-513	B63-10514	01	M-FS-67	B63-10481	03
Solid-state switching used to speed up capacitive integrator			Lead oxide ceramic makes excellent high-temperature lubricant		
LANGLEY-104	B65-10159	01	LEWIS-144	B64-10116	03
Aluminum doping improves silicon solar cells			Reflective insulator layers separated by bonded silica beads		
LEWIS-206	B66-10181	02	MSC-215	B66-10070	03
Thermal and bias cycling stabilizes planar silicon devices			Vapor grown silicon dioxide improves transistor base-collector junctions		
ERC-48	B67-10176	01	GSFC-389	B66-10091	01
Process controls introduction of selected impurities into semiconductor wafers			<b>SILICON POLYMER</b>		
GSFC-523	B67-10303	01	Flexible protective coatings made from silicon-nitrogen materials		
Method of improving contact bonds in silicon integrated circuits			M-FS-528	B66-10027	03
M-FS-1753	B67-10335	01	Silazane polymers show promise for high-temperature application		
<b>SILICON ALLOY</b>			M-FS-466	B66-10194	03
Brazing process using Al-Si filler alloy reliably bonds aluminum parts			Substituted silane-diol polymers have improved thermal stability		
MSC-448	B66-10241	05	M-FS-469	B66-10259	03
Gage of 6.5 per cent Si-Fe sheet is chemically reduced			<b>SILICON TRANSISTOR</b>		
MSC-537	B66-10454	03	Zener diode is starter for transistor-regulated power supply		
Study made of ductility limitations of aluminum-silicon alloys			NU-0015	B65-10052	01
M-FS-12524	B67-10392	03	Temperature transducer has high output, is time stable		
<b>SILICON CARBIDE</b>			GSFC-446	B65-10362	01
Thin film process forms effective electrical contacts on semiconductor crystals			Vapor grown silicon dioxide improves transistor base-collector junctions		
M-FS-2343	B67-10142	01	GSFC-389	B66-10091	01
Process facilitates photoresist mask alignment on SiC crystals			Transistor circuit increases range of logarithmic current amplifier		
M-FS-2394	B67-10144	01	NU-0018	B66-10350	01
SiC/Si diode trigger circuit provides automatic range switching for log amplifier			Metal oxide silicon /MOS/ transistors protected from destructive damage by wire device		
M-FS-1879	B67-10314	01	ARC-65	B66-10419	01
<b>SILICON COMPOUND</b>			Miniature electrometer preamplifier effectively compensates for input capacitance		
Refractory ceramic has wide usage, low fabrication cost			ARC-69	B66-10549	01
M-FS-67	B63-10481	03	<b>SILICONE</b>		
<b>SILICON CONTROL RECTIFIER /SCR/</b>			Lightweight load support serves as vibration damper		
Circuit controls transients in scr inverters			JPL-661	B65-10144	05
GSFC-120	B63-10600	01	<b>SILICONE RUBBER</b>		
Digital-output cardiometer measures rapid changes in heartbeat rate			Thermally conductive metal wool-silicone rubber material can be used as shock and vibration damper		
MSC-133	B65-10143	01	JPL-321	B63-10207	03
Simple circuit reduces transistor switching time			Pressure molding of powdered materials improved by rubber mold insert		
GSFC-314	B65-10234	01	WOO-100	B64-10270	03
Compact SCR trigger circuit for ignitron switch operates efficiently			Flexible curtain shields equipment from intense heat fluxes		
M-FS-371	B65-10347	01	M-FS-48	B65-10044	03
Pulse generator using transistors and silicon controlled rectifiers produces high current pulses with fast rise and fall times			Shock mount isolates pressure transducers from vibration		
MSC-405	B66-10456	01	JPL-631	B65-10113	05
Solid state circuit controls direction, speed, and braking of dc motor			Copper foil provides uniform heat sink path		
JPL-757	B66-10486	01	MSC-262	B66-10004	02
Low cost SCR lamp driver indicates contents of digital computer registers			Split glass tube assures quality in electron beam brazing		
GSFC-10221	B67-10656	01	M-FS-564	B66-10151	05
<b>SILICON JUNCTION</b>					
Impurity diffusion process for silicon semiconductors is fast and precise					

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# SLEEVE

Rubber and alumina gaskets retain vacuum seal in high temperature EMF cell ARG-17	B66-10472	05	WOO-250	B66-10010	02
<b>SILOXANE</b> Arylenesiloxane copolymers M-FS-1812	B67-10079	03	Antenna simulator permits preinstallation system checkout GSFC-522	B66-10518	01
<b>SILVER</b> Improved molybdenum disulfide-silver motor brushes have extended life M-FS-64	B63-10479	03	A phonocardiogram simulator KSC-67-94	B67-10239	01
Connector for thermocouple leads saves costly wire, makes reliable connectors LANGLEY-26	B63-10529	01	Pump simulator provides variable pressure-flow characteristics LEWIS-10122	B67-10453	05
Improved electrode gives high-quality biological recordings MSC-17	B64-10025	04	<b>SIMULATOR TRAINING</b> Technique simulates effect of reduced gravity LANGLEY-44	B64-10146	04
Gelatin coated electrodes allow prolonged bioelectronic measurements MSC-153	B66-10088	01	<b>SINE WAVE</b> Field effect transistor presents high input impedance in ac amplifier JPL-500	B65-10232	01
Copper wire plated with nickel and silver resists corrosion M-FS-761	B66-10421	03	<b>SINTERING</b> Improved molybdenum disulfide-silver motor brushes have extended life M-FS-64	B63-10479	03
Undercoat prevents blistering of silver plating at elevated temperatures M-FS-2049	B67-10096	05	New sintering process adjusts magnetic value of ferrite cores GSFC-129	B63-10606	01
Silver plating ensures reliable diffusion bonding of dissimilar metals M-FS-1975	B67-10124	03	Combustion chamber struts can be effectively transpiration cooled M-FS-1830	B66-10643	03
Thermodynamic properties of solid palladium-silver alloys and other alloys are investigated by torsion-effusion technique ARG-277	B67-10324	03	Fuel cell life improved by metallic sinter activation after electrode assembly welding MSC-10965	B67-10436	03
Technique eliminates high voltage arcing at electrode-insulator contact area LEWIS-10133	B67-10470	01	<b>SINUSOID</b> Pressure transducers dynamically tested with sinusoidal pressure generator LEWIS-268	B66-10031	01
<b>SILVER ALLOY</b> New brazing alloy eliminates metal-stress cracking WOO-249	B65-10397	03	Edge-type connectors evaluated by electrical noise measurement M-FS-2243	B67-10125	01
Silver-base ternary alloy proves superior for slip ring lead wires M-FS-1540	B66-10540	03	Circuit measures hysteresis loop areas at 30 Hz M-FS-13069	B67-10519	01
Silver-palladium braze alloy recovered from masking materials M-FS-1845	B66-10631	03	Computer program provides improved longitudinal response analysis for axisymmetric launch vehicles LANGLEY-10093	B67-10531	06
<b>SILVER CHLORIDE</b> Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03	<b>SKIN</b> Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05
<b>SILVER-ZINC BATTERY</b> Auxiliary silver electrode eliminates two-step voltage discharge characteristic of silver-zinc cells GSFC-169	B64-10114	01	<b>SKIN /BIOL/</b> Improved electrode gives high-quality biological recordings MSC-17	B64-10025	04
<b>SIMULATION</b> Computer program simulates design, test, and analysis phases of sensitivity experiments M-FS-1496	B67-10077	01	Improved conductive paste secures biomedical electrodes MSC-107	B65-10015	03
GREMEX-A new management training concept GSFC-574	B67-10092	01	Integral skin electrode for electrocardiography is expendable MSC-299	B66-10118	04
<b>SIMULATOR</b> Electronic device simulates respiration rate and depth MSC-89	B64-10255	01	<b>SKIN RESISTANCE</b> Improved electrode paste provides reliable measurement of galvanic skin response MSC-146	B66-10049	04
Simulator produces physiological waveforms MSC-94	B65-10091	01	<b>SLEEVE</b> Self sealing disconnect for tubing forms metal seal after breakaway JPL-354	B63-10226	05
Optical projectors simulate human eyes to establish operator's field of view			Sleeve and cutter simplify disconnecting welded joint in tubing JPL-384	B63-10240	05

New coupling compensates for shaft misalignment NU-0013	B65-10077	05	determines NaMBT inhibitor in ethylene glycol-water solutions MSC-11496	B67-10573	03
New nut and sleeve improve flared connections M-FS-194	B65-10180	05	<b>SODIUM D-LINE</b> Self-balancing line-reversal pyrometer automatically measures gas temperatures LEWIS-348	B67-10268	01
Shrinkable sleeve eliminates shielding gap in RF cable WDO-207	B65-10387	01	<b>SODIUM FLUORIDE</b> Pure xenon hexafluoride prepared for thermal properties studies ARG-10056	B67-10577	03
Noncontacting transducer measures shaft torque M-FS-474	B66-10048	01	<b>SOIL</b> Microorganisms detected by enzyme-catalyzed reaction JPL-782	B66-10117	04
Single connector provides safety fuses for multiple lines MSC-199	B66-10050	01	Extendable mast used in one shot soil penetrometer JPL-685	B66-10146	05
Insert sleeve prevents tube soldering contamination MSC-552	B66-10238	05	Tool samples subsurface soil free of surface contaminants MSC-10988	B67-10473	05
Pipe joints reinforced in place with fitted aluminum sleeves MSC-11109	B67-10271	05	<b>SOLAR CELL</b> New method used to fabricate gallium arsenide photovoltaic device WDO-062	B64-10019	01
<b>SLIDING FRICTION</b> Solenoid valve design minimizes vibration and sliding wear problem M-FS-14079	B67-10667	05	Assembly jig assures reliable solar cell modules GSFC-455	B66-10040	05
<b>SLIP BAND</b> Contact stresses calculated for miniature slip rings M-FS-280	B65-10098	05	Aluminum doping improves silicon solar cells LEWIS-206	B66-10181	02
Silver-base ternary alloy proves superior for slip ring lead wires M-FS-1540	B66-10540	03	Tool permits damage-free removal of solar cell GSFC-467	B66-10219	05
<b>SLOPE</b> Composite filter steepens rejection slopes in microwave application GSFC-480	B66-10393	01	Solar cell submodule design facilitates assembly of lightweight arrays JPL-728	B66-10231	02
<b>SLOSHING</b> Study made of large amplitude fuel sloshing M-FS-12381	B67-10439	03	Control circuit ensures solar cell operation at maximum power GSFC-432	B67-10061	01
<b>SLOT</b> V-slotted screw head and matching driving tool facilitate insertion and removal of screw fasteners FRC-16	B63-10023	05	Simplified method introduces drift fields into cells GSFC-572	B67-10102	03
<b>SLURRY</b> Vapor condensation process produces slurry of magnesium particles in liquid hydrocarbons LEWIS-263	B66-10104	03	Process controls introduction of selected impurities into semiconductor wafers GSFC-523	B67-10303	01
<b>SLUSH</b> Study of hydrogen slush-hydrogen gel utilization M-FS-13068	B67-10413	02	Converter provides constant electrical power at various output voltages GSFC-519	B67-10481	01
<b>SMOOTHING</b> Device spot-laps spheres to very close tolerances JPL-SC-119	B66-10175	05	Composite solar cell matrix is reliable, lightweight and flexible NPO-10821	B67-10503	01
Improved method facilitates debulking and curing of phenolic impregnated asbestos MSC-949	B66-10459	05	<b>SOLAR COLLECTOR</b> Cone and column solar energy concentrator LANGLEY-210	B67-10517	01
<b>SOAP</b> Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01	<b>SOLAR ENERGY</b> Wide-aperture solar energy collector is light in weight JPL-SC-055	B65-10046	02
<b>SODIUM COMPOUND</b> Improved chlorate candle provides concentrated oxygen source MSC-1137	B67-10095	03	Modular thermoelectric cell is easily packaged in various arrays GSFC-339	B65-10199	01
Sodium perxenate permits rapid oxidation of manganese for easy spectrophotometric determination ARG-262	B67-10421	03	Emergency solar still desalts seawater MSC-135	B65-10214	03
Spectrophotometric technique quantitatively			<b>SOLAR RADIATION</b> Simple control device senses solar position JPL-638	B65-10061	01
			Multiple element soft X-ray source produces wide range of radiation GSFC-286	B65-10082	02



# SUBJECT INDEX

# SOLID LUBRICANT

Multichannel pulse height analyzer is inexpensive, features low power requirements HQN-10020	B67-10258	01	M-FS-725	B66-10246	05
<b>SOLAR SENSOR</b> Solar-angle sensor has no moving parts JPL-418	B63-10260	02	Substituting gold for silver improves electrical connections M-FS-2390	B67-10228	03
<b>SOLAR SYSTEM</b> Analog solar system model relates celestial bodies spatially JPL-195	B66-10413	01	<b>SOLENOID</b> Solenoid permits remote control of stop watch and assures restarting FRC-17	B63-10024	01
<b>SOLAR X-RAY</b> Solar X-ray spectrum reproduced in vacuum MSC-228	B67-10164	02	Electromechanically operated camera shutter provides uniform exposure JPL-357	B63-10227	01
<b>SOLDER</b> Cesium iodide crystals fused to vacuum tube faceplates GSFC-67	B63-10476	03	Camera shutter is actuated by electric signal ARC-20	B63-10560	05
Hot-air soldering technique prevents overheating of electrical components GSFC-91	B63-10536	01	Improved magnetometer uses toroidal gating coil GSFC-249	B65-10103	01
Improved solderless connector is easily disconnected JPL-SC-060	B65-10197	01	Force controlled solenoid drives microweld tester WOD-125	B65-10182	01
<b>SOLDERED JOINT</b> Circuit reliability boosted by soldering pins of disconnect plugs to sockets JPL-447	B64-10002	01	Circuit exhibits power efficiency greater than 75 percent MSC-254	B66-10034	01
Soldering tool heats workpieces and applies solder in one operation LEWIS-247	B66-10115	05	Solenoid magnetic fields calculated from superposed semi-infinite solenoids LEWIS-184	B66-10490	01
Telescoping of instrumentation tubing eliminates swaging M-FS-546	B66-10116	05	Monitoring circuit accurately measures movement of solenoid valve M-FS-1829	B66-10568	01
<b>SOLDERING</b> Hot-air soldering technique prevents overheating of electrical components GSFC-91	B63-10536	01	Fuel and oxidizer valve assembly employs single solenoid actuator MSC-1046	B66-10648	05
Compact coaxial connector for printed circuit adds reliability MSC-57	B64-10016	01	Variable-pulse switching circuit accurately controls solenoid-valve actuations M-FS-1895	B67-10022	01
Solder flux leaves corrosion-resistant coating on metal JPL-611	B64-10206	03	Residual magnetism holds solenoid armature in desired position LEWIS-343	B67-10038	01
Feed-through has polyterminal feature M-FS-25	B65-10057	01	Simple pump maintains liquid helium level in cryostat M-FS-1763	B67-10039	05
High permeability semiconductors permit close-tolerance soldering GSFC-319	B65-10134	05	Solenoid valve design has one moving part NPO-10039	B67-10219	05
Assembly jig assures reliable solar cell modules GSFC-455	B66-10040	05	Ferromagnetic core valve gives rapid action on minimum energy LEWIS-10135	B67-10623	05
Soldering tool heats workpieces and applies solder in one operation LEWIS-247	B66-10115	05	Solenoid hammer valve developed for quick-opening requirements LEWIS-10134	B67-10639	05
Fixture aids soldering of electronic components on circuit board ARC-56	B66-10162	01	Solenoid valve design minimizes vibration and sliding wear problem M-FS-14079	B67-10667	05
Soldering iron temperature is automatically reduced ARC-57	B66-10203	01	<b>SOLID LUBRICANT</b> Lead oxide ceramic makes excellent high-temperature lubricant LEWIS-144	B64-10116	03
Tool permits damage-free removal of solar cell GSFC-467	B66-10219	05	Fluoride coatings make effective lubricants in molten sodium environment LEWIS-229	B66-10005	03
Insert sleeve prevents tube soldering contamination MSC-552	B66-10238	05	Polytetrafluoroethylene lubricates ball bearings in vacuum environment M-FS-379	B66-10081	03
Modified soldering iron speeds cutting of synthetic materials			Solid-film lubricant is effective at high temperatures in vacuum LEWIS-228	B66-10087	03
			Composites of porous metal and solid lubricants increase bearing life LEWIS-307	B67-10007	03

## SOLID PROPELLANT ROCKET ENGINE

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## SOLID PROPELLANT ROCKET ENGINE

Study of vortex valve for medium  
temperature solid propellants  
LANGLEY-204 B66-10524 01

Cold solid propellant motor has stop-restart  
capability  
JPL-836 B66-10673 03

## SOLID SOLUTION

Brazing method produces solid-solution bond  
between refractory metals  
LEWIS-212 B65-10370 05

## SOLID STATE

Primary cells utilize halogen-organic  
charge transfer complex  
JPL-926 B66-10682 02

## SOLID STATE DEVICE

Digital cardiometer computes and displays  
heartbeat rate  
MSC-93 B64-10258 01

Logarithmic amplifier uses field effect  
transistors  
JPL-509 B65-10145 01

Analog-to-digital converter has increased  
reliability and reduced power consumption  
GSFC-246 B65-10194 01

Thin-film resistors used in functional  
electronic blocks  
GSFC-380 B65-10305 01

Threshold detector produces narrow pulses at  
high repetition rates  
GSFC-383 B65-10310 01

Ring counter circuit switches multiphase  
motor direction of rotation  
JPL-SC-166 B66-10101 01

New television camera eliminates vidicon tube  
M-FS-472 B66-10112 01

Optical gyro pickoff operates at cryogenic  
temperatures  
M-FS-407 B66-10128 01

Solid state thermostat has integral probe and  
circuitry  
M-FS-434 B66-10193 01

Solid state detectors monitor relay contacts  
JPL-785 B66-10396 01

Solid-state switch increases switching speed  
W00-298 B66-10430 01

Single-sideband modulator accurately  
reproduces phase information in 2-mc signals  
M-FS-664 B66-10437 01

Instrument automatically selects peak  
acceleration signal from several  
accelerometers  
JPL-816 B66-10462 01

Solid state circuit controls direction, speed,  
and braking of dc motor  
JPL-757 B66-10486 01

Solid state annunciator facilitates complex  
system troubleshooting  
M-FS-1258 B66-10505 01

Solid-state recoverable fuse functions as  
circuit breaker  
GSFC-560 B66-10691 01

Hybrid solid state switch replaces motor-  
driven power switch  
JPL-931 B67-10165 01

Solid state circuit averages multiple signals  
and rejects those varying significantly  
from the average

NUC-10066 B67-10262 01

Solid state zero-bias bilateral switch  
GSFC-532 B67-10559 01

## SOLID SUSPENSION

Colloidal suspension simulates linear  
dynamic pressure profile  
W00-266 B66-10214 05

## SOLIDIFICATION

Study made of ductility limitations of  
aluminum-silicon alloys  
M-FS-12524 B67-10392 03

## SOLIDS

Computer program calculates steady-state  
temperature distribution within plane or  
axisymmetric solids  
NUC-10049 B67-10224 06

Computer program MCAP-TOSS calculates  
steady-state fluid dynamics of coolant in  
parallel channels and temperature  
distribution in surrounding heat-generating  
solid  
NUC-10042 B67-10456 06

Computer program MCAP provides for steady  
state thermal and flow analysis of multiple  
parallel channels in heat generating solid  
NUC-10043 B67-10457 06

## SOLUBILITY

Solubility data are compiled for metals in  
liquid zinc  
ARG-149 B67-10191 03

## SOLUTION

Chemical milling solution reveals stress  
corrosion cracks in titanium alloy  
LANGLEY-10077 B67-10322 03

## SOLVENT

Method of welding joint in closed vessel  
improves quality of seam  
JPL-170 B63-10139 05

Soluble undercoating facilitates removal of  
foamed-in-place insulation  
LEWIS-193 B65-10344 03

Surfactant for dye-penetrant inspection is  
insensitive to liquid oxygen  
M-FS-475 B66-10131 03

Solvent residue content measured by light  
scattering technique  
M-FS-850 B66-10320 01

Use of steel and tantalum apparatus for  
molten Cd-Mg-Zn alloys  
ARG-199 B66-10594 03

Solvent permits solid curing agents to be  
used at room temperatures  
M-FS-13434 B67-10593 03

## SONAR

System locates randomly placed remote objects  
LANGLEY-209 B66-10315 01

## SONIC BOOM

Computer program calculates sonic-boom  
pressure signatures  
LANGLEY-10096 B67-10489 06

## SONIC FLOW

Computer program calculates peripheral  
water injection cooling of axisymmetric  
subsonic diffuser  
NUC-10541 B67-10543 06

## SOUND FIELD

Study made of interaction between sound  
fields and structural vibrations  
HQ-26 B67-10068 02

## SPARK EROSION MACHINING

**I-165**

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**I-166**

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## STABLE OSCILLATION

Ultrasonic hand tool allows convenient scanning of spot welds M-FS-539	B66-10289	02	lathe chuck M-FS-685	B66-10277	05
Quality control criteria for acceptance testing of cross-wire welds MSC-627	B66-10587	05	Bellows joint absorbs torsional deflections in duct system M-FS-882	B66-10332	05
<b>SPRAY</b> Quick-hardening problems are eliminated with spray gun modification which mixes resin and accelerator liquids during application LANGLEY-6A	B63-10318	03	Spiral spring/strain gage combination accurately measures shock induced deflection MSC-789	B66-10488	01
Spray-on technique simplifies fabrication of complex thermal insulation blanket M-FS-497	B66-10053	03	Resonant frequency can be adjusted on vibration mount JPL-SC-134	B66-10672	05
Copper-acrylic enamel serves as lubricant for cold drawing of refractory metals ARG-54	B66-10471	05	Gage accurately controls force for placing chips on substrates M-FS-1941	B66-10675	01
<b>SPRAYED PROTECTIVE COATING</b> Intergranular metal phase increases thermal shock resistance of ceramic coating M-FS-1862	B66-10651	03	Elastic guides reduce hysteresis effect in Belleville spring package JPL-910	B67-10011	05
<b>SPRAYING</b> Sprayable birefringent coating enables strain measurements on large surfaces M-FS-1484	B66-10578	03	Excellent spring properties developed in two nickel alloys for use at cryogenic temperatures NUC-10084	B67-10349	03
Multilayer refractory nozzles produced by plasma-spray process WOO-318	B66-10611	05	<b>SPUTTERING</b> Improved carbon electrode reduces arc sputtering MSC-219	B66-10026	01
<b>SPRAYING APPARATUS</b> Inert gas spraying device aids in repair of hazardous systems LEWIS-8B	B65-10115	05	Complex surfaces plated by thin-film deposition in one operation LEWIS-292	B67-10006	05
Acid spray technique mills aluminum alloy materials without immersion M-FS-12500	B67-10463	03	<b>SQUID</b> Quick-closing valve is actuated by explosive discharge ARC-55	B66-10233	05
<b>SPRING</b> Solenoid permits remote control of stop watch and assures restarting FRC-17	B63-10024	01	<b>STABILITY</b> Computer determines high-frequency phase stability GSFC-113	B63-10555	01
New package for belleville spring permits rate change, easy disassembly JPL-392	B63-10247	05	Monostable circuit with tunnel diode has fast recovery GSFC-132	B63-10603	01
Apparatus measures very small thrusts WOO-048	B64-10284	05	Irradiation improves properties of an aromatic polyester LANGLEY-115	B65-10164	03
Gage measures electrical connector pin retention force JPL-SC-071	B65-10034	03	Refractory oxides evaluated for high-temperature use LANGLEY-121	B65-10167	03
Leaf-spring suspension provides accurate parallel displacements JPL-480	B65-10104	05	Cuprous selenide and sulfide form improved photovoltaic barriers WOO-212	B66-10025	01
Collapsible truss structure is automatically expandable GSFC-265	B65-10126	05	Binary fluid amplifier solves stability and load problems ERC-15	B66-10177	01
Coiled spring makes self-locking device for threaded fasteners MSC-149	B65-10135	05	Remote preamplifier circuit maintains stability over wide temperature range WOO-278	B66-10432	01
Lightweight load support serves as vibration damper JPL-661	B65-10144	05	Electronic circuit delivers pulse of high interval stability MSC-673	B66-10501	01
Bidirectional torque filter eliminates backlash GSFC-335	B65-10148	05	<b>STABILIZATION</b> An improved nuclear magnetic resonance spectrometer JPL-762	B67-10234	01
Spiral heater coils hand-formed with fixture LEWIS-208	B65-10192	05	<b>STABILIZER</b> New inflatable liferaft is nontippable MSC-4A	B64-10001	05
Mounting improves heat-sink contact with beryllia washer MSC-194	B66-10144	01	<b>STABLE OSCILLATION</b> Oscillator circuit operates as digitally controlled frequency synthesizer GSFC-570	B67-10447	01
Device facilitates centering of workpieces in					

## STAGNATION POINT

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## STAGNATION POINT

Program computes equilibrium normal shock  
and stagnation point solutions for  
arbitrary gas mixtures  
LANGLEY-10090 B67-10509 06

## STAINLESS STEEL

Apparatus facilitates high-temperature tensile  
testing in vacuum  
LEWIS-42 B63-10345 03

Ellipsoidal optical reflectors reproduced by  
electroforming  
GSFC-92 B63-10547 05

Stainless-steel elbows formed by spin forging  
M-FS-122 B63-10590 05

Screening technique makes reliable bond at  
room temperature  
M-FS-227 B65-10004 03

New alloy brazes titanium to stainless steel  
MSC-102 B65-10060 05

New nut and sleeve improve flared connections  
M-FS-194 B65-10180 05

Coating method enables low-temperature  
brazing of stainless steel  
NU-0030 B65-10250 03

Plastic plus stainless-steel fibers make  
resilient, impermeable material  
WOO-246 B65-10374 03

New brazing alloy eliminates metal-stress  
cracking  
WOO-249 B65-10397 03

Cold cathode ionization gauge has rigid metal  
housing  
GSFC-445 B66-10041 01

Telescoping of instrumentation tubing  
eliminates swaging  
M-FS-546 B66-10116 05

Differential expansion provides pressure for  
diffusion bonding of large diameter rings  
M-FS-588 B66-10269 05

Electrolytic etching process provides  
effective bonding surface on stainless steel  
GSFC-484 B66-10299 03

Brazing process provides high-strength bond  
between aluminum and stainless steel  
M-FS-803 B66-10352 05

Nonhazardous acid etches weld samples  
M-FS-975 B66-10378 05

Electroless nickel plating on stainless  
steels and aluminum  
GSFC-533 B66-10479 03

Braze alloy holds bonding strength over wide  
temperature range  
LEWIS-337 B66-10519 03

Gas chromatographic column enables analysis  
of propellant hydrazines  
MSC-1161 B66-10586 03

Improved rolling element bearings provide  
low torque and small temperature rise in  
ultrahigh vacuum environment  
LEWIS-359 B66-10678 05

Study made of corrosion resistance of  
stainless steel and nickel alloys in nuclear  
reactor superheaters  
ARG-230 B67-10051 03

Materials data handbooks prepared for  
aluminum alloys 2014, 2219, and 5456, and  
stainless steel alloy 301  
M-FS-1959 B67-10089 03

Ultrasonics permits brazing complex stainless  
steel assembly without flux  
NU-0115 B67-10094 05

Stabilizing stainless steel components for  
cryogenic service  
M-FS-13127 B67-10377 05

Standard surface grinder for precision  
machining of thin-wall tubing  
ARG-10014 B67-10400 05

Protected, high-temperature connecting cable  
LEWIS-10149 B67-10461 01

Aluminum and stainless steel tubes joined  
by simple ring and welding process  
M-FS-13120 B67-10472 05

Study made of resistance of stainless steels  
to zinc-vapor corrosion  
ARG-10055 B67-10582 03

## STANDARDIZATION

Standards for electron probe microanalysis of  
silicates prepared by convenient method  
GSFC-469 B66-10234 03

## STAR TRACKING

Point-source light sensor circuit is  
insensitive to background light  
JPL-778 B66-10502 01

## STARTER

Zener diode is starter for transistor-  
regulated power supply  
NU-0015 B65-10052 01

Compact SCR trigger circuit for ignitron  
switch operates efficiently  
M-FS-371 B65-10347 01

Electric arc heater is self starting  
LANGLEY-208 B66-10230 03

## STARTING

Circuit controls transients in scr inverters  
GSFC-120 B63-10600 01

## STATIC FRICTION

Device measures static friction of magnetic  
tape  
GSFC-10360 B67-10586 03

## STATIC LOADING

Pressure responsive seal handles static and  
dynamic loads  
GSFC-441 B65-10327 05

## STATIC PRESSURE

Averaging probe reduces static-pressure  
sensing errors  
LANGLEY-36 B65-10114 05

Combination spacer and gasket provides  
effective static seal  
M-FS-1397 B66-10485 05

Pressure probe compensates for dimensional  
tolerance variations  
LEWIS-302 B66-10599 01

## STATISTICAL ANALYSIS

Computer program performs statistical  
analysis for random processes  
M-FS-723 B66-10525 01

Computer programs perform spectral  
analyses of up to seven time series  
M-FS-1133 B66-10539 01

Algebraic Monte Carlo procedure reduces  
statistical analysis time and cost factors  
M-FS-1887 B67-10434 01

## STATOR

Brushless dc motor uses electron beam  
switching tube as commutator  
GSFC-345 B65-10237 01

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# STORAGE

## STATOR BLADE

Noise study of single stage compressor  
rotor-stator interaction  
LANGLEY-137 B67-10516 02

## STEADY STATE

Improved variable-reluctance transducer meas-  
ures transient pressures  
LANGLEY-10 B63-10321 01

Computer program calculates steady-state  
temperature distribution within plane or  
axisymmetric solids  
NUC-10049 B67-10224 06

General purpose computer programs for  
numerically analyzing linear ac electrical  
and electronic circuits for steady-state  
conditions  
M-FS-13094 B67-10331 06

## STEADY STATE FLOW

Computer program determines gas flow rates in  
piping systems  
M-FS-443 B66-10300 01

New computer program solves wide variety of  
heat flow problems  
M-FS-421 B66-10404 01

Computer program provides steady state  
analysis for liquid propellant propulsion  
systems  
MSC-10064 B67-10414 06

Computer program MCAP-TOSS calculates  
steady-state fluid dynamics of coolant in  
parallel channels and temperature  
distribution in surrounding heat-generating  
solid  
NUC-10042 B67-10456 06

Computer program MCAP provides for steady  
state thermal and flow analysis of multiple  
parallel channels in heat generating solid  
NUC-10043 B67-10457 06

## STEAM

Reaction of steam with molybdenum is  
studied  
ARG-295 B67-10502 03

## STEAM GENERATOR

Oxygen-hydrogen torch is a small-scale  
steam generator  
NU-0042 B66-10120 03

## STEEL

Lightweight universal joint transmits both  
torque and thrust  
JPL-375 B63-10236 05

Etching process mills pH 14-8 Mo alloy  
steel to precise tolerances  
MSC-270 B66-10110 03

Aluminum/steel wire composite plates exhibit  
high tensile strength  
M-FS-401 B66-10262 05

Impact- and puncture-resistant material  
protects parts from damage  
MSC-747 B66-10375 05

Use of steel and tantalum apparatus for  
molten Cd-Mg-Zn alloys  
ARG-199 B66-10594 03

Controlled ferrite content improves  
weldability of corrosion-resistant steel  
M-FS-568 B67-10069 03

Effects of heat input rates on T-1 and  
T-1A steel welds  
M-FS-2475 B67-10163 03

High-strength braze joints between copper  
and steel  
M-FS-2512 B67-10211 05

Welding of AM350 and AM355 steel  
M-FS-2314 B67-10292 05

Study made of pneumatic high pressure piping  
materials /10,000 psi/  
KSC-10133 B67-10437 03

## STEEL STRUCTURE

Flexible magnetic planning boards are easily  
transported  
M-FS-340 B65-10219 05

Computer program simplifies selection of  
structural steel columns  
NU-0044 B66-10097 01

Combination spacer and gasket provides  
effective static seal  
M-FS-1397 B66-10485 05

Nondestructive test method accurately sorts  
mixed bolts  
M-FS-1426 B66-10574 01

## STEERING

Current steering commutator offers  
versatility  
JPL-812 B67-10410 01

## STELLAR REFRACTION

Star/horizon simulator used to test space  
guidance system  
MSC-407 B67-10110 02

## STEP FUNCTION

Stepping switch with simple actuator provides  
many contacts in small space  
JPL-122 B63-10118 01

## STEREOSCOPIC PHOTOGRAPHY

Screen of cylindrical lenses produces  
stereoscopic television pictures  
M-FS-273 B66-10086 02

## STEREOSCOPIC VISION

Study made of application of stereoscopic  
display system to analog computer simulation  
M-FS-1263 B66-10590 01

## STERILIZATION

Dispenser leak-tests and sterilizes rubber  
gloves  
MSC-285 B66-10166 03

## STIFF STRUCTURE

Friction loading device enables accurate  
testing of brittle materials  
NU-0051 B66-10345 05

Preformed stiffeners used to fabricate  
structural components for pressurized  
tanks  
M-FS-1796 B66-10688 05

Concept for design of variable stiffness  
damper  
ARC-11225 B67-10483 05

## STIMULUS

Subminiature biotelemetry unit permits remote  
physiological investigations  
ARC-39 B64-10171 01

## STIRLING CYCLE

Improved cryogenic refrigeration system  
JPL-731 B67-10128 02

## STOPWATCH CONTROL

Solenoid permits remote control of stop watch  
and assures restarting  
FRC-17 B63-10024 01

## STORAGE

Stepping switch with simple actuator provides  
many contacts in small space  
JPL-122 B63-10118 01

Metal strip forms 21 foot boom, rolls up for  
compact storage

## STORAGE DEVICE

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GSFC-151	B64-10011	05	thermal and mechanical deformations GSFC-478	B66-10280	01
Tool pre-tensions covers prior to lacing MSC-631	B66-10301	05	Spiral spring/strain gage combination accurately measures shock induced deflection MSC-789	B66-10488	01
<b>STORAGE DEVICE</b>			Miniature telemetry system accurately measures pressure ARC-74	B66-10624	01
Metal strip forms 21 foot boom, rolls up for compact storage GSFC-151	B64-10011	05	Strain gage circuitry provides fatigue testing machine with accurate cycle count NU-0114	B67-10093	01
Special tool kit aids heavily garmented workers MSC-163	B66-10403	05	Stress calculator speedily converts strain data M-FS-2021	B67-10182	03
Large diameter metal ring seal prevents gas leakage at 5000 psi M-FS-1064	B66-10422	05	Web belt load measuring instrument has excellent stability MSC-921	B67-10242	01
<b>STORAGE STABILITY</b>			Transducer measures embedment stresses in electronic modules M-FS-13486	B67-10367	01
Storage-stable foamable polyurethane is activated by heat LANGLEY-187	B66-10111	03	Device measures static friction of magnetic tape GSFC-10360	B67-10586	03
<b>STORAGE TANK</b>			<b>STRAIN GAUGE ACCELEROMETER</b>		
Helical tube separates nitrogen gas from liquid nitrogen JPL-398	B63-10251	05	Angular acceleration measured by deflection in sensing ring MSC-250	B66-10105	01
Capacitive system detects and locates fluid leaks M-FS-478	B66-10099	01	<b>STRAIN RATE</b>		
Interior servicing platform simplifies maintenance of storage tanks M-FS-1300	B66-10425	05	Tensile-strength apparatus applies high strain-rate loading with minimum shock JPL-28	B66-10063	05
Preformed stiffeners used to fabricate structural components for pressurized tanks M-FS-1796	B66-10688	05	<b>STREAM</b>		
<b>STORAGE UNIT</b>			Valve effectively controls amount of contaminant in flow stream M-FS-1771	B66-10683	05
Compact cartridge drives coded tape at constant readout speed JPL-472	B64-10222	01	<b>STRESS</b>		
Critical parts are stored and shipped in environmentally controlled reusable container M-FS-703	B66-10258	05	Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss LEWIS-39	B63-10342	01
<b>STORE</b>			Stringent cleaning technique assures reliable epoxy bond GSFC-161	B64-10142	03
Dispensing system eliminates torsion in deployed hoses MSC-80	B65-10185	05	New brazing alloy eliminates metal-stress cracking WOO-249	B65-10397	03
<b>STRAIN</b>			Universal transloader moves delicate equipment without stress MSC-654	B66-10384	05
Dispensing system eliminates torsion in deployed hoses MSC-80	B65-10185	05	Polarized light reveals stress in machined laminated plastics LEWIS-10018	B67-10383	03
Sprayable birefringent coating enables strain measurements on large surfaces M-FS-1484	B66-10578	03	Circuit measures hysteresis loop areas at 30 Hz M-FS-13069	B67-10519	01
<b>STRAIN GAUGE</b>			<b>STRESS /BIOL/</b>		
Rapid helium-air analyzer can measure other binary gas mixtures LANGLEY-16	B63-10557	03	Helmet system broadcasts electroencephalograms of wearer ARC-70	B66-10536	01
Forming blocks speed production of strain gage grids LEWIS-182	B65-10009	05	<b>STRESS ANALYSIS</b>		
Differential pressure gauge has fast response M-FS-358	B65-10285	05	Computer program simplifies design of rotating components of turbomachinery NUC-10046	B67-10235	06
Mechanism continuously measures static and dynamic cable loads MSC-217	B66-10107	05	Improved computer program for elastic analysis of highly redundant structural configurations M-FS-13087	B67-10330	06
Radiation used to temperature compensate semiconductor strain gages LANGLEY-207	B66-10186	02	<b>STRESS AND LOAD</b>		
Coating permits use of strain gage in water and liquid hydrogen M-FS-594	B66-10192	01	Contact stresses calculated for miniature slip rings		
Strain gage network distinguishes between					



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# STRUCTURE

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Torus elements used in effective shock absorber WOO-114	B66-10318	05	Orthopedic stretcher with average-sized person can pass through 18-inch opening M-FS-811	B66-10573	05
<b>STRESS CALCULATION</b>			<b>STRIP</b>		
Stress calculator speedily converts strain data M-FS-2021	B67-10182	03	New method used to fabricate light-weight heat exchanger for rocket motor LEWIS-43	B63-10346	02
<b>STRESS CORROSION</b>			Test strips detect different CO2 concentrations in closed compartments MSC-210	B65-10390	03
Aluminum alloys protected against stress-corrosion cracking M-FS-235	B65-10172	03	<b>STRUCTURAL DESIGN</b>		
Treatment increases stress-corrosion resistance of aluminum alloys M-FS-1840	B66-10595	05	A conceptual design for squeeze film bearings M-FS-573	B66-10226	05
Degreasing of titanium to minimize stress corrosion LEWIS-382	B67-10147	03	Solar cell submodule design facilitates assembly of lightweight arrays JPL-728	B66-10231	02
Glass bead shot peening retards stress corrosion failure of titanium tanks LANGLEY-319	B67-10198	05	Application of distorted models in developing scaled structural models M-FS-2540	B67-10321	05
Study made of procedures for externally loading and corrosion testing stress corrosion specimens M-FS-12064	B67-10451	03	<b>STRUCTURAL DYNAMICS</b>		
Study of stress corrosion in aluminum alloys M-FS-13906	B67-10533	03	A modal combination computer program for dynamic analysis of structures NPO-10129	B67-10217	06
<b>STRESS DISTRIBUTION</b>			<b>STRUCTURAL ENGINEERING</b>		
Lightweight hinged bellows restraint has high load capacity WOO-151	B65-10341	03	Lifting clamp positively grips structural shapes M-FS-593	B66-10176	05
Resilient clamp holds fuel cell stack through thermal cycle MSC-313	B66-10035	05	<b>STRUCTURAL FAILURE</b>		
<b>STRESS MEASUREMENT</b>			Study to minimize hydrogen embrittlement of ultrahigh-strength steels M-FS-2455	B67-10141	03
Miniature stress transducer has directional capability JPL-591	B65-10023	01	<b>STRUCTURAL FOUNDATION</b>		
<b>STRESS PROPAGATION</b>			Post-stressed concrete foundation may reduce machinery vibration ARG-130	B67-10237	05
Warping eliminated in copper-clad microwave circuit laminates M-FS-13892	B67-10454	03	<b>STRUCTURAL HEATING</b>		
<b>STRESS RATIO</b>			Predicting surface heating rates and pressures resulting from hot exhaust gases MSC-971	B66-10633	05
Testing device subjects elastic materials to biaxial deformations JPL-616	B65-10189	03	<b>STRUCTURAL RELIABILITY</b>		
<b>STRESS RELAXATION</b>			Design reliability goal developed from small sample M-FS-403	B66-10405	05
Thermal stress-relief treatments for 2219 aluminum alloy are evaluated M-FS-1213	B66-10448	03	Warping eliminated in copper-clad microwave circuit laminates M-FS-13892	B67-10454	03
Jacketed cryogenic piping is stress relieved M-FS-985	B67-10308	05	<b>STRUCTURAL STABILITY</b>		
Machining heavy plastic sections M-FS-12720	B67-10381	03	New method used to fabricate light-weight heat exchanger for rocket motor LEWIS-43	B63-10346	02
<b>STRESS RUPTURE</b>			<b>STRUCTURAL STRAIN</b>		
Apparatus facilitates pressure-testing of metal tubing LEWIS-174	B65-10131	05	Torus elements used in effective shock absorber WOO-114	B66-10318	05
<b>STRESS WAVE</b>			<b>STRUCTURAL VIBRATION</b>		
Lamb waves increase sensitivity in nondestructive testing ARG-10009	B67-10605	02	Viscous-pendulum damper suppresses structural vibrations LANGLEY-45	B64-10272	05
<b>STRESSED-SKIN CONSTRUCTION</b>			Seismic transducer measures small horizontal displacements M-FS-81	B65-10029	05
Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05	Study made of interaction between sound fields and structural vibrations HQ-26	B67-10068	02
<b>STRETCHER</b>			<b>STRUCTURE</b>		
Buoyant Stokes litter assembly used for sea			Variable-transparency wall regulates temperatures of structures LANGLEY-25	B63-10528	03

Nonresonant support facilitates vibration testing of structures M-FS-224	B65-10039	05	stability M-FS-171	B65-10035	05
Air-cured ceramic coating insulates against high heat fluxes M-FS-150	B65-10357	03	Tool samples subsurface soil free of surface contaminants MSC-10988	B67-10473	05
<b>STYROFOAM</b>			<b>SUCTION</b>		
Mill profiler machines soft materials accurately M-FS-692	B66-10254	05	Calibrated clamp facilitates pressure application MSC-298	B66-10059	05
Fixed vacuum plate clamps styrofoam for machining M-FS-683	B66-10283	05	<b>SULFIDE</b>		
<b>SUBCOOLING</b>			Cuprous selenide and sulfide form improved photovoltaic barriers WOO-212	B66-10025	01
Complementary system vaporizes subcooled liquid, improves transformer efficiency M-FS-550	B66-10045	02	<b>SULFUR</b>		
<b>SUBLIMATION</b>			Chemical milling solution produces smooth surface finish on aluminum MSC-549	B66-10312	03
Modular Porous Plate Sublimator /MPPS/ requires only water supply for coolant M-FS-1374	B66-10409	01	<b>SUNLIGHT</b>		
<b>SUBMERGED BODY</b>			Pigmented coating resists thermal shock JPL-SC-083	B65-10354	03
System locates randomly placed remote objects LANGLEY-209	B66-10315	01	<b>SUPERALLOY</b>		
<b>SUBMILLIMETER WAVE</b>			Nickel-base superalloys developed for high-temperature applications LEWIS-226	B66-10222	03
Ferroelectric bolometer measures RF absolute power at submillimeter wavelengths GSFC-422	B66-10051	01	<b>SUPERCONDUCTING MAGNET</b>		
<b>SUBROUTINE</b>			Superconductor magnets used for stagger-tuning traveling-wave maser GSFC-292	B65-10165	01
Subroutines GEORGE and DRASTC simplify operation of automatic digital plotter NUC-10044	B67-10222	06	Mechanisms of superconductivity investigated by nuclear radiation M-FS-1944	B67-10057	02
Computer subroutine ISUDS accurately solves large system of simultaneous linear algebraic equations NUC-10051	B67-10344	06	<b>SUPERCONDUCTOR</b>		
Computerized parts list system coordinates engineering releases, parts control, and manufacturing planning NUC-10073	B67-10348	06	Supercold technique duplicates magnetic field in second superconductor JPL-376	B63-10237	05
Analysis of dynamic systems with DAP4H computer program M-FS-13999	B67-10523	06	Shaped superconductor cylinder retains intense magnetic field JPL-381	B63-10238	01
<b>SUBSONIC FLOW</b>			Superconductor shields test chamber from ambient magnetic fields JPL-627	B65-10297	02
Computer program calculates peripheral water injection cooling of axisymmetric subsonic diffuser NUC-10541	B67-10543	06	Niobium thin films are superconductive in strong magnetic fields at low temperatures JPL-SC-174	B66-10122	02
<b>SUBSONIC SPEED</b>			<b>SUPERCOOLING</b>		
Computer program calculates wing aerodynamic characteristics for fixed wings with dihedral and variable-sweep wings at subsonic speeds LANGLEY-10191	B67-10666	06	Supercold technique duplicates magnetic field in second superconductor JPL-376	B63-10237	05
<b>SUBSTRATE</b>			<b>SUPERFLUIDITY</b>		
Tantalum cathode improves electron-beam evaporation of tantalum JPL-WOO-021	B65-10175	03	Cryogenic filter method produces super-pure helium and helium isotopes JPL-374	B63-10235	03
Thin transparent films formed from powdered glass GSFC-352	B65-10217	03	<b>SUPERHEATING</b>		
Tool permits damage-free removal of solar cell GSFC-467	B66-10219	05	Zirconium alloys with small amounts of iron and copper or nickel show improved corrosion resistance in superheated steam ARG-226	B67-10050	03
Single-crystal semiconductor films grown on foreign substrates WOO-076	B66-10225	01	Study made of corrosion resistance of stainless steel and nickel alloys in nuclear reactor superheaters ARG-230	B67-10051	03
Oxide film on metal substrate reduced to form metal-oxide-metal layer structure ARG-48	B67-10187	03	<b>SUPERHETERODYNE RECEIVER</b>		
<b>SUBSURFACE</b>			Optical superheterodyne receiver uses laser for local oscillator M-FS-1605	B66-10584	01
Oceanborne transponder platform has good			<b>SUPERSONIC FLOW</b>		
			Problem of oscillating cone in supersonic flow is solved by small perturbation techniques M-FS-869	B66-10700	02

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## SURFACE ROUGHNESS EFFECT

Digital program analyzes supersonic flow field within bell-shaped rocket nozzles M-FS-14292	B67-10664	06	MSC-238	B65-10375	05
<b>SUPERSONIC INLET</b>			<b>SURFACE CHEMISTRY</b>		
Perforations in jet engine supersonic inlet increase shock stability NEO-8	B66-10530	05	Instrument performs nondestructive chemical analysis, data can be telemetered JPL-SC-078	B65-10317	01
<b>SUPPORT</b>			Apparatus presents visual display of semiconductor surface characteristics JPL-665	B66-10200	01
Mounting for diodes provides efficient heat sink M-FS-197	B64-10283	01	<b>SURFACE CRACK</b>		
Simulator effects partial gravity conditions MSC-152	B66-10339	05	Chemical milling solution reveals stress corrosion cracks in titanium alloy LANGLEY-10077	B67-10322	03
Universal transloader moves delicate equipment without stress MSC-654	B66-10384	05	Surface-crack detection by microwave methods ARC-10009	B67-10482	01
Device measures reaction engine thrust vector deviations JPL-SC-163	B66-10642	05	<b>SURFACE DISTORTION</b>		
<b>SUPPORT SYSTEM</b>			Electromagnetic hammer removes weld distortions from aluminum tanks M-FS-287	B65-10342	05
Nonresonant support facilitates vibration testing of structures M-FS-224	B65-10039	05	<b>SURFACE EROSION</b>		
Flexure support system protects thermally and dynamically loaded models LANGLEY-39	B65-10042	05	Sensors measure surface ablation rate of reentry vehicle heat shield LANGLEY-287	B66-10592	01
Lightweight load support serves as vibration damper JPL-661	B65-10144	05	<b>SURFACE FINISH</b>		
Heat exchanger tubes supported in high vibration environment M-FS-1401	B66-10567	05	Portable flooring protects finished surfaces, is easily moved M-FS-15	B63-10387	05
Teflon sheet permits valve and valve operator to move as a single unit in a cryogenic pipe line NU-0077	B66-10702	05	Device measures curved surface finish on gear teeth WOO-112	B65-10064	05
Air bearing provides friction-free support for shaker system slip table NU-0086	B66-10708	05	Rotating holder permits accurate grinding of metallurgical microsamples LEWIS-131	B65-10262	05
<b>SUPPRESSOR</b>			Chemical milling solution produces smooth surface finish on aluminum MSC-549	B66-10312	03
Suppressor plate eliminates undesired arcing during electron beam welding M-FS-1126	B66-10357	05	Study shows effect of surface preparations on improving thermionic emission JPL-SC-140	B66-10493	01
Basic suppression techniques are evaluated M-FS-867	B66-10449	01	<b>SURFACE GEOMETRY</b>		
High transients suppressed in electromagnetic devices KSC-66-13	B67-10031	01	Instrument calculates moments of inertia of complex plane figures MSC-628	B66-10306	01
<b>SURFACE</b>			Dot patterns provide reproducible flaw areas for study of adhesive bonds M-FS-862	B66-10367	05
Portable flooring protects finished surfaces, is easily moved M-FS-15	B63-10387	05	<b>SURFACE IONIZATION</b>		
Kinetic-energy absorber employs frictional force between mating cylinders LEWIS-75	B63-10442	05	Highly sensitive solids mass spectrometer uses inert-gas ion source ERC-11	B66-10114	02
Pressure transducer 3/8-inch in size can be faired into surface WOO-065	B64-10021	05	<b>SURFACE PROPERTY</b>		
Stringent cleaning technique assures reliable epoxy bond GSFC-161	B64-10142	03	Measuring coplanarity of surfaces MSC-12044	B67-10371	02
Connector seals fluid lines at cryogenic temperatures and high vacuums GSFC-253	B64-10327	05	<b>SURFACE REACTION</b>		
Averaging probe reduces static-pressure sensing errors LANGLEY-36	B65-10114	05	Radioactive method enables determination of surface areas rapidly and accurately NU-0088	B66-10710	03
Portable tool cleans pipes and tubing			<b>SURFACE ROUGHNESS</b>		
			Rough surface improves stability of air-sounding balloons M-FS-320	B65-10326	05
			Ronchi test applied to measurement of surface roughness M-FS-12583	B67-10636	02
			<b>SURFACE ROUGHNESS EFFECT</b>		
			Universal transloader moves delicate equipment without stress MSC-654	B66-10384	05
			Selective tube roughening increases heat transfer capability		

# SURFACE TEMPERATURE

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M-FS-599	B66-10610	05	parallel displacements JPL-480	B65-10104	05
<b>SURFACE TEMPERATURE</b>			<b>SWAGING</b>		
Pyrometry handbook describes practical aspects of surface temperature measurements of opaque materials LEWIS-349	B66-10520	01	Telescoping of instrumentation tubing eliminates swaging M-FS-546	B66-10116	05
Instrument accurately measures small temperature changes on test surface LANGLEY-174	B66-10637	01	Low power heating element provides thermal control during swaging operations M-FS-457	B66-10206	05
<b>SURFACE TENSION</b>			<b>SWEEP FREQUENCY</b>		
Tool pre-tensions covers prior to lacing MSC-631	B66-10301	05	An investigation of phase-lock loop swept-frequency synchronization M-FS-656	B66-10423	01
<b>SURFACE TREATMENT</b>			<b>SWITCH</b>		
Device spot-laps spheres to very close tolerances JPL-SC-119	B66-10175	05	Stepping switch with simple actuator provides many contacts in small space JPL-122	B63-10118	01
Dry film lubricant is effective at extreme loads M-FS-628	B66-10256	03	Coincident switch closing reduces error in motor-driven timer JPL-182	B63-10143	05
Seal surfaces protected during assembly NU-0067	B66-10266	05	Liquid switch is remotely operated by low dc voltage GSFC-119	B63-10599	01
Valve seat pores sealed with thermosetting monomer M-FS-900	B66-10322	03	Digital logic elements provide additional functions from analog input MSC-64	B64-10064	01
Sprayable birefringent coating enables strain measurements on large surfaces M-FS-1484	B66-10578	03	Bandwidth switching is transient-free, avoids loss of loop lock WOO-054	B64-10349	01
Composites of porous metal and solid lubricants increase bearing life LEWIS-307	B67-10007	03	Photoelectric semiconductor switch operates with low level inputs JPL-SC-068	B65-10033	01
Study made of corrosion resistance of stainless steel and nickel alloys in nuclear reactor superheaters ARG-230	B67-10051	03	Automatic thermal switch accelerates cooling-down of cryogenic system JPL-655	B65-10068	01
<b>SURFACE VEHICLE</b>			Rotor position sensor switches currents in brushless dc motors GSFC-315	B65-10151	01
Vehicle walks on varied terrain, can assist handicapped persons WOO-005	B64-10274	05	<b>Inflatable bladder provides accurate calibration of pressure switch M-FS-367</b>	B65-10279	01
<b>SURFACTANT</b>			Selenium bond decreases on resistance of light-activated switch JPL-SC-101	B65-10324	01
Surfactant for dye-penetrant inspection is insensitive to liquid oxygen M-FS-475	B66-10131	03	Three-position rocker switch actuator has positive centering MSC-261	B65-10376	01
Ultrasonic cleaning restores depth-type filters M-FS-540	B66-10298	03	Economical and maintenance-free gas system operates railroad switches NU-0045	B66-10124	05
<b>SURGE</b>			Optically driven switch turn-off time reduced by opaque coatings JPL-SC-107	B66-10141	01
High-pressure regulating system prevents pressure surges JPL-231	B63-10170	05	Switching mechanism senses angular acceleration GSFC-462	B66-10158	01
<b>SURGICAL INSTRUMENT</b>			Safety switch permits emergency bridge crane shutdown M-FS-549	B66-10168	05
Encapsulation process sterilizes and preserves surgical instruments JPL-484	B64-10066	05	Soldering iron temperature is automatically reduced ARC-57	B66-10203	01
Hand-held instrument should relieve hematoma pressure MSC-599	B67-10332	04	Key-locked guard prevents accidental switch actuation MSC-419	B66-10235	05
<b>SURVIVAL</b>			Magnetically operated limit switch has improved reliability, minimizes arcing MSC-422	B66-10270	01
Self-inflating lifevest stores in small package MSC-5A	B66-10184	04			
<b>SUSPENSION</b>					
Device enables measurement of moments of inertia about three axes GSFC-49	B65-10176	05			
Vacuum chamber provides improved insulation and support for cryostat M-FS-415	B65-10368	02			
<b>SUSPENSION SYSTEM</b>					
Leaf-spring suspension provides accurate					

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## SYNCHRONOUS MOTOR

Flexible arms provide constant force for pressure switch calibration HQ-38	B66-10317	05	Solid state circuit switches ac load JPL-798	B66-10465	01
Design concept for pressure switch calibrator HQ-36	B66-10598	01	Computer program detects transient malfunctions in switching circuits MSC-604	B67-10002	01
Low rate flow switch can be used for gas or liquid JPL-867	B66-10696	01	Variable-pulse switching circuit accurately controls solenoid-valve actuations M-FS-1895	B67-10022	01
Variable reluctance switch avoids contact corrosion and contact bounce MSC-1178	B67-10137	01	Switching-type regulator circuit has increased efficiency MSC-1063	B67-10190	01
Rugged switch responds to minute pressure differentials M-FS-12704	B67-10389	01	Current steering commutator offers versatility JPL-812	B67-10410	01
Series transistors isolate amplifier from flyback voltage MSC-11023	B67-10468	01	Automatic transducer switching provides accurate wide range measurement of pressure differential NUC-10001	B67-10540	01
Solid state zero-bias bilateral switch GSFC-532	B67-10559	01	Solid state single-ended switching dc-to-dc converter M-FS-13598	B67-10558	01
<b>SWITCHING</b>			Thermionic diode switching has high temperature application NPD-10404	B67-10672	01
Zener diode controls switching of large direct currents MSC-188	B65-10350	01	<b>SWITCHING ELEMENT</b>		
Lamp automatically switches to new filament on burnout M-FS-498	B66-10046	01	Dc to ac converter operates efficiency at low input voltages GSFC-130	B65-10178	01
Simplified technique demonstrates magnetic domain switching M-FS-13153	B67-10342	02	Efficient dc to dc converter eliminates large stray magnetic fields GSFC-463	B66-10376	01
<b>SWITCHING CIRCUIT</b>			<b>SWITCHING FUNCTION</b>		
Double-throw microwave device switches two lines quickly JPL-410	B63-10258	01	Knob linkage permits one-hand control of several operations MSC-30	B65-10022	05
Solid-state switching used to speed up capacitive integrator LANGLEY-104	B65-10159	01	Exclusive-or logic circuit has useful properties LANGLEY-214	B66-10272	01
Simple circuit reduces transistor switching time GSFC-314	B65-10234	01	Automatic channel switching device MSC-832	B67-10086	01
Improved circuit minimizes generation of pseudonoise check bits JPL-698	B65-10275	01	Scanning means for Cassegrainian antenna JPL-946	B67-10174	05
Cam-operated limit switch features safe fuse replacement MSC-218	B65-10322	01	<b>SYMMETRICAL BODY</b>		
Tester periodically registers dc amplifier characteristics MSC-190	B66-10148	01	Automatic system determines moments of inertia of asymmetrical objects M-FS-1769	B66-10636	01
Junction connectors permit strategic placement of television cameras KSC-66-22	B66-10391	01	<b>SYMMETRY</b>		
Electrically controlled optical latch and switch requires less current JPL-SC-111	B66-10414	01	Modified interelement spacing improves Yagi antenna array LANGLEY-130	B65-10183	01
Electronic bidirectional valve circuit prevents crossover distortion and threshold effect MSC-193	B66-10420	01	<b>SYNCHRONIZATION</b>		
Video signal processing system uses gated current mode switches to perform high speed multiplication and digital-to-analog conversion MSC-781	B66-10429	01	Video synchronization processor overcomes poor signal-to-noise ratio KSC-10002	B67-10515	01
Solid-state switch increases switching speed WOO-298	B66-10430	01	<b>SYNCHRONIZED OSCILLATOR</b>		
Basic suppression techniques are evaluated M-FS-867	B66-10449	01	An investigation of phase-lock loop swept-frequency synchronization M-FS-656	B66-10423	01
			Improved frequency divider employs transistor avalanche effect NPD-10008	B67-10575	01
			<b>SYNCHRONOUS DETECTOR</b>		
			Phase detector circuit synthesizes own reference signal M-FS-247	B65-10080	01
			<b>SYNCHRONOUS MOTOR</b>		
			Circuit increases capability of hysteresis synchronous motor MSC-1090	B67-10084	01

## SYSTEM FAILURE

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## SYSTEM FAILURE

Safety switch permits emergency bridge crane shutdown  
M-FS-549 B66-10168 05

Simplified circuit corrects faults in parallel binary information channels  
JPL-SC-090 B66-10261 01

## SYSTEMS ANALYSIS

Human transfer functions used to predict system performance parameters  
LANGLEY-203 B66-10379 01

Solid state annunciator facilitates complex system troubleshooting  
M-FS-1258 B66-10505 01

Analytical technique permits comparison of reliability of alternate mechanical designs  
NUC-10065 B67-10261 06

Computer program uses Monte Carlo techniques for statistical system performance analysis  
M-FS-2234 B67-10306 06

Analysis of dynamic systems with DAP4H computer program  
M-FS-13999 B67-10523 06

## SYSTEMS DESIGN

Program computes single-point failures in critical system designs  
MSC-603 B67-10001 01

Tube-to-header joint for bimetallic construction  
LEWIS-10282 B67-10464 05

Computer programs for antenna feed system design and analysis  
NPO-10359 B67-10504 06

## SYSTEMS ENGINEERING

Computerized parts list system coordinates engineering releases, parts control, and manufacturing planning  
NUC-10073 B67-10348 06

## T

## TABLE

Gear drive automatically indexes rotary table  
M-FS-753 B66-10383 05

Recommended values of the thermophysical properties of eight alloys, their major constituents and oxides  
NU-0095 B67-10062 03

Solubility data are compiled for metals in liquid zinc  
ARG-149 B67-10191 03

## TACHOMETER

Variable-capacitance tachometer eliminates troublesome magnetic fields  
GSFC-435 B66-10126 01

## TAKOFF AND LANDING

New anemometer has fast response, measures dynamic pressure directly  
LANGLEY-28 B63-10530 05

## TANK

Two-part valve acts as quick coupling  
JPL-478 B64-10223 05

Magnets position X-ray film for weld inspection  
M-FS-253 B65-10110 05

Oscillator circuit measures liquid level in tanks  
M-FS-245 B65-10209 01

Weld leaks rapidly and safely detected  
M-FS-362 B65-10265 01

Device without electrical connections in tank measures liquid level  
W00-235 B66-10198 01

## TANTALUM

Apparatus facilitates high-temperature tensile testing in vacuum  
LEWIS-42 B63-10345 03

Tantalum cathode improves electron-beam evaporation of tantalum  
JPL-W00-021 B65-10175 03

Thermoelectric elements diffusion-bonded to tungsten electrodes  
GSFC-346 B65-10309 01

Bimetallic devices help maintain constant sealing forces down to cryogenic temperatures  
M-FS-800 B66-10325 02

Nonelectrolytic tantalum capacitors developed  
M-FS-1546 B66-10552 01

Tantalum alloys resist creep deformation at elevated temperatures  
LEWIS-350 B66-10558 03

Use of steel and tantalum apparatus for molten Cd-Mg-Zn alloys  
ARG-199 B66-10594 03

Thin film process forms effective electrical contacts on semiconductor crystals  
M-FS-2343 B67-10142 01

## TAPE

New energy storage concept uses tapes  
LEWIS-239 B66-10098 02

Expandable takeup reel facilitates paper tape removal  
W00-271 B66-10399 05

## TAPE RECORDER

Electronic phase-locked-loop speed control system is stable  
JPL-SC-084 B66-10232 01

Recording and time expansion technique for high-speed, single-shot transient video signal  
ARC-10003 B67-10139 01

## TAPERED COLUMN

Tool facilitates sealing of metal fill tubes  
MSC-24 B63-10519 05

## TARGET

Simplified fixture permits precision alignment of an optical target  
M-FS-1181 B66-10556 01

## TECHNICAL WRITING

Review of research and development in fluid logic elements  
M-FS-420 B67-10438 01

Review of biological mechanisms for application to instrument design  
HQ-33 B67-10663 04

## TEFLON

Insert sleeve prevents tube soldering contamination  
MSC-552 B66-10238 05

Teflon sheet permits valve and valve operator to move as a single unit in a cryogenic pipe line  
NU-0077 B66-10702 05

Technique for stripping Teflon insulated wire  
M-FS-1774 B67-10048 05

Evaluation of high temperature stranded hookup wire  
M-FS-2478 B67-10122 03

## TELECOMMUNICATION

Multiplexing control device enables handling of wide variations in sampling rates  
M-FS-1871 B67-10150 01

## TELEMETER

Device measures fluid drag on test vehicles  
LANGLEY-34 B65-10195 01

## TELEMETRY

Circuit converts AM signals to FM for magnetic recording  
GSFC-227 B65-10001 01

Simple circuit functions as frequency discriminator for PFM signals  
GSFC-267 B65-10102 01

Variable frequency transistor inverters use multiple core transformers  
GSFC-183 B65-10119 01

Circuit reduces distortion of FM modulator  
GSFC-257 B65-10152 01

Instrument performs nondestructive chemical analysis, data can be telemetered  
JPL-SC-078 B65-10317 01

Solid state thermostat has integral probe and circuitry  
M-FS-434 B66-10193 01

Miniature capacitive accelerometer is especially applicable to telemetry  
ARC-72 B66-10491 01

Digital system detects binary code patterns containing errors  
GSFC-541 B66-10516 01

Miniature telemetry system accurately measures pressure  
ARC-74 B66-10624 01

Multiplexing control device enables handling of wide variations in sampling rates  
M-FS-1871 B67-10150 01

A conceptual, parallel operating data compression processor  
NPO-10068 B67-10204 01

Improved television signal processing system  
NPO-10140 B67-10246 01

An efficient, temperature-compensated subcarrier oscillator  
JPL-SC-091 B67-10251 01

Automatic telemetry checkout system  
M-FS-12580 B67-10402 01

Range recording technique enables four-way polarization measurements  
M-FS-12447 B67-10460 01

## TELESCOPE

Attachment converts microscope to point source autocollimator  
JPL-499 B64-10124 05

Square tubing reduces cost of telescoping bridge crane hoist  
ARG-13 B67-10293 05

Glancing incidence telescope for far ultraviolet and soft X-rays  
GSFC-10052 B67-10508 02

Telescope mount with azimuth-only primary  
NPO-10468 B67-10671 02

## TELEVISION

Means for improving apparent resolution of television  
ERC-65 B67-10152 01

## TELEVISION CAMERA

Raster linearity of video cameras calibrated with precision tester  
GSFC-200 B64-10209 01

Screen of cylindrical lenses produces stereoscopic television pictures  
M-FS-273 B66-10086 02

Circular, explosion-proof lamp provides uniform illumination  
MSC-382 B66-10156 02

Junction connectors permit strategic placement of television cameras  
KSC-66-22 B66-10391 01

Security warning system monitors up to fifteen remote areas simultaneously  
KSC-66-39 B66-10548 01

Subminiature deflection circuit operates integrated sweep circuits in TV camera  
MSC-1263 B67-10155 01

Electronic shutter gates image orthicon on and off  
HQ-96 B67-10270 01

Improved head-controlled TV system produces high-quality remote image  
ARG-128 B67-10317 01

Ultraminiature television camera  
M-FS-11967 B67-10469 01

## TELEVISION EQUIPMENT

Unijunction frequency divider is free of backward loading  
JPL-W00-010 B65-10112 01

Parallel line raster eliminates ambiguities in reading timing of pulses less than 500 microseconds apart  
JPL-805 B66-10386 01

Improved digital TV encoding and decoding system  
MSC-11147 B67-10562 01

## TELEVISION RECEPTION

Improved ultrasonic TV images achieved by use of Lamb-wave orientation technique  
ARG-203 B67-10295 02

## TELEVISION TRANSMISSION

Variable word length encoder reduces TV bandwidth requirements  
LANGLEY-87 B65-10345 01

TV synchronization system features stability and noise immunity  
JPL-915 B67-10118 01

Multiplex television transmission system  
MSC-11595 B67-10576 01

Scan rate converter for tape recording and playback of TV pictures  
NPO-10166 B67-10676 01

## TELLURIUM COMPOUND

IR-transmission glasses formed from oxides of bismuth and tellurium  
M-FS-279 B65-10190 03

## TEMPERATURE

Two-stage emitter follower is temperature stabilized  
MSC-20 B63-10493 01

## TEMPERATURE COMPENSATION

New low level ac amplifier provides adjustable noise cancellation and automatic temperature compensation  
ARC-2 B63-10003 04

Simple circuit provides adjustable voltage with linear temperature variation

## TEMPERATURE CONTROL

## SUBJECT INDEX

JPL-W00-029	B63-10537	01	GSFC-425	B66-10009	03
An efficient, temperature-compensated subcarrier oscillator			Angular acceleration measured by deflection in sensing ring		
JPL-SC-091	B67-10251	01	MSC-250	B66-10105	01
MOSFET improves performance of power supply regulator			Concept for passive system to control gas flow independently of temperature		
GSFC-10022	B67-10569	01	M-FS-982	B66-10343	05
TEMPERATURE CONTROL			Metal flame spray coating protects electrical cables in extreme environment		
Variable-transparency wall regulates temperatures of structures			NUC-10077	B67-10351	03
LANGLEY-25	B63-10528	03	Concept for design of variable stiffness damper		
Simple control device senses solar position			ARC-11225	B67-10483	05
JPL-638	B65-10061	01	TEMPERATURE FIELD		
Closed fluid system without moving parts controls temperature			Hydrogen-atmosphere induction furnace has increased temperature range		
LEWIS-222	B65-10331	02	LEWIS-153	B66-10055	05
Special coatings control temperature of structures			Remote preamplifier circuit maintains stability over wide temperature range		
GSFC-444	B65-10337	03	W00-278	B66-10432	01
Auxiliary coil controls temperature of RF induction heater			Thermodynamic properties of saturated liquid parahydrogen charted for important temperature range		
GSFC-428	B66-10067	01	NUC-10018	B67-10346	03
Control system maintains compartment at constant temperature			TEMPERATURE GRADIENT		
JPL-SC-145	B66-10188	05	Packless valve with all-metal seal handles wide temperature, pressure range		
Soldering iron temperature is automatically reduced			JPL-361	B63-10228	05
ARC-57	B66-10203	01	Simple circuit provides adjustable voltage with linear temperature variation		
High-speed furnace uses infrared radiation for controlled brazing			JPL-W00-029	B63-10537	01
NU-0047	B66-10268	02	Simple transducer measures low heat-transfer rates		
Mixer conditions temperature of liquified gas streams			JPL-466	B64-10122	01
M-FS-1784	B66-10565	02	Seal allows blind assembly and thermal expansion of components		
Heater control circuit provides both fast and proportional control			NU-0005	B65-10053	05
M-FS-906	B67-10097	01	Jacketed cryogenic piping is stress relieved		
TEMPERATURE DIFFERENCE			M-FS-985	B67-10308	05
Temperature-compensation circuit stabilizes performance of vidicons			TEMPERATURE INDICATOR		
JPL-486	B64-10226	01	Braze alloys used as temperature indicators		
Feed-through connector withstands high temperatures in vacuum environment			NU-0063	B66-10274	01
GSFC-442	B65-10328	01	Thin film thermal detector		
TEMPERATURE DISTRIBUTION			JPL-943	B67-10505	01
Computer program simplifies transient and steady-state temperature prediction for complex body shapes			Calibration technique for electromagnetic flowmeters		
MSC-989	B66-10619	01	LEWIS-10328	B67-10554	01
Computer program calculates steady-state temperature distribution within plane or axisymmetric solids			TEMPERATURE MEASUREMENT		
NUC-10049	B67-10224	06	Thermistor connector assembly increases accuracy of measurements		
Computer program MCAP-TOSS calculates steady-state fluid dynamics of coolant in parallel channels and temperature distribution in surrounding heat-generating solid			LANGLEY-62	B65-10045	01
NUC-10042	B67-10456	06	Infrared shield facilitates optical pyrometer measurements		
Computer program MCAP provides for steady state thermal and flow analysis of multiple parallel channels in heat generating solid			LANGLEY-133	B65-10272	02
NUC-10043	B67-10457	06	Miniature bioelectric device accurately measures and telemeters temperature		
TEMPERATURE EFFECT			ARC-52	B66-10057	01
Hot-air soldering technique prevents overheating of electrical components			Multiple temperatures sampled using only one reference junction		
GSFC-91	B63-10536	01	GSFC-485	B66-10260	01
Coiled sheet metal strip opens into tubular configuration			Strain gage network distinguishes between thermal and mechanical deformations		
			GSFC-478	B66-10280	01
			Accurate depth control provided for thermocouple junction locations		
			LANGLEY-289	B66-10632	01



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# TEST CHAMBER

Self-balancing line-reversal pyrometer automatically measures gas temperatures LEWIS-348 B67-10268	01	JPL-28	B66-10063	05
Vapor deposition process provides new method for fabricating high temperature thermocouples NUC-10152 B67-10616	01	Friction loading device enables accurate testing of brittle materials NU-0051 B66-10345		05
TEMPERATURE PROBE Internal cooling increases range of immersion-type temperature probe LEWIS-171 B65-10157	02	Self-aligning rod prevents eccentric loading of tensile specimens NUC-10525 B67-10594		05
TEMPERATURE PROFILE Density trace made with computer printout GSFC-322 B65-10200	01	Polystyrene cryostat facilitates testing tensile specimens under liquid nitrogen NUC-10522 B67-10613		02
TEMPERATURE TRANSDUCER Transducer measures temperature differentials in presence of strong electromagnetic fields ARC-27 B65-10089	01	Test system accurately determines tensile properties of irradiated metals at cryogenic temperatures NUC-10521 B67-10617		02
Temperature transducer has high output, is time stable GSFC-446 B65-10362	01	Environmental control system for cryogenic testing of tensile specimens NUC-10523 B67-10618		02
Heat flux sensor design reduces extraneous source effects MSC-400 B66-10531	01	Tensile testing grips are easily assembled under liquid nitrogen NUC-10524 B67-10628		05
Study of theory and application of long duration heat flux transducers M-FS-1265 B66-10614	01	TENSION Buckle joins web straps quickly, adjusts easily LANGLEY-21 B64-10119		05
TEMPLATE Lathe converted for grinding aspheric surfaces GSFC-115 B63-10556	05	Cantilever springs maintain tension in thermally expanded wires LEWIS-136 B65-10149		05
TENSILE STRENGTH Mechanism continuously measures static and dynamic cable loads MSC-217 B66-10107	05	Single-source mechanical loading system produces biaxial stresses in cylinders M-FS-12530 B67-10380		05
Aluminum/steel wire composite plates exhibit high tensile strength M-FS-401 B66-10262	05	TERMINAL Feed-through has polyterminal feature M-FS-25 B65-10057		01
New tungsten alloy has high strength at elevated temperatures LEWIS-336 B66-10551	03	Standoff tool speeds placement of friction-fit electrical terminals WOO-029 B65-10348		05
Tungsten fiber-reinforced copper composites form high strength electrical conductors LEWIS-338 B66-10572	03	Adhesive-backed terminal board eliminates mounting screws MSC-173 B65-10396		01
Study made to control depth of potting compound for honeycomb sandwich fasteners LEWIS-370 B66-10677	05	Semiautomatic device tests components with biaxial leads MSC-516 B66-10337		05
Study made of mechanics of deformation and fracture of fibrous composites HQ-10035 B67-10660	03	Flat cable insulation stripping machine M-FS-13776 B67-10581		05
TENSILE STRESS Ultrasonic emission method enables testing of adhesive bonds M-FS-799 B66-10341	01	TERNARY ALLOY Silver-base ternary alloy proves superior for slip ring lead wires M-FS-1540 B66-10540		03
Glass bead shot peening retards stress corrosion failure of titanium tanks LANGLEY-319 B67-10198	05	TEST CHAMBER Test device prevents molecular bounce-back GSFC-82 B66-10546		03
TENSILE TESTING MACHINE Apparatus facilitates high-temperature tensile testing in vacuum LEWIS-42 B63-10345	03	Multiple test chamber exposes materials to various environments MSC-179 B65-10268		01
Peel resistance of adhesive bonds accurately measured GSFC-320 B65-10173	03	Superconductor shields test chamber from ambient magnetic fields JPL-627 B65-10297		02
Testing device subjects elastic materials to biaxial deformations JPL-616 B65-10189	03	Materials physically tested in variable- environment chamber JPL-789 B66-10130		01
Tensile-strength apparatus applies high strain-rate loading with minimum shock		Improved system measures output energy of pyrotechnic devices WOO-256 B66-10159		01
		Expandable rubber plug seals openings for pressure testing NU-0048 B66-10229		05
		Vacuum test fixture improves leakage rate		

## TEST EQUIPMENT

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measurements MSC-271	B66-10286	01	Fixture tests bellows reliability through repetitive pressure/temperature cycling MSC-1176	B67-10111	01
Feed-thru flange is useful in vacuum applications to cryogenic temperatures JPL-846	B66-10615	02	Portable fixture facilitates pressure testing of instrumentation fittings M-FS-2032	B67-10121	03
Volume-ratio calibration system for vacuum gages LEWIS-303	B66-10640	01	A phonocardiogram simulator KSC-67-94	B67-10239	01
High speed blowdown system provides rapid pressure loss LEWIS-375	B67-10043	05	Tester automatically checks insulation of individual conductors in multiple-strand cables NUC-10068	B67-10260	01
<b>TEST EQUIPMENT</b>			Tester automatically checks paper tape punch and reader after maintenance ARC-66	B67-10267	01
Test device prevents molecular bounce-back GSFC-82	B63-10546	03	IR vidicon scanner monitors many test points M-FS-1937	B67-10277	01
Machine tests crease durability of sheet materials JPL-604	B64-10178	05	Remotely operated high pressure valve protects test personnel MSC-11010	B67-10291	05
Circuit converts AM signals to FM for magnetic recording GSFC-227	B65-10001	01	Electronic test instrument generates extremely small current signals ARG-276	B67-10318	01
Fluid pressure used to test turbopump bearings NU-0001	B65-10024	03	Cut-through tester accurately measures insulation failure rates M-FS-12506	B67-10354	03
Circuit detects errors in address currents for magnetic core arrays M-FS-234	B65-10047	01	Steel test panel helps control additives in pyrophosphate copper plating LEWIS-10101	B67-10358	05
Piezoresistive gage tests pin-connector sockets JPL-675	B65-10128	01	Test device prevents weld joint damage by eliminating axial pin forces on unpotted modules LEWIS-10201	B67-10359	01
Force controlled solenoid drives microweld tester WOO-125	B65-10182	01	Pressure levels and pulsation frequencies can be varied on high pressure/frequency testing device LEWIS-10205	B67-10360	05
Testing device subjects elastic materials to biaxial deformations JPL-616	B65-10189	03	Jet engine powers large, high-temperature wind tunnel M-FS-13544	B67-10621	02
Novel probe simplifies electronic component testing GSFC-342	B65-10243	01	<b>TEST FACILITY</b>		
Pressure transducers dynamically tested with sinusoidal pressure generator LEWIS-268	B66-10031	01	Monitoring circuit accurately measures movement of solenoid valve M-FS-1829	B66-10568	01
Extendable mast used in one shot soil penetrometer JPL-685	B66-10146	05	<b>TEST METHOD</b>		
Dispenser leak-tests and sterilizes rubber gloves MSC-285	B66-10166	03	Continuity tester screens out faulty socket connections JPL-596	B64-10065	01
Matching flow characteristics of standard shutoff valves eliminates need for custom fabricated valves M-FS-1069	B66-10416	05	Improved insertion-loss tester JPL-358	B64-10080	01
Semiconductors can be tested without removing them from circuitry M-FS-1163	B66-10447	01	Electronic device simulates respiration rate and depth MSC-89	B64-10255	01
Device measures reaction engine thrust vector deviations JPL-SC-163	B66-10642	05	Apparatus facilitates pressure-testing of metal tubing LEWIS-174	B65-10131	05
Logic circuitry used to automatically test shielded cables HQ-60	B66-10659	01	Weld leaks rapidly and safely detected M-FS-362	B65-10265	01
Tester for study of rolling element bearings LEWIS-305	B67-10009	01	Test strips detect different CO2 concentrations in closed compartments MSC-210	B65-10390	03
Flow-test device fits into restricted access passages MSC-1078	B67-10074	01	Vibration tests on vidicons made by improved method JPL-SC-115	B66-10042	01
Special purpose reflectometer uses modified Ulbricht sphere MSC-1135	B67-10109	02	Rectilinear accelerometer possesses self-calibration feature M-FS-1480	B66-10452	01

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# THERMAL PROPERTY

Method for predicting frictional loss in metal bellows and flexible hose M-FS-883	B66-10662	05	Seal allows blind assembly and thermal expansion of components NU-0005	B65-10053	05
<b>TEST PROGRAM</b> Multiple correlation computer program determines relationships between several independent and dependent variables M-FS-13024	B67-10327	06	Cantilever springs maintain tension in thermally expanded wires LEWIS-136	B65-10149	05
Test and inspection for process control of monolithic circuits M-FS-13084	B67-10507	01	Differential expansion provides pressure for diffusion bonding of large diameter rings M-FS-588	B66-10269	05
<b>TETROXIDE</b> Effects of helium and nitrogen as pressurants in nitrogen tetroxide transfer MSC-924	B67-10083	03	<b>THERMAL EXPANSION COEFFICIENT</b> Bimetallic devices help maintain constant sealing forces down to cryogenic temperatures M-FS-800	B66-10325	02
<b>THERAPY</b> Simulator effects partial gravity conditions MSC-152	B66-10339	05	Glass formulation has high coefficient of thermal expansion NU-0084	B66-10705	03
Uranyl phthalocyanines show promise in the treatment of brain tumors ARG-100	B67-10188	04	<b>THERMAL INSULATION</b> Variable-transparency wall regulates temperatures of structures LANGLEY-25	B63-10528	03
<b>THERMAL CONDUCTOR</b> Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02	Aluminized fiberglass insulation conforms to curved surfaces M-FS-477	B66-10024	03
Simple transducer measures low heat-transfer rates JPL-466	B64-10122	01	Spray-on technique simplifies fabrication of complex thermal insulation blanket M-FS-497	B66-10053	03
Study made of anodized aluminum circuit boards M-FS-13580	B67-10425	01	Insulation for cryogenic tanks has reduced thickness and weight M-FS-326	B66-10183	02
<b>THERMAL CYCLING</b> Thermal and bias cycling stabilizes planar silicon devices ERC-48	B67-10176	01	Improved thermal insulation materials made of foamed refractory oxides M-FS-735	B66-10288	03
<b>THERMAL EFFECT</b> Magnetic field test coils are temperature compensated GSFC-294	B65-10081	02	Inexpensive insulation is effective for cryogenic transfer lines MSC-618	B66-10348	02
Light ray modulation controls optical system alignment GSFC-171	B65-10211	02	Dispersion of borax in plastic is excellent fire-retardant heat insulator ARG-5	B67-10016	03
Resilient clamp holds fuel cell stack through thermal cycle MSC-313	B66-10035	05	Newly developed foam ceramic body shows promise as thermal insulation material at 3000 deg F M-FS-11968	B67-10441	03
<b>THERMAL EFFICIENCY</b> Multidimensional reaction kinetic ablation program /REKAP/ MSC-10079	B67-10495	06	A ceramic composite thermal insulation M-FS-13991	B67-10608	03
<b>THERMAL ENERGY</b> Polymer film exhibits thermal and radiation stability LANGLEY-100	B66-10043	03	<b>THERMAL NEUTRON</b> Detection of entrapped moisture in honeycomb sandwich structures MSC-1103	B67-10116	01
<b>THERMAL ENVIRONMENT</b> Electrically conductive fibers thermally isolate temperature sensor GSFC-456	B66-10349	01	Thermal neutron image intensifier tube provides brightly visible radiographic pattern ARG-120	B67-10296	02
Computer program determines thermal environment and temperature history of lunar orbiting space vehicles M-FS-12916	B67-10307	06	Glancing incidence telescope for far ultraviolet and soft X-rays GSFC-10052	B67-10508	02
<b>THERMAL EXPANSION</b> Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05	Compilation of detection sensitivities in thermal-neutron activation ARG-10068	B67-10641	03
Fastener provides cooling and compensates for thermal expansion NU-0003	B65-10038	05	<b>THERMAL POWER</b> Thermal motor positions magnetometer sensors ARC-51	B66-10078	05
Flexure support system protects thermally and dynamically loaded models LANGLEY-39	B65-10042	05	<b>THERMAL PROPERTY</b> Indium foil with beryllia washer improves transistor heat dissipation GSFC-42	B63-10033	01
			Copper foil provides uniform heat sink path MSC-262	B66-10004	02
			Silazane elastomer remains resilient at		

## THERMAL PROTECTION

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400 deg C M-FS-1144	B66-10667	05	JPL-SC-136	B66-10303	05
Pure xenon hexafluoride prepared for thermal properties studies ARG-10056	B67-10577	03	Chemical regeneration of emitter surface increases thermionic diode life LEWIS-17	B66-10435	02
<b>THERMAL PROTECTION</b>			Design for high-temperature /1800 deg F/ liquid metal pressure transducer LEWIS-10144	B67-10458	01
Flexible curtain shields equipment from intense heat fluxes M-FS-48	B65-10044	03	<b>THERMIONIC EMISSION</b>		
Predicting surface heating rates and pressures resulting from hot exhaust gases MSC-971	B66-10633	05	Thermionic scanner pinpoints work function of emitter surfaces JPL-SC-177	B66-10444	01
Study of fast response thermocouple measurement of temperatures in cryogenic gases M-FS-1659	B66-10661	01	Study shows effect of surface preparations on improving thermionic emission JPL-SC-140	B66-10493	01
Eutectic fuse provides current and thermal protection under high vibration M-FS-13664	B67-10535	01	<b>THERMISTOR</b>		
Development of dual solid cryogens for high reliability refrigeration system GSFC-10188	B67-10644	02	Temperature-compensation circuit stabilizes performance of vidicons JPL-486	B64-10226	01
<b>THERMAL RADIATION</b>			Electronic device simulates respiration rate and depth MSC-89	B64-10255	01
Variable-transparency wall regulates tempera- tures of structures LANGLEY-25	B63-10528	03	Ptc thermistor protects multiloaded power supplies GSFC-236	B64-10281	01
Refractory metal shielding /insulation/ increases operating range of induction furnace LEWIS-202	B65-10188	02	Thermistor connector assembly increases accuracy of measurements LANGLEY-62	B65-10045	01
Calorimeter accurately measures thermal radiation energy LANGLEY-173	B66-10058	02	Wedge immersed thermistor bolometer measures infrared radiation GSFC-443	B65-10330	02
Chromium oxide coatings improve thermal emissivity of alumina WOO-263	B66-10227	03	Solid state thermostat has integral probe and circuitry M-FS-434	B66-10193	01
Infrared radiometer M-FS-13373	B67-10422	01	Electrically conductive fibers thermally isolate temperature sensor GSFC-456	B66-10349	01
<b>THERMAL SHOCK</b>			<b>THERMOCONDUCTIVITY</b>		
Refractory ceramic has wide usage, low fabrication cost M-FS-67	B63-10481	03	Apparatus measures thermal conductivity of honeycomb-core panels LANGLEY-202	B66-10127	01
Pigmented coating resists thermal shock JPL-SC-083	B65-10354	03	<b>THERMOCOUPLE</b>		
Multilayer refractory nozzles produced by plasma-spray process WOO-318	B66-10611	05	Connector for thermocouple leads saves costly wire, makes reliable connectors LANGLEY-26	B63-10529	01
Intergranular metal phase increases thermal shock resistance of ceramic coating M-FS-1862	B66-10651	03	Simple circuit continuously monitors thermocouple sensor M-FS-61	B63-10567	01
<b>THERMAL STRESS</b>			Wide-angle sensor measures radiant heat energy in corrosive atmospheres M-FS-228	B65-10019	05
Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05	Metal sheath improves thermocouple using graphite in one leg NU-0011	B65-10051	01
Thermal stress-relief treatments for 2219 aluminum alloy are evaluated M-FS-1213	B66-10448	03	Transducer measures temperature differentials in presence of strong electromagnetic fields ARC-27	B65-10089	01
<b>THERMIONIC CONVERTER</b>			Thermocouple-to-instrumentation connector features quick assembly NU-0022	B65-10246	05
Collector/collector guard ring balancing circuit eliminates edge effects JPL-SC-143	B66-10563	01	Hollow plastic hoops protect thermocouple in storage and handling NU-0023	B65-10256	05
Potassium plasma cell facilitates thermionic energy conversion process ARG-10010	B67-10399	01	Compound improves thermal interface between thermocouple and sensed surface NU-0028	B66-10121	02
Thermionic diode switching has high temperature application NPU-10404	B67-10672	01	Liquid trap seals thermocouple leads M-FS-688	B66-10212	05
<b>THERMIONIC DIODE</b>					
Bypass rod transfers heat developed in thermionic diode					

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# THIN FILM

Multiple temperatures sampled using only one reference junction  
GSFC-485 B66-10260 01

Modified thermocouple is effective from minus 250 deg to 5000 deg F  
MSC-420 B66-10461 01

Microminiature thermocouple monitors own installation  
M-FS-1111 B66-10463 05

Thermocouples electrically checked while connected to data system  
LANGLEY-182 B66-10623 01

Accurate depth control provided for thermocouple junction locations  
LANGLEY-289 B66-10632 01

Thermocouples easily installed in hard-to-get-to places  
M-FS-1946 B66-10653 01

Study of fast response thermocouple measurement of temperatures in cryogenic gases  
M-FS-1659 B66-10661 01

Thermocouple-flexible cable connector insulator is highly reliable  
NU-0082 B66-10709 01

Multipurpose instrumentation cable provides integral thermocouple circuit  
NU-0108 B67-10046 01

Sensing disks for slug-type calorimeters have higher temperature stability  
M-FS-1867 B67-10161 01

High temperature thermocouple design provides gas cooling without increasing overall size of unit  
NUC-10515 B67-10497 01

Vapor deposition process provides new method for fabricating high temperature thermocouples  
NUC-10152 B67-10616 01

Thoriated tungsten tube provides improved high temperature thermocouple sheath  
NUC-10145 B67-10627 03

**THERMOCOUPLE PYROMETER**  
High temperature thermocouple operates in reduction atmosphere  
NU-0046 B66-10134 01

**THERMODYNAMIC EQUILIBRIUM**  
Computer program determines chemical composition of physical system at equilibrium  
MSC-1119 B66-10670 01

**THERMODYNAMIC PROPERTY**  
Closed fluid system without moving parts controls temperature  
LEWIS-222 B65-10331 02

Thermodynamic properties related to expansion of two-component gas  
MSC-1133 B67-10112 03

Thermodynamic properties of solid palladium-silver alloys and other alloys are investigated by torsion-effusion technique  
ARG-277 B67-10324 03

**THERMOELECTRIC CONVERSION SYSTEM**  
Modular thermoelectric cell is easily packaged in various arrays  
GSFC-339 B65-10199 01

**THERMOELECTRIC MATERIAL**  
Thermoelectric elements diffusion-bonded to tungsten electrodes  
GSFC-346 B65-10309 01

## THERMOMETRY

Apparatus measures concentration of suspended droplets in gas streams  
LANGLEY-31 B64-10237 01

## THERMOPHYSICS

Recommended values of the thermophysical properties of eight alloys, their major constituents and oxides  
NU-0095 B67-10062 03

## THERMOPLASTIC

Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns  
ARC-7 B63-10008 05

Thermoplastic rubberlike material produced at low cost  
JPL-793 B66-10453 03

## THERMOPLASTIC FILM

Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns  
ARC-7 B63-10008 05

## THERMOSETTING

Valve seat pores sealed with thermosetting monomer  
M-FS-900 B66-10322 03

New class of thermosetting plastics has improved strength, thermal and chemical stability  
LEWIS-10108 B67-10197 03

## THERMOSTABILITY

Substituted silane-diol polymers have improved thermal stability  
M-FS-469 B66-10259 03

## THERMOSTAT

Solid state thermostat has integral probe and circuitry  
M-FS-434 B66-10193 01

## THICKNESS RATIO

Opposed arcs permit deep weld penetration with only one pass  
M-FS-1696 B66-10513 05

## THIN FILM

Efficient thin film heating element takes minimum space  
GSFC-289 B65-10123 01

High permeability semiconductors permit close-tolerance soldering  
GSFC-319 B65-10134 05

Modified developer increases line resolution in photosensitive resist  
GSFC-386 B65-10278 01

Improved wire memory matrix uses very little power  
JPL-SC-167 B65-10359 01

Thin-film semiconductor rectifier has improved properties  
MSC-207 B66-10012 01

Thin carbon film serves as UV bandpass filter  
ERC-8 B66-10060 02

Submicron holes in thin films increase sampling range of mass spectrometers  
JPL-SC-097 B66-10380 03

Self-supported aluminum thin films produced by vacuum deposition process  
ARC-58 B66-10387 03

Thin-film ferrites vapor deposited by one-step process in vacuum  
MSC-259 B66-10398 03

Thin plastic sheet eliminates need for expensive plating  
M-FS-1896 B66-10681 03

Complex surfaces plated by thin-film deposition in one operation LEWIS-292	B67-10006	05	THRUSTOR		
Thin film process forms effective electrical contacts on semiconductor crystals M-FS-2343	B67-10142	01	Plated nickel wire mesh makes superior catalyst bed MSC-216	B65-10321	03
Substituting gold for silver improves electrical connections M-FS-2390	B67-10228	03	Combined attenuator and latch for cartridge powered actuator MSC-11242	B67-10488	05
Soft metal plating enables hard metal seal to operate successfully in low temperature, high pressure environment NUC-10083	B67-10350	03	TIME CONSTANT		
Thin film thermal detector JPL-943	B67-10505	01	Foil radiometer accessory improves measurements M-FS-12684	B67-10448	01
Development of Curie point switching for thin film, random access, memory device NPD-10402	B67-10633	02	TIME DELAY		
THIN WALL			Simple circuit functions as frequency discriminator for PFM signals GSFC-267	B65-10102	01
Study made of thin-walled pipe response to turbulent fluids M-FS-1321	B67-10518	05	Pneumatic shutoff and time-delay valve operates at controlled rate M-FS-602	B66-10189	05
THORIUM			TIME DIVISION MULTIPLEX		
Magnesium-zinc reduction is effective in preparation of metals ARG-10050	B67-10579	03	Multiplex television transmission system MSC-11595	B67-10576	01
THORIUM OXIDE			TIME FACTOR		
Thoriated nickel bonded by solid-state diffusion method LANGLEY-116	B65-10220	03	Computer modification reduces time of performing iterative division M-FS-166	B65-10005	01
THREE-BODY PROBLEM			Temperature transducer has high output, is time stable GSFC-446	B65-10362	01
Study compares methods for the numerical solution of ordinary differential equations M-FS-830	B66-10466	01	Binary counter accumulates time by complementary preset MSC-242	B65-10399	01
THRESHOLD			Computer program generates averaged value data tapes M-FS-12728	B67-10411	06
New sintering process adjusts magnetic value of ferrite cores GSFC-129	B63-10606	01	Algebraic Monte Carlo procedure reduces statistical analysis time and cost factors M-FS-1887	B67-10434	01
Blocking oscillator uses low triggering voltage MSC-58	B64-10017	01	Instrumentation monitors transported material through variety of parameters M-FS-12938	B67-10545	01
THRESHOLD DETECTOR			GMT/local-time conversion chart GSFC-10521	B67-10548	01
Circuit maintains digital decision threshold at preset level M-FS-331	B65-10281	01	TIME MEASUREMENT		
Constant-current regulator improves tunnel diode threshold-detector performance GSFC-239	B65-10282	01	Vibrator elapsed time is automatically controlled M-FS-2573	B67-10284	01
Threshold detector produces narrow pulses at high repetition rates GSFC-383	B65-10310	01	TIME RESPONSE		
Digitally controlled pulse-level discriminator operates over wide voltage range GSFC-324	B66-10129	01	Optically driven switch turn-off time reduced by opaque coatings JPL-SC-107	B66-10141	01
THRUST			Improved design provides faster response time in photomultiplier GSFC-451	B66-10526	01
Lightweight universal joint transmits both torque and thrust JPL-375	B63-10236	05	Study of fast response thermocouple measurement of temperatures in cryogenic gases M-FS-1659	B66-10661	01
THRUST MEASUREMENT			DYANA - An advanced programming system for large classes of dynamic and equivalent systems B67-10524		06
Apparatus measures very small thrusts WDO-048	B64-10284	05	TIME SERIES		
Damper reduces effects of resonance on force transducer WDO-321	B66-10550	05	Computer programs perform spectral analyses of up to seven time series M-FS-1133	B66-10539	01
THRUST VECTOR CONTROL /TVC/			TIME SHARING		
Study of vortex valve for medium temperature solid propellants LANGLEY-204	B66-10524	01	Nixie tube display unit employs time-shared logic ARG-117	B66-10512	01

# SUBJECT INDEX

# TOOL

## TIMING

Single channel pulse-height analyzer operates in subnanosecond range  
LEWIS-267 B66-10377 01

Variable-pulse switching circuit accurately controls solenoid-valve actuations  
M-FS-1895 B67-10022 01

## TIMING APPARATUS

Coincident switch closing reduces error in motor-driven timer  
JPL-182 B63-10143 05

Unijunction frequency divider is free of backward loading  
JPL-W00-010 B65-10112 01

Modified McLeod gage records automatically  
LEWIS-290 B66-10290 02

Parallel line raster eliminates ambiguities in reading timing of pulses less than 500 microseconds apart  
JPL-805 B66-10386 01

Technique for strip chart recorder time notation  
GSFC-473 B67-10196 01

Long time constant timer requires no recovery time  
GSFC-10091 B67-10487 01

## TIN

Nickel/tin coating protects threaded fasteners in corrosive environment  
MSC-253 B65-10398 03

Jig protects transistors from heat while tinning leads  
MSC-515 B66-10240 05

## TIN ALLOY

Improved rolling element bearings provide low torque and small temperature rise in ultrahigh vacuum environment  
LEWIS-359 B66-10678 05

## TIN TELLURIDE

Thermoelectric elements diffusion-bonded to tungsten electrodes  
GSFC-346 B65-10309 01

## TISSUE

Effect of preparation procedures on intensity of radioautographic labeling is studied  
ARG-10032 B67-10500 04

Simple colorimetric method determines uranium in tissue  
ARG-10039 B67-10580 03

## TITANIUM

New alloy brazes titanium to stainless steel  
MSC-102 B65-10060 05

Titanium treatment improves brazed joints  
MSC-127 B65-10153 05

Titanium diaphragm makes excellent amplatron cathode support  
GSFC-394 B65-10298 01

Auxiliary titanium sublimation pump produces ultrahigh /10 to the minus 11 torr/ vacuum  
LANGLEY-212 B66-10388 02

Degreasing of titanium to minimize stress corrosion  
LEWIS-382 B67-10147 03

Aluminum-titanium hydride-boron carbide composite provides lightweight neutron shield material  
NUC-10069 B67-10265 03

## TITANIUM ALLOY

Galvanic corrosion reduced in aluminum fabrications  
M-FS-272 B65-10140 03

Glass bead shot peening retards stress corrosion failure of titanium tanks  
LANGLEY-319 B67-10198 05

Chemical milling solution reveals stress corrosion cracks in titanium alloy  
LANGLEY-10077 B67-10322 03

Copper and nickel adherently electroplated on titanium alloy  
M-FS-13952 B67-10532 03

## TONOMETRY

Direct force-measuring transducer used in blood pressure research  
ARC-53 B65-10325 01

## TOOL

V-slotted screw head and matching driving tool facilitate insertion and removal of screw fasteners  
FRC-16 B63-10023 05

Special pliers connect hose containing liquid under pressure  
JPL-IT-1003 B63-10291 05

Heavy-duty staple remover operated by hand  
JPL-IT-1004 B63-10292 05

Miniature oxygen-hydrogen cutting torch constructed from hypodermic needle  
JPL-545 B63-10517 05

Tool facilitates sealing of metal fill tubes  
MSC-24 B63-10519 05

Forming blocks speed production of strain gage grids  
LEWIS-182 B65-10009 05

Spring loaded beaded cable makes efficient wire puller  
W00-108 B65-10031 05

Screw locking cups quickly and neatly crimped  
NU-0009 B65-10049 05

Cutter and stripper reduces coaxial cable connection time  
ARC-40 B65-10094 05

Low-cost tool minimizes damage to O-rings during installation  
MSC-140 B65-10116 05

Lathe attachment used to machine elliptical cones  
MSC-100 B65-10168 05

Spiral heater coils hand-formed with fixture  
LEWIS-208 B65-10192 05

Self-aligning fixture used in lathe chuck jaw refacing  
FRC-21 B65-10198 05

Handtool facilitates extraction of circuit modules  
LANGLEY-38 B65-10231 05

Standoff tool speeds placement of friction-fit electrical terminals  
W00-029 B65-10348 05

Portable tool removes burrs from pipe and tubing  
MSC-237 B65-10360 05

Portable tool cleans pipes and tubing  
MSC-238 B65-10375 05

Drill bit design assures clean holes in laminated materials

TOOLING

SUBJECT INDEX

WOO-098	B65-10386	05	M-FS-1344	B66-10417	05
Improved tool easily removes brazed tube connectors			Bearing puller facilitates removal and replacement of bearing assemblies		
MSC-263	B66-10003	05	M-FS-1538	B66-10418	05
Torque wrench designed for restricted areas			Heat treatment stabilizes welded aluminum jig and tool structures		
LEWIS-246	B66-10011	05	MSC-800	B66-10458	03
Bench vise adapter grips tubing securely and safely			Hole saw drill attachment has zero force reaction		
MSC-279	B66-10056	05	MSC-543	B66-10604	05
Shoulder adapter steadies spot welding gun			Pneumatic wrench retains or discharges nuts or bolts as desired		
M-FS-321	B66-10076	05	NU-0085	B66-10707	05
Tool provides constant purge during tube welding			Micromanipulation tool is easily adapted to many uses		
M-FS-547	B66-10093	05	JPL-129	B67-10004	05
Hand drill adapter limits holes to desired depth			Tool facilitates installation of Marmon clamps		
MSC-346	B66-10123	05	M-FS-2039	B67-10105	05
Device spot-laps spheres to very close tolerances			Single wrench separates nuts from free-floating bolts		
JPL-SC-119	B66-10175	05	NUC-10013	B67-10158	05
Torque wrench allows readings from inaccessible locations			Ultrasonic wrench produces leaktight connections		
M-FS-598	B66-10204	05	M-FS-12561	B67-10353	05
Tool enables proper mating of accelerometer and cable connector			<b>TOOLING</b>		
M-FS-611	B66-10208	05	Insulated weld tooling permits uniform, high-quality weld		
Special tool seals conductors with combination of plastic sleeves			MSC-42	B64-10058	05
M-FS-579	B66-10209	05	Fiberglass dies speed forming of large metal sheets		
Tool permits damage-free removal of solar cell			M-FS-214	B65-10210	05
GSFC-467	B66-10219	05	Cork is used to make tooling patterns and molds		
Automatic reel controls filler wire in welding machines			MSC-425	B66-10328	05
MSC-416	B66-10236	05	<b>TORCH</b>		
Adjustable knife cuts honeycomb material to specified depth			Miniature oxygen-hydrogen cutting torch constructed from hypodermic needle		
MSC-475	B66-10237	05	JPL-545	B63-10517	05
Hand tool permits shrink sizing of assembled tubing			Oxygen-hydrogen torch is a small-scale steam generator		
MSC-504	B66-10239	05	NU-0042	B66-10120	03
Portable sandblaster cleans small areas			Argon purge gas cooled by chill box		
MSC-523	B66-10242	05	M-FS-560	B66-10153	02
Hollow needle used to cut metal honeycomb structures			Welding torch and wire feed manipulator		
MSC-485	B66-10244	05	M-FS-13102	B67-10385	05
Modified soldering iron speeds cutting of synthetic materials			<b>TOROID</b>		
M-FS-725	B66-10246	05	Improved magnetometer uses toroidal gating coil		
Ultrasonic hand tool allows convenient scanning of spot welds			GSFC-249	B65-10103	01
M-FS-539	B66-10289	02	Gapped toroid provides infinite resolution of delay-line pickup		
Tool pre-tensions covers prior to lacing			GSFC-370	B65-10258	01
MSC-631	B66-10301	05	High frequency wide-band transformer uses coax to achieve high turn ratio and flat response		
Tool forms right angles in component leads			ARG-107	B66-10600	01
M-FS-722	B66-10346	05	<b>TOROIDAL SHELL</b>		
Welds chilled by liquid coolant manifold			Investigation of pressurized toroidal shells		
M-FS-579	B66-10354	05	HQ-27	B67-10117	05
Special tool kit aids heavily garmented workers			<b>TORQUE</b>		
MSC-163	B66-10403	05	Device transmits rotary motion through hermetically sealed wall		
Alignment tool facilitates pin placement on irregular horizontal surfaces			JPL-303	B63-10198	05
LANGLEY-219	B66-10410	05	Lightweight universal joint transmits both torque and thrust		
Modified pliers facilitate coupling of bayonet-type connectors			JPL-375	B63-10236	05



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# TRANSDUCER

Shock absorber protects motive components against overloads WOO-092	B65-10008	05	M-FS-512	B66-10090	03
Slit feeds reduce unbalanced torques in gas-lubricated bearings JPL-264	B65-10099	05	Portable detector set discloses helium leak rates M-FS-1733	B67-10065	01
Bidirectional torque filter eliminates backlash GSFC-335	B65-10148	05	Fixture facilitates helium leak testing of pipe welds M-FS-2167	B67-10178	05
Torque wrench designed for restricted areas LEWIS-246	B66-10011	05	Radiation counting technique allows density measurement of metals in high-pressure - high-temperature environment ARG-124	B67-10316	02
Modified power tool rapidly drives series torque bolts MSC-221	B66-10054	05	<b>TRACKING</b>		
T-handle wrench has torque-limiting action MSC-280	B66-10065	05	Direction indicator system does not require complicated optics WOO-305	B66-10407	01
Torque wrench allows readings from inaccessible locations M-FS-598	B66-10204	05	Photocell shadowing technique improves light source detector JPL-809	B66-10564	01
Power torque wrench concept for precision torque application M-FS-13546	B67-10547	05	<b>TRACKING ANTENNA</b>		
<b>TORQUE MEASURING APPARATUS</b>			Hydraulic system provides smooth control of large tracking and antenna drive systems at very low tracking rates NPO-10316	B67-10418	05
Optics used to measure torque at high rotational speeds LEWIS-13	B63-10338	01	<b>TRACKING SYSTEM</b>		
Device enables measurement of moments of inertia about three axes GSFC-49	B65-10176	05	An investigation of phase-lock loop swept-frequency synchronization M-FS-656	B66-10423	01
Air brake-dynamometer accurately measures torque LEWIS-163	B65-10312	05	Point-source detection system rejects spatially extended radiation sources GSFC-486	B66-10622	01
Miniature servo accelerometer is force-balanced JPL-155	B65-10340	01	Low speed, long term tracking electric drive system has zero backlash NPO-10173	B67-10220	01
Noncontacting transducer measures shaft torque M-FS-474	B66-10048	01	Reflectometer for receiver input system NPO-10843	B67-10657	01
Torque meter aids study of hysteresis motor rings M-FS-12219	B67-10412	01	<b>TRAILER</b>		
<b>TORQUE MOTOR</b>			Compressed gas system operates semitrailer brakes during winching operation JPL-0036	B64-10306	05
Hydraulic drive system prevents backlash JPL-371	B65-10351	05	<b>TRAINING</b>		
<b>TORSION</b>			GREMEX-A new management training concept GSFC-574	B67-10092	01
Dispensing system eliminates torsion in deployed hoses MSC-80	B65-10185	05	Training course for radiation safety technicians ARG-216	B67-10477	02
Resilient clamp holds fuel cell stack through thermal cycle MSC-313	B66-10035	05	<b>TRAJECTORY</b>		
Thermodynamic properties of solid palladium-silver alloys and other alloys are investigated by torsion-effusion technique ARG-277	B67-10324	03	Computer program for mass optional solutions of some endpoint trajectory problems M-FS-12976	B67-10310	06
<b>TORSIONAL STRESS</b>			<b>TRANSDUCER</b>		
Bellows joint absorbs torsional deflections in duct system M-FS-882	B66-10332	05	Improved variable-reluctance transducer measures transient pressures LANGLEY-10	B63-10321	01
<b>TRACE CONTAMINANT</b>			Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02
Trace levels of metallic corrosion in water determined by emission spectrography MSC-1193	B66-10701	03	Device calibrates vibration transducers at amplitudes up to 20g M-FS-86	B63-10572	01
Analytical technique characterizes all trace contaminants in water MSC-11032	B67-10243	03	Ultra-sensitive transducer advances micro-measurement range ARC-26	B64-10004	01
<b>TRACER</b>			Simple transducer measures low heat-transfer rates JPL-466	B64-10122	01
Radioactive tracer system detects oil contaminants in fluid lines			Miniature stress transducer has directional capability JPL-591	B65-10023	01

## TRANSFER FUNCTION

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Seismic transducer measures small horizontal displacements M-FS-81	B65-10029	05	Circuit multiplies pulse width modulation, exhibits linear transfer function HQ-56	B67-10055	01
Vibrating-membrane electrometer has high conversion gain ARC-38	B65-10056	01	<b>TRANSFER VEHICLE</b> Dispensing system eliminates torsion in deployed hoses MSC-80	B65-10185	05
Noncontacting vibration transducer has constant sensitivity LANGLEY-99	B65-10392	01	<b>TRANSFORMER</b> Improved insertion-loss tester JPL-358	B64-10080	01
Noncontacting transducer measures shaft torque M-FS-474	B66-10048	01	Variable frequency transistor inverters use multiple core transformers GSFC-183	B65-10119	01
Apparatus measures thermal conductivity of honeycomb-core panels LANGLEY-202	B66-10127	01	Complementary system vaporizes subcooled liquid, improves transformer efficiency M-FS-550	B66-10045	02
Electropneumatic transducer automatically limits motor current LEWIS-253	B66-10160	01	Two-light circuit continuously monitors ac ground, phase, and neutral wires MSC-356	B66-10163	01
Transducer measures force in vacuum environment LEWIS-218	B66-10161	01	High frequency wide-band transformer uses coax to achieve high turn ratio and flat response ARG-107	B66-10600	01
Device without electrical connections in tank measures liquid level WOO-235	B66-10198	01	<b>TRANSIENT HEATING</b> New computer program solves wide variety of heat flow problems M-FS-421	B66-10404	01
Wide-range instrument monitors flow rates of chemically active fluids MSC-186	B66-10205	01	<b>TRANSIENT LOAD</b> Circuit controls transients in scr inverters GSFC-120	B63-10600	01
Phonocardiograph microphone is rugged and moistureproof MSC-212	B66-10314	04	<b>TRANSIENT PRESSURE</b> Improved variable-reluctance transducer measures transient pressures LANGLEY-10	B63-10321	01
Acceleration-compensated pressure transducer has fast response LANGLEY-113	B66-10353	01	Burst diaphragm protects vacuum vessel from internal pressure transients JPL-687	B65-10236	05
Method permits mechanical and electrical checkout of piezoelectric transducers while installed in a system ARC-73	B66-10533	01	Special mount improves remote transducer accuracy LEWIS-269	B66-10021	01
Damper reduces effects of resonance on force transducer WSD-321	B66-10550	05	Digital computer program predicts effects of local pressure transients on deformation and stresses in cylindrical ducts M-FS-13058	B67-10631	06
Ultrasonic water column probe speeds up testing of welds HQ-58	B66-10577	01	<b>TRANSIENT RESPONSE</b> Polarimeter provides transient response in nanosecond range JPL-890	B67-10021	02
Multipurpose instrumentation cable provides integral thermocouple circuit NU-0108	B67-10046	01	<b>TRANSISTOR</b> Indium foil with beryllia washer improves transistor heat dissipation GSFC-42	B63-10033	01
Ultrasonics permits brazing complex stainless steel assembly without flux NU-0115	B67-10094	05	Two-stage emitter follower is temperature stabilized MSC-20	B63-10493	01
Vibration analysis utilizing Mossbauer effect M-FS-11974	B67-10339	01	Transistorized trigger circuit is frequency-controllable GSFC-111	B63-10553	01
Improved circuit for measuring capacitive and inductive reactances M-FS-13083	B67-10513	01	Highly efficient square-wave oscillator operator at high power levels GSFC-112	B63-10554	01
Nondestructive testing techniques used in analysis of honeycomb structure bond strength M-FS-1214	B67-10574	01	Low-power transistorized circuit provides staircase waveform GSFC-48	B64-10007	01
<b>TRANSFER FUNCTION</b> Cryogenic liquid transfer system reduces residual boiloff LEWIS-274	B66-10157	02	Temperature-compensation circuit stabilizes performance of vidicons JPL-486	B64-10226	01
Human transfer functions used to predict system performance parameters LANGLEY-203	B66-10379	01	Transistorized converter provides nondissipative regulation		
Carriage system remotely moves drawer over extended distance NU-0092	B66-10711	05			

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# TRANSISTOR CIRCUIT

GSFC-238	B64-10305	01	performance, low power drain	ARC-41	B65-10203	01	
Pulse generator permits nondestructive testing of component breakdown voltage	MSC-122	B65-10054	01	Field effect transistor presents high input impedance in ac amplifier	JPL-500	B65-10232	01
Feedback oscillator functions as low-level pulse stretcher	GSFC-261	B65-10069	01	Phase inverter provides variable reference push-pull output	HQ-23	B66-10344	01
Unijunction frequency divider is free of backward loading	JPL-W00-010	B65-10112	01	Transistor biased amplifier minimizes diode discriminator threshold attenuation	ARG-163	B67-10311	01
Digital-output cardiometer measures rapid changes in heartbeat rate	MSC-133	B65-10143	01	TRANSISTOR CIRCUIT			
Constant-current regulator improves tunnel diode threshold-detector performance	GSFC-239	B65-10282	01	Igniting system for mercury vapor lamps protects transistorized sustaining supply	JPL-421	B63-10262	01
Boron nitride housing cools transistors	W00-079	B65-10289	01	Two-stage emitter follower is temperature stabilized	MSC-20	B63-10493	01
Insulator-holder protects transistors in dense electronic assemblies	MSC-214	B65-10389	01	Transistorized trigger circuit is frequency-controllable	GSFC-111	B63-10553	01
Low-power ring counter drives high-level loads	GSFC-431	B66-10106	01	Highly efficient square-wave oscillator operator at high power levels	GSFC-112	B63-10554	01
Jig protects transistors from heat while tinning leads	MSC-515	B66-10240	05	Low-power transistorized circuit provides staircase waveform	GSFC-48	B64-10007	01
Semiconductors can be tested without removing them from circuitry	M-FS-1163	B66-10447	01	Inexpensive, stable circuit measures heart rate	MSC-95	B65-10010	01
Pulse generator using transistors and silicon controlled rectifiers produces high current pulses with fast rise and fall times	MSC-405	B66-10456	01	Transistor voltage comparator performs own sensing	GSFC-228	B65-10028	01
Simple, one transistor circuit boosts pulse amplitude	GSFC-501	B66-10480	01	Pulse height analyzer operates at high repetition rates, low power	W00-046	B65-10041	01
Computer program searches characteristic data of diodes and transistors	GSFC-493	B66-10529	01	Variable voltage supply uses zener diode as reference	GSFC-262	B65-10097	01
Solid state phase detector replaces bulky transformer circuit	MSC-11007	B67-10253	01	Transistorized circuit clamps voltage with 0.1 percent error	GSFC-196	B65-10118	01
Aluminum heat sink enables power transistors to be mounted integrally with printed circuit board	M-FS-13663	B67-10426	01	Sensitive electrometer features digital output	GSFC-288	B65-10206	01
Series transistors isolate amplifier from flyback voltage	MSC-11023	B67-10468	01	High-speed square-wave current limiter operates efficiently	JPL-SC-073	B65-10233	01
Solid state zero-bias bilateral switch	GSFC-532	B67-10559	01	Simple circuit reduces transistor switching time	GSFC-314	B65-10234	01
Transistor **H** parameter conversion slide rule	JPL-649	B67-10561	01	Increased junction lead inductance ballasts high-frequency transistors	GSFC-387	B65-10259	01
Prediction of radiation damage effects in transistors	GSFC-10021	B67-10606	01	Hybrid circuit achieves pulse regeneration with low power drain	GSFC-382	B65-10314	01
TRANSISTOR AMPLIFIER				High-intensity flashing beacon powered by mercury cells	LANGLEY-80	B65-10361	01
New low level ac amplifier provides adjustable noise cancellation and automatic temperature compensation	ARC-2	B63-10003	04	Improved chopper circuit uses parallel transistors	M-FS-468	B66-10113	01
High-gain amplifier has excellent stability and low power consumption	GSFC-272	B65-10138	01	Substituting transistor for diode improves rectifying means	GSFC-474	B66-10295	01
Tiny biomedical amplifier combines high				Transistor circuit increases range of			

## TRANSIT TIME

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logarithmic current amplifier NU-0018	B66-10350	01	M-FS-12681	B67-10424	01
Equivalent circuit for a field effect transistor established for computer simulation M-FS-1752	B66-10690	01	Rock anchors restore broken swamp anchors economically WLP-10004	B67-10498	05
Double emitter suppressed carrier modulator uses commercially available components M-FS-2494	B67-10101	01	Multiplex television transmission system MSC-11595	B67-10576	01
Hybrid solid state switch replaces motor- driven power switch JPL-931	B67-10165	01	<b>TRANSMITTANCE</b> Calculation of infrared spectral transmittances of inhomogeneous gases M-FS-1563	B66-10554	02
Improved frequency divider employs transistor avalanche effect NPD-10008	B67-10575	01	Exposure valve /eV/ system expanded to include filter factors and transmittance LANGLEY-190	B66-10602	02
<b>TRANSIT TIME</b> Instrument calibrates low gas-rate flowmeters MSC-134	B65-10137	01	<b>TRANSMITTER</b> Tiny sensor-transmitter can withstand extreme acceleration, gives digital output ARC-22	B63-10561	01
<b>TRANSITION POINT</b> Lower-cost tungsten-rhenium alloys LEWIS-332	B66-10528	03	Subminiature biotelemetry unit permits remote physiological investigations ARC-39	B64-10171	01
Elimination of rocket engine asymmetric loads during tests at sea level M-FS-1730	B66-10674	05	Helical coaxial-resonator makes excellent RF filter GSFC-243	B65-10012	01
<b>TRANSMISSION</b> Lightweight universal joint transmits both torque and thrust JPL-375	B63-10236	05	Solid-state laser transmitter is amplitude modulated MSC-121	B65-10238	01
IR-transmission glasses formed from oxides of bismuth and tellurium M-FS-279	B65-10190	03	System locates randomly placed remote objects LANGLEY-209	B66-10315	01
<b>TRANSMISSION LINE</b> Double-throw microwave device switches two lines quickly JPL-410	B63-10258	01	<b>TRANSPARENCY</b> Variable-transparency wall regulates tempera- tures of structures LANGLEY-25	B63-10528	03
Plastic molds reduce cost of encapsulating electric cable connectors M-FS-69	B63-10568	05	<b>TRANSPARENT MATERIAL</b> One-piece transparent shell improves design of helmet assembly MSC-187	B66-10390	05
High-pass RF coaxial filter rejects dc and low frequency signals GSFC-73	B64-10173	01	Scribble coating for plastic films MSC-11194	B67-10409	03
Electrical cable connector-clamp has smooth exterior surface MSC-154	B65-10201	05	<b>TRANSPIRATION COOLING</b> Combustion chamber struts can be effectively transpiration cooled M-FS-1830	B66-10643	03
Oscillator circuit measures liquid level in tanks M-FS-245	B65-10209	01	<b>TRANSPONDER</b> Oceanborne transponder platform has good stability M-FS-171	B65-10035	05
Electrical cabling withstands severe environmental conditions M-FS-1585	B66-10427	01	Frequency offset in linear FM/CW transponder eliminates clutter M-FS-249	B65-10146	01
Pulse technique provides more accurate checkout of exploding bridge wire device HQ-62	B66-10561	01	<b>TRANSPORT</b> Universal transloader moves delicate equipment without stress MSC-654	B66-10384	05
Improved memory word line configuration allows high storage density GSFC-559	B66-10617	01	<b>TRANSPORT VEHICLE</b> Hydrostatic force used to handle outsized, heavy objects HQ-90	B67-10167	05
Cable clamp bolt fixture facilitates assembly in close quarters KSC-67-80	B67-10244	05	<b>TRANSPORTATION</b> Instrumentation monitors transported material through variety of parameters M-FS-12938	B67-10545	01
Tester automatically checks insulation of individual conductors in multiple-strand cables NUC-10068	B67-10260	01	<b>TRAVELING WAVE MASER</b> Superconductor magnets used for stagger-tuning traveling-wave maser GSFC-292	B65-10165	01
Metal flame spray coating protects electrical cables in extreme environment NUC-10077	B67-10351	03	Highly stable microwave delay line NPD-09828	B67-10642	01
Temperature-sensed cryogenic bleed maintains liquid state in transfer line					

# SUBJECT INDEX

# TUBING

## TRAVELING WAVE TUBE

Traveling-wave tube circuit simplifies  
microwave relay  
GSFC-299 B65-10127 01

## TRICHLOROETHANE

Organic reactants rapidly produce plastic foam  
LANGLEY-37 B65-10288 03

Corrosion of aluminum alloys by chlorinated  
hydrocarbon/methanol mixtures  
MSC-11365 B67-10442 03

## TRICHLOROETHYLENE

Degreasing of titanium to minimize stress  
corrosion  
LEWIS-382 B67-10147 03

## TRIGONOMETRIC FUNCTION

Circuit operates as sine function generator  
MSC-255 B66-10038 01

## TRIGONOMETRY

Instrument accurately measures weld angle  
and offset  
M-FS-12849 B67-10563 05

## TRUSS

Collapsible truss structure is automatically  
expandable  
GSFC-265 B65-10126 05

## TUBE

Self sealing disconnect for tubing forms metal  
seal after breakaway  
JPL-354 B63-10226 05

Filter for high-pressure gases has easy take-  
down, assembly  
JPL-373 B63-10234 03

Helical tube separates nitrogen gas from  
liquid nitrogen  
JPL-398 B63-10251 05

Break-up of metal tube makes one-time shock  
absorber, bars rebound  
LANGLEY-1A B63-10304 05

Tool facilitates sealing of metal fill tubes  
MSC-24 B63-10519 05

Metal strip forms 21 foot boom, rolls up for  
compact storage  
GSFC-151 B64-10011 05

New nut and sleeve improve flared connections  
M-FS-194 B65-10180 05

Strainer fits inside flared-tube fittings  
LANGLEY-180 B65-10388 05

Coiled sheet metal strip opens into tubular  
configuration  
GSFC-425 B66-10009 03

Tool provides constant purge during tube  
welding  
M-FS-547 B66-10093 05

Plastic scintillator converts standard  
photomultiplier to ultraviolet range  
ERC-9 B66-10108 02

Bypass rod transfers heat developed in  
thermionic diode  
JPL-SC-136 B66-10303 05

Inspection of fine wires simplified by  
capillary tube wire holder  
MSC-358 B66-10329 05

Metal tube can be folded for compact  
storage, is self-erecting  
LEWIS-288 B66-10450 05

Selective tube roughening increases heat  
transfer capability  
M-FS-599 B66-10610 05

Metal boot permits fabrication of  
hermetically sealed splices in metal  
sheathed instrumentation cables  
NU-0083 B66-10704 05

Spherical joint connects axially misaligned  
flanges  
M-FS-2238 B67-10273 05

Metal tube reducer is inexpensive and  
simple to operate  
ARG-49 B67-10401 05

Study made of heat transfer and pressure  
drop through tubes with internal  
interrupted fins  
LEWIS-10280 B67-10555 05

Thoriated tungsten tube provides improved  
high temperature thermocouple sheath  
NUC-10145 B67-10627 03

## TUBING

Sleeve and cutter simplify disconnecting  
welded joint in tubing  
JPL-384 B63-10240 05

Helical tube separates nitrogen gas from  
liquid nitrogen  
JPL-398 B63-10251 05

Special pliers connect hose containing liquid  
under pressure  
JPL-IT-1003 B63-10291 05

Connector for vacuum-jacketed lines cuts  
tubing system cost  
LEWIS-66 B63-10367 05

Composite, vacuum-jacketed tubing replaces  
bellows in cryogenic systems  
LEWIS-67 B63-10368 05

Apparatus facilitates pressure-testing of  
metal tubing  
LEWIS-174 B65-10131 05

Metal bellows custom-fabricated from tubing  
LEWIS-192 B65-10150 05

Dispensing system eliminates torsion in  
deployed hoses  
MSC-80 B65-10185 05

Angular glass tubing drawn from round tubing  
HQ-20 B65-10235 05

Portable tool removes burrs from pipe and  
tubing  
MSC-237 B65-10360 05

Tungsten wire and tubing joined by nickel  
brazing  
M-FS-394 B65-10391 05

Forming tool improves quality of tubing flares  
WOO-231 B66-10001 05

Portable self-powered device detects internal  
flaws in tubular structures  
NU-0019 B66-10028 01

Bench vise adapter grips tubing securely and  
safely  
MSC-279 B66-10056 05

Telescoping of instrumentation tubing  
eliminates swaging  
M-FS-546 B66-10116 05

Aluminum oxide filler prevents obstructions  
in tubing during welding  
MSC-222 B66-10125 05

Split glass tube assures quality in electron  
beam brazing  
M-FS-564 B66-10151 05

Hand tool permits shrink sizing of assembled

## TUMOR

## SUBJECT INDEX

tubing MSC-504	B66-10239	05	TUMOR		
Tool separates sleeve-type unions without heat MSC-497	B66-10253	05	Uranyl phthalocyanines show promise in the treatment of brain tumors	ARG-100	B67-10188 04
High pressure tube coupling requires no threads or flares MSC-600	B66-10285	05	TUNGSTEN		
Union would facilitate joining of tubing, minimize braze contamination MSC-777	B66-10311	05	Apparatus facilitates high-temperature tensile testing in vacuum	LEWIS-42	B63-10345 03
Torus elements used in effective shock absorber W00-114	B66-10318	05	Novel clamps align large rocket cases, eliminate back-up bars M-FS-1		B63-10376 05
Special mandrel permits uniform welding of out-of-round tubing M-FS-706	B66-10323	05	Pressure molding of powdered materials improved by rubber mold insert W00-100		B64-10270 03
Adapter assembly prevents damage to tubing during high pressure tests MSC-563	B66-10330	05	Jig and fixture aid fabrication of tungsten rivets LEWIS-185		B65-10101 05
Electrochemical milling removes burrs and solder from tubing ends M-FS-714	B66-10358	03	Tantalum cathode improves electron-beam evaporation of tantalum JPL-W00-021		B65-10175 03
Copper-acrylic enamel serves as lubricant for cold drawing of refractory metals ARG-54	B66-10471	05	Thermoelectric elements diffusion-bonded to tungsten electrodes GSFC-346		B65-10309 01
Hydraulic fluid serves as mandrel for small diameter refractory tube drawing ARG-44	B66-10523	05	Tungsten wire and tubing joined by nickel brazing M-FS-394		B65-10391 05
Ductile mandrel and parting compound facilitate tube drawing ARG-43	B66-10571	05	Heated die facilitates tungsten forming LEWIS-25A		B66-10047 05
Rotational fluid coupling eliminates hose entanglements MSC-312	B66-10585	05	High temperature thermocouple operates in reduction atmosphere NU-0046		B66-10134 01
Plastic tubing protects flexible copper hose M-FS-772	B66-10588	05	Tungsten insulated susceptor cup for high temperature induction furnace eliminates contamination LEWIS-283		B66-10538 03
Lightweight, all-metal hose assembly has high flexibility and strength over wide range of temperature and pressure M-FS-1831	B66-10635	05	Tungsten fiber-reinforced copper composites form high strength electrical conductors LEWIS-338		B66-10572 03
Mechanical gauge accurately checks tubing flare, roundness, and concentricity M-FS-1822	B66-10656	05	Electron beam welder X-rays its own welds LEWIS-10111		B67-10216 02
Method for predicting frictional loss in metal bellows and flexible hose M-FS-883	B66-10662	05	Extrusion of small-diameter, thin-wall tungsten tubing LEWIS-335		B67-10355 05
Orbital tube flaring system produces tubing connectors with zero leakage M-FS-2016	B67-10019	05	TUNGSTEN ALLOY		
Square tubing reduces cost of telescoping bridge crane hoist ARG-13	B67-10293	05	Lower-cost tungsten-rhenium alloys LEWIS-332		B66-10528 03
Extrusion of small-diameter, thin-wall tungsten tubing LEWIS-335	B67-10355	05	New tungsten alloy has high strength at elevated temperatures LEWIS-336		B66-10551 03
Large volume continuous counterflow dialyzer has high efficiency HQ-10055	B67-10395	04	High-strength tungsten alloy with improved ductility LEWIS-10257		B67-10340 03
Standard surface grinder for precision machining of thin-wall tubing ARG-10014	B67-10400	05	TUNGSTEN COMPOUND		
Aluminum and stainless steel tubes joined by simple ring and welding process M-FS-13120	B67-10472	05	Thoriated tungsten tube provides improved high temperature thermocouple sheath NUC-10145		B67-10627 03
Plastic shoe facilitates ultrasonic inspection of thin wall metal tubing NUC-10010	B67-10542	02	TUNGSTEN INERT GAS /TIG/ WELDING		
			Refractory metals welded or brazed with tungsten inert gas equipment LEWIS-219		B65-10319 05
			Tungsten wire and tubing joined by nickel brazing M-FS-394		B65-10391 05
			Argon purge gas cooled by chill box M-FS-560		B66-10153 02
			Closed circuit TV system monitors welding operations		

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# ULTRASONIC WAVE

MSC-11002 B67-10162 01

Continuous internal channels formed in aluminum fusion welds  
M-FS-2399 B67-10183 05

Weld procedure produces quality welds for thick sections of Hastelloy-X  
NUC-10048 B67-10195 05

Welding of AM350 and AM355 steel  
M-FS-2314 B67-10292 05

**TUNNEL DIODE**  
Monostable circuit with tunnel diode has fast recovery  
GSFC-132 B63-10603 01

Tunnel-diode circuit features zero-level clipping  
GSFC-241 B65-10002 01

Simple circuit produces high-speed, fixed duration pulses  
GSFC-285 B65-10228 01

Constant-current regulator improves tunnel diode threshold-detector performance  
GSFC-239 B65-10282 01

**TURBINE BLADE**  
Turbine blade root design concept promises superior alignment  
M-FS-1685 B66-10620 05

**TURBINE INSTRUMENT**  
Performance of turbine-type flowmeters in liquid hydrogen  
LEWIS-10137 B67-10506 01

**TURBINE WHEEL**  
Ball bearing used in design of rugged flow-meter  
LEWIS-159 B64-10170 05

Simple key locks turbine rotor blades  
WOO-103 B66-10023 05

Turbine blade root design concept promises superior alignment  
M-FS-1685 B66-10620 05

**TURBOMACHINE**  
Computer program performs flow analysis through turbines  
LEWIS-236 B66-10496 01

Computer program simplifies design of rotating components of turbomachinery  
NUC-10046 B67-10235 06

**TURBOPUMP**  
Fluid pressure used to test turbopump bearings  
NU-0001 B65-10024 03

Run-in with chemical additive protects gear surface  
M-FS-548 B66-10069 05

Honeycomb seal backing ring increases turbopump disk life  
M-FS-13303 B67-10607 05

**TURBULENT BOUNDARY LAYER**  
Thin-film gage measures low heat-transfer rates  
LANGLEY 205 B66-10180 01

**TURBULENT FLOW**  
Stationary device produces homogeneous mixture of fluids  
M-FS-525 B66-10570 05

Study of hot wire techniques in low density flows with high turbulence levels  
M-FS-1269 B66-10687 01

Local measurements in turbulent flows through cross correlation of optical signals

M-FS-1268 B67-10030 01

Study made of thin-walled pipe response to turbulent fluids  
M-FS-1321 B67-10518 05

**TWO-PHASE FLOW**  
Mixer conditions temperature of liquified gas streams  
M-FS-1784 B66-10565 02

**U**

**ULTRAHIGH VACUUM**  
Precision gage measures ultrahigh vacuum levels  
GSFC-114 B63-10597 01

Ion pump provides increased vacuum pumping speed  
NEO-13 B65-10239 02

Baking enables McLeod gauge to measure in ultrahigh vacuum range  
GSFC-440 B65-10329 01

Auxiliary titanium sublimation pump produces ultrahigh /10 to the minus 11 torr/ vacuum  
LANGLEY-212 B66-10388 02

**ULTRASONIC AGITATION**  
High purity electroforming yields superior metal models  
ARC-6 B63-10007 05

Ultrasonic cleaning restores depth-type filters  
M-FS-540 B66-10298 03

**ULTRASONIC MACHINING**  
High purity electroforming yields superior metal models  
ARC-6 B63-10007 05

Ultrasonic wrench produces leaktight connections  
M-FS-12561 B67-10353 05

**ULTRASONIC RADIATION**  
Ultrasonic hand tool allows convenient diagnostic scanning of bone integrity  
M-FS-14102 B67-10486 02

**ULTRASONIC TESTING**  
Ultrasonic recording scanner used for nondestructive weld inspection  
M-FS-284 B66-10220 01

Ultrasonic hand tool allows convenient scanning of spot welds  
M-FS-539 B66-10289 02

Ultrasonic quality inspection of bonded honeycomb assemblies is automated  
MSC-859 B66-10544 01

Ultrasonic water column probe speeds up testing of welds  
HQ-58 B66-10577 01

Correlation established between heat transfer and ultrasonic transmission properties of copper braze bonds  
ARG-247 B67-10037 02

Calibrating ultrasonic test equipment for checking thin metal strip stock  
NUC-10009 B67-10127 01

Ballpoint probe gives optimum results in ultrasonic testing  
M-FS-13590 B67-10620 01

**ULTRASONIC WAVE**  
Improved ultrasonic TV images achieved by use of Lamb-wave orientation technique  
ARG-203 B67-10295 02

Ultrasonics used to measure residual stress

## ULTRASONICS

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M-FS-12449 B67-10428 02

**ULTRASONICS**  
 Ultrasonics permits brazing complex stainless steel assembly without flux  
 NU-0115 B67-10094 05

Plastic shoe facilitates ultrasonic inspection of thin wall metal tubing  
 NUC-10010 B67-10542 02

**ULTRAVIOLET FILTER**  
 PTFE-aluminum films serve as neutral density filters  
 LANGLEY-189 B66-10017 02

Thin carbon film serves as UV bandpass filter  
 ERC-8 B66-10060 02

**ULTRAVIOLET LIGHT**  
 Oil-smeared models aid wind tunnel measurements  
 LANGLEY-4 B63-10311 03

Sensor detects hydrocarbon oil contaminants in fluid lines  
 M-FS-522 B66-10068 01

Borate glass efficiently transmits ultraviolet light  
 ARG-91 B66-10475 03

**ULTRAVIOLET MICROSCOPY**  
 Ultraviolet microscopy aids in cytological and biomedical research  
 ARG-178 B67-10590 04

**ULTRAVIOLET PHOTOMETRY**  
 Ultraviolet photographic pyrometer used in rocket exhaust analysis  
 M-FS-499 B66-10095 02

**ULTRAVIOLET RADIATION**  
 Plastic scintillator converts standard photomultiplier to ultraviolet range  
 ERC-9 B66-10108 02

A continuously operating source of vacuum ultraviolet below 500 angstrom  
 GSFC-545 B66-10576 01

Lamp enables measurement of oxygen concentration in presence of water vapor  
 MSC-10043 B67-10387 01

**ULTRAVIOLET REFLECTION**  
 Uniform reflective films deposited on large surfaces  
 GSFC-507 B66-10483 02

**ULTRAVIOLET SPECTROGRAPH**  
 Thin carbon film serves as UV bandpass filter  
 ERC-8 B66-10060 02

**ULTRAVIOLET SPECTROMETER**  
 Glancing incidence telescope for far ultraviolet and soft X-rays  
 GSFC-10052 B67-10508 02

**UNDERWATER ENGINEERING**  
 Electronic skewing circuit monitors exact position of object underwater  
 NUC-10146 B67-10629 01

**UNDERWATER VEHICLE**  
 Device measures fluid drag on test vehicles  
 LANGLEY-34 B65-10195 01

**UNMANNED SPACECRAFT**  
 Rotor position sensor switches currents in brushless dc motors  
 GSFC-315 B65-10151 01

**UPCONVERTER**  
 Parametric up-converter increases flexibility of laser  
 KSC-67-98 B67-10104 01

## URANIUM

Crucible cast from beryllium oxide and refractory cement is impervious to flux and molten metal  
 ARG-22 B66-10527 03

Uranium isotopes quantitatively determined by modified method of atomic absorption spectrophotometry  
 ARG-210 B67-10236 03

Magnesium-zinc reduction is effective in preparation of metals  
 ARG-10050 B67-10579 03

Simple colorimetric method determines uranium in tissue  
 ARG-10039 B67-10580 03

**URANIUM ALLOY**  
 Fluid-bed fluoride volatility process recovers uranium from spent uranium alloy fuels  
 ARG-232 B67-10032 03

**URANIUM COMPOUND**  
 Uranyl phthalocyanines show promise in the treatment of brain tumors  
 ARG-100 B67-10188 04

**URANIUM 235**  
 Computer program FPIP-REV calculates fission product inventory for U-235 fission  
 NUC-10089 B67-10450 06

**URANYL**  
 Simple colorimetric method determines uranium in tissue  
 ARG-10039 B67-10580 03

**URINE**  
 Automated urinalysis technique determines concentration of creatine and creatinine by colorimetry  
 NPO-10149 B67-10245 04

## V

## VACUUM

New cobalt alloys have high-temperature strength and long life in vacuum environments  
 LEWIS-47 B63-10351 03

Connector seals fluid lines at cryogenic temperatures and high vacuums  
 GSFC-253 B64-10327 05

Transducer measures force in vacuum environment  
 LEWIS-218 B66-10161 01

Gallium alloy films investigated for use as boundary lubricants  
 LEWIS-245 B66-10165 03

Brushless dc motor has high efficiency, long life  
 GSFC-181 B66-10355 01

Rubber and alumina gaskets retain vacuum seal in high temperature EMF cell  
 ARG-17 B66-10472 05

Study made of destructive sectioning of complex structures for examination  
 LEWIS-341 B66-10676 05

Solar X-ray spectrum reproduced in vacuum  
 MSC-228 B67-10164 02

**VACUUM CHAMBER**  
 Cryopumping of hydrogen in vacuum chambers is aided by catalytic oxidation of hydrogen  
 LEWIS-15 B63-10340 05

Apparatus facilitates high-temperature tensile testing in vacuum  
 LEWIS-42 B63-10345 03



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# VACUUM PUMP

Modified RF coaxial connector ends vacuum chamber wiring problem GSFC-150	B64-10010	01	tubing system cost LEWIS-66	B63-10367	05
Vapor pressure measured with inflatable plastic bag GSFC-281	B65-10136	03	Spherical electrode eliminates high-voltage breakdown LEWIS-155	B65-10139	01
Heater decomposes oil backstreaming from high-vacuum pumps GSFC-356	B65-10224	02	Heater decomposes oil backstreaming from high-vacuum pumps GSFC-356	B65-10224	02
Electron bombardment improves vacuum chamber efficiency LEWIS-160	B65-10280	02	Burst diaphragm protects vacuum vessel from internal pressure transients JPL-687	B65-10236	05
Vacuum test fixture improves leakage rate measurements MSC-271	B66-10286	01	Feed-through connector withstands high temperatures in vacuum environment GSFC-442	B65-10328	01
Thin-film ferrites vapor deposited by one-step process in vacuum MSC-259	B66-10398	03	Dispenser leak-tests and sterilizes rubber gloves MSC-285	B66-10166	03
Dielectrometer design permits measurement in vacuum under irradiation M-FS-359	B66-10401	01	Fixed vacuum plate clamps styrofoam for machining M-FS-683	B66-10283	05
Combination double door high-vacuum valve provides access to vacuum chamber JPL-849	B66-10697	05	Precision capacitor has improved temperature and operational stability ARG-189	B67-10313	01
Feed-through connector couples RF power into vacuum chamber NU-0096	B67-10027	01	Machine tests slow-speed sliding friction in high vacuum M-FS-12341	B67-10379	05
Vacuum chamber is remotely sealed by eutectic metal NU-0091	B67-10059	05	<b>VACUUM FURNACE</b>		
Quartz crystals detect gas contaminants during vacuum chamber evacuation NPO-10144	B67-10205	01	Radiant heater for vacuum furnaces offers high structural rigidity, low heat loss LEWIS-39	B63-10342	01
Evaporant feed device facilitates flash vapor deposition process in vacuum NPO-10232	B67-10320	03	New cobalt alloys have high-temperature strength and long life in vacuum environments LEWIS-47	B63-10351	03
Method for X-ray study under extreme temperature and pressure conditions MSC-11232	B67-10474	02	Braze alloy holds bonding strength over wide temperature range LEWIS-337	B66-10519	03
<b>VACUUM DEPOSITION</b>			<b>VACUUM GAUGE</b>		
Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns ARC-7	B63-10008	05	Ionization vacuum gage starts quickly, is unaffected by spurious currents JPL-304	B65-10036	02
Efficient thin film heating element takes minimum space GSFC-289	B65-10123	01	Instrument accurately measures extremely low air densities M-FS-193	B65-10221	01
Aluminized fiberglass insulation conforms to curved surfaces M-FS-477	B66-10024	03	Modified McLeod pressure gage eliminates measurement errors ARC-62	B66-10481	01
Self-supported aluminum thin films produced by vacuum deposition process ARC-58	B66-10387	03	Volume-ratio calibration system for vacuum gages LEWIS-303	B66-10640	01
Uniform reflective films deposited on large surfaces GSFC-507	B66-10483	02	<b>VACUUM MELTING</b>		
Low rate flow switch can be used for gas or liquid JPL-867	B66-10696	01	Vacuum forming of thermoplastic sheet results in low-cost investment casting patterns ARC-7	B63-10008	05
<b>VACUUM EFFECT</b>			<b>VACUUM PUMP</b>		
Bearing alloys with hexagonal crystal structures provide improved friction and wear characteristics LEWIS-320	B66-10373	03	Fine-particle filter prevents damage to vacuum pumps LEWIS-106	B63-10489	05
Study made of transfer of heat energy through metal joints in vacuum environment M-FS-12534	B67-10465	02	Ion pump provides increased vacuum pumping speed NEO-13	B65-10239	02
<b>VACUUM EQUIPMENT</b>			Automatic protective vent has fail-safe feature LANGLEY-218	B66-10369	05
Connector for vacuum-jacketed lines cuts			Auxiliary titanium sublimation pump produces ultrahigh /10 to the minus 11 torr/ vacuum LANGLEY-212	B66-10388	02
			Seal-off assembly permits rapid evacuation of air from containers		

# VACUUM SYSTEM

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GSFC-513	B66-10446	05	Respiratory transfer value has fail-safe feature		
<b>VACUUM SYSTEM</b>			ARC-1	B65-10369	01
Instrument accurately measures extremely low air densities			Tensile-strength apparatus applies high strain-rate loading with minimum shock		
M-FS-193	B65-10221	01	JPL-28	B66-10063	05
Rubber-coated bellows improves vibration damping in vacuum lines			Cryogenic trap valve has no moving parts		
LEWIS-273	B66-10187	02	M-FS-487	B66-10136	05
Apparatus enables accurate determination of alkali oxides in alkali metals			Soft-seal valve holds hazardous fluids safely		
LEWIS-256	B66-10296	03	LEWIS-275	B66-10216	05
Versatile machine mills, saws light materials			Flow ring valve is simple, quick-acting		
M-FS-827	B66-10364	05	M-FS-752	B66-10255	05
Special treatment reduces helium permeation of glass in vacuum systems			Valve seat pores sealed with thermosetting monomer		
HQ-25	B66-10372	02	M-FS-900	B66-10322	03
<b>VACUUM TUBE</b>			Matching flow characteristics of standard shutoff valves eliminates need for custom fabricated valves		
Composite, vacuum-jacketed tubing replaces bellows in cryogenic systems			M-FS-1069	B66-10416	05
LEWIS-67	B63-10368	05	Labyrinth-type valve seat increases valve life by decreasing fluid velocity		
Cesium iodide crystals fused to vacuum tube faceplates			M-FS-1051	B66-10424	05
GSFC-67	B63-10476	03	Actuator device schedules rate of valve closure		
Emission tester for high-power vacuum tubes			M-FS-1556	B66-10686	05
JPL-628	B64-10158	01	Combination double door high-vacuum valve provides access to vacuum chamber		
<b>VACUUM ULTRAVIOLET</b>			JPL-849	B66-10697	05
Fresnel zone plate forms images at wavelengths below 1000 angstroms			Teflon sheet permits valve and valve operator to move as a single unit in a cryogenic pipe line		
GSFC-231	B65-10171	02	NU-0077	B66-10702	05
Ion chambers simplify absolute intensity measurements in the vacuum ultraviolet			Variable-pulse switching circuit accurately controls solenoid-valve actuations		
ERC-10	B66-10439	01	M-FS-1895	B67-10022	01
<b>VALVE</b>			Solenoid valve design has one moving part		
High-pressure regulating system prevents pressure surges			NPD-10039	B67-10219	05
JPL-231	B63-10170	05	Temperature responsive valve withstands high impact loading		
Packless valve with all-metal seal handles wide temperature, pressure range			NPD-10186	B67-10225	05
JPL-361	B63-10228	05	Remotely operated high pressure valve protects test personnel		
Design of valve permits sealing even if the stem is misaligned			MSC-11010	B67-10291	05
LEWIS-38	B63-10341	05	Stabilizing stainless steel components for cryogenic service		
High-temperature, high-pressure spherical segment valve provides quick opening			M-FS-13127	B67-10377	05
ARC-13	B63-10431	05	Hand-operated plug insertion valve		
Gate valve with ceramic-coated base operates at high temperatures			M-FS-12019	B67-10466	05
ARC-23	B63-10562	03	Accumulator isolator prevents malfunctioning of faulty hydraulic system		
Multiple port pressure scanner valve features greater accuracy, quicker data			M-FS-1415	B67-10528	05
JPL-555	B64-10031	05	Butterfly valve with metal seals controls flow of hydrogen from cryogenic through high temperatures		
Blade valve isolates compartment in pipe, opens to allow free flow			NUC-10034	B67-10567	05
JPL-585	B64-10188	05	Dynamic captive plastic seal		
Two-part valve acts as quick coupling			M-FS-12988	B67-10600	03
JPL-478	B64-10223	05	Ferromagnetic core valve gives rapid action on minimum energy		
Valve designed with elastic seat			LEWIS-10135	B67-10623	05
JPL-442	B65-10040	05	Eddy current disk valve		
Averaging probe reduces static-pressure sensing errors			LEWIS-10123	B67-10638	05
LANGLEY-36	B65-10114	05	Solenoid hammer valve developed for quick-opening requirements		
Pressure responsive seal handles static and dynamic loads			LEWIS-10134	B67-10639	05
GSFC-441	B65-10327	05			
Improved poppet valve provides positive damageproof seal					
M-FS-293	B65-10346	05			

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## VIBRATION

Solenoid valve design minimizes vibration and sliding wear problem M-FS-14079	B67-10667	05	LEWIS-274	B66-10157	02
<b>VANADIUM</b>			Vapor diffusion electrode improves fuel cell operation LEWIS-187	B66-10281	03
Vanadium diaphragm electrode serves as hydrogen diffuser in lithium hydride cell ARG-10048	B67-10499	01	<b>VAPORIZER</b>		
<b>VAPOR</b>			Reaction heat used in static water removal from fuel cells M-FS-532	B66-10013	01
Study made of resistance of stainless steels to zinc-vapor corrosion ARG-10055	B67-10582	03	<b>VARACTOR DIODE</b>		
<b>VAPOR DEPOSITION</b>			Efficient millimeter wave /140 GHz/ diode for harmonic power generation HQ-61	B67-10166	01
Economical fabrication process produces high-quality junction transistors JPL-SC-065	B64-10330	01	<b>VARIATION METHOD</b>		
Tantalum cathode improves electron-beam evaporation of tantalum JPL-W00-021	B65-10175	03	Transistorized trigger circuit is frequency-controllable GSFC-111	B63-10553	01
Boron carbide whiskers produced by vapor deposition HQ-24	B65-10261	03	<b>VECTOR</b>		
Automatic fluid separator supplies own driving power W00-085	B66-10008	02	Device measures reaction engine thrust vector deviations JPL-SC-163	B66-10642	05
Submicron holes in thin films increase sampling range of mass spectrometers JPL-SC-097	B66-10380	03	<b>VEITCH DIAGRAM</b>		
Thin-film ferrites vapor deposited by one-step process in vacuum MSC-259	B66-10398	03	Veitch diagram plotter simplifies boolean functions JPL-385	B63-10241	05
Uniform reflective films deposited on large surfaces GSFC-507	B66-10483	02	<b>VELOCITY</b>		
Combustion chamber struts can be effectively transpiration cooled M-FS-1830	B66-10643	03	Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01
Mechanism facilitates coating of inner surfaces of metal cylinders GSFC-515	B66-10698	05	Digital system accurately controls velocity of electromechanical drive GSFC-287	B65-10096	01
Welding, bonding, and sealing of refractory metals by vapor deposition LEWIS-123	B67-10232	03	Rectilinear display gives acceleration load factor and velocity information MSC-1045	B67-10248	01
Evaporant feed device facilitates flash vapor deposition process in vacuum NPD-10232	B67-10320	03	<b>VELOCITY MEASUREMENT</b>		
Vapor deposition process provides new method for fabricating high temperature thermocouples NUC-10152	B67-10616	01	Low-cost tape system measures velocity of acceleration GSFC-85	B63-10512	01
<b>VAPOR PRESSURE</b>			Laser Doppler flowmeter measures gas velocity M-FS-1747	B66-10693	02
Vapor pressure measured with inflatable plastic bag GSFC-281	B65-10136	03	<b>VENT</b>		
Gallium alloy films investigated for use as boundary lubricants LEWIS-245	B66-10165	03	Vented piston seal prevents fluid leakage between two chambers JPL-179	B63-10141	05
New class of compounds have very low vapor pressures ARG-115	B67-10184	03	Cryogenic liquid transfer system reduces residual boiloff LEWIS-274	B66-10157	02
Thermodynamic properties of solid palladium-silver alloys and other alloys are investigated by torsion-effusion technique ARG-277	B67-10324	03	Automatic protective vent has fail-safe feature LANGLEY-218	B66-10369	05
<b>VAPORIZATION</b>			High speed blowdown system provides rapid pressure loss LEWIS-375	B67-10043	05
Complementary system vaporizes subcooled liquid, improves transformer efficiency M-FS-550	B66-10045	02	Toroidal ring prevents gas ignition at vent stack outlet M-FS-2042	B67-10098	05
Cryogenic liquid transfer system reduces residual boiloff			<b>VENTURI TUBE</b>		
			Mixer conditions temperature of liquified gas streams M-FS-1784	B66-10565	02
			<b>VESSEL</b>		
			Method of welding joint in closed vessel improves quality of seam JPL-170	B63-10139	05
			<b>VIBRATION</b>		
			Adhesive for vacuum environments resists shock and vibration MSC-56	B65-10016	03

Nonresonant support facilitates vibration testing of structures M-FS-224	B65-10039	05	Eutectic fuse provides current and thermal protection under high vibration M-FS-13664	B67-10535	01
Rack mount device quickly inserts or extracts chassis units MSC-244	B65-10385	05	Solenoid valve design minimizes vibration and sliding wear problem M-FS-14079	B67-10667	05
Post-stressed concrete foundation may reduce machinery vibration ARG-130	B67-10237	05	<b>VIBRATION MEASUREMENT</b>		
System precisely controls oscillation of vibrating mass M-FS-1875	B67-10276	01	Transducer senses displacements of panels subjected to vibration ARC-37	B65-10085	01
Vibration analysis utilizing Mossbauer effect M-FS-11974	B67-10339	01	Instrument sequentially samples ac signals from several accelerometers JPL-884	B67-10029	01
Stable ac phase and amplitude comparator M-FS-13086	B67-10459	01	<b>VIBRATION MEASURING APPARATUS</b>		
<b>VIBRATION ABSORBER</b>			Device calibrates vibration transducers at amplitudes up to 20g M-FS-86	B63-10572	01
Thermally conductive metal wool-silicone rubber material can be used as shock and vibration damper JPL-321	B63-10207	03	Noncontacting vibration transducer has constant sensitivity LANGLEY-99	B65-10392	01
<b>VIBRATION DAMPER</b>			Monitoring system determines amplitude and time of vibration channel peaks JPL-879	B66-10699	01
Shock mount isolates pressure transducers from vibration JPL-631	B65-10113	05	<b>VIBRATION PROTECTION</b>		
Rubber-coated bellows improves vibration damping in vacuum lines LEWIS-273	B66-10187	02	Improved holder protects crystal during high acceleration and impact JPL-463	B65-10037	05
Damper reduces effects of resonance on force transducer WSU-321	B66-10550	05	Wire mesh isolator protects sensitive electronic components GSFC-347	B65-10216	05
<b>VIBRATION DAMPING</b>			Tensile-strength apparatus applies high strain-rate loading with minimum shock JPL-28	B66-10063	05
Thermally conductive metal wool-silicone rubber material can be used as shock and vibration damper JPL-321	B63-10207	03	Electrical cabling withstands severe environmental conditions M-FS-1585	B66-10427	01
Frictional wedge shock mount is inexpensive, has good damping characteristics JPL-IT-1001	B63-10289	05	Plastic tubing protects flexible copper hose M-FS-772	B66-10588	05
Lightweight load support serves as vibration damper JPL-661	B65-10144	05	Friction brake cushions acceleration and vibration loads MSC-715	B66-10608	05
Oil-damped mercury pool makes precise optical alignment tool GSFC-353	B65-10253	02	<b>VIBRATION TESTING</b>		
Fluid damping reduces bellows seal fatigue failures M-FS-565	B66-10249	05	An improved method for testing performance of vidicons during vibration JPL-SC-113	B66-10442	01
Resonant frequency can be adjusted on vibration mount JPL-SC-134	B66-10672	05	Rocket engine vibration accurately measured by photography M-FS-1916	B66-10652	02
Vibration damping composition has flush-away feature M-FS-597	B67-10432	03	Edge-type connectors evaluated by electrical noise measurement M-FS-2243	B67-10125	01
<b>VIBRATION EFFECT</b>			Vibration damping composition has flush-away feature M-FS-597	B67-10432	03
Vibration tests on vidicons made by improved method JPL-SC-115	B66-10042	01	<b>VIBRATION TESTING MACHINE</b>		
Angular acceleration measured by deflection in sensing ring MSC-250	B66-10105	01	System transmits mechanical vibration into hazardous environment NU-0025	B65-10248	05
Vibrator improves spark erosion cutting process NU 0071	B66-10333	05	Air bearing provides friction-free support for shaker system slip table NU-0086	B66-10708	05
Study made of thin-walled pipe response to turbulent fluids M-FS-1321	B67-10518	05	<b>VIBRATIONAL STRESS</b>		
			Wire material reduces compressor blade vibration LEWIS-357	B66-10666	03
			<b>VIBRATOR</b>		
			Modified univibrator compensates for output timing errors ARG-85	B67-10130	01

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# VISUAL PERCEPTION

Vibrator elapsed time is automatically controlled M-FS-2573	B67-10284	01	LANGLEY-45	B64-10272	05
<b>VIBRATORY FINISHING</b>			Nonresonant support facilitates vibration testing of structures M-FS-224	B65-10039	05
Metallographic holding fixture permits polishing of soft metals on vibratory lapping machine ARG-42	B66-10562	05	Damping technique gives accelerometer flat frequency response M-FS-471	B66-10293	01
<b>VIBRATORY LOADING</b>			Damper reduces effects of resonance on force transducer WSO-321	B66-10550	05
Heat exchanger tubes supported in high vibration environment M-FS-1401	B66-10567	05	<b>VISUAL AID</b>		
<b>VIDEO DATA</b>			Single projector accommodates slides of different size and format GSFC-439	B66-10016	02
Video synchronization processor overcomes poor signal-to-noise ratio KSC-10002	B67-10515	01	Chart case opens to form briefing easeel MSC-349	B66-10135	05
Computer program for video data processing system /VDPS/ NPO-10042	B67-10630	06	Sea dye marker provides visibility for 20 hours MSC-714	B66-10313	03
<b>VIDEO EQUIPMENT</b>			<b>VISUAL DISPLAY</b>		
Video signal processing system uses gated current mode switches to perform high speed multiplication and digital-to-analog conversion MSC-781	B66-10429	01	Digital cardiometer computes and displays heartbeat rate MSC-93	B64-10258	01
Security warning system monitors up to fifteen remote areas simultaneously KSC-66-39	B66-10548	01	Pneumotachometer counts respiration rate of human subject MSC-92	B64-10259	01
Miniature electrometer preamplifier effectively compensates for input capacitance ARC-69	B66-10549	01	Apparatus presents visual display of semiconductor surface characteristics JPL-665	B66-10200	01
Recording and time expansion technique for high-speed, single-shot transient video signal ARC-10003	B67-10139	01	Multicolor stroboscope pinpoints resonances in vibrating components JPL-0033	B66-10223	01
New electron microscope employs new video display technique ARG-158	B67-10312	03	Three-axis attitude and direction reference instrument has only one moving part M-FS-1819	B66-10644	01
<b>VIDICON</b>			Absolute viscosity measured using instrumented parallel plate system JPL-874	B67-10041	01
Raster linearity of video cameras calibrated with precision tester GSFC-200	B64-10209	01	Graphic visualization of program performance aids management review NUC-10011	B67-10568	06
Temperature-compensation circuit stabilizes performance of vidicons JPL-486	B64-10226	01	<b>VISUAL FIELD</b>		
Detector circuit compensates for vidicon beam current variations GSFC-310	B65-10212	01	Optical projectors simulate human eyes to establish operator's field of view WOO-250	B66-10010	02
Vibration tests on vidicons made by improved method JPL-SC-115	B66-10042	01	One-piece transparent shell improves design of helmet assembly MSC-187	B66-10390	05
An improved method for testing performance of vidicons during vibration JPL-SC-113	B66-10442	01	<b>VISUAL OBSERVATION</b>		
Plotter design simplifies determination of image sensor transfer characteristic NPO-10164	B67-10206	01	Use of photographs speeds inspection of printed-circuit boards MSC-72	B64-10118	01
Improved television signal processing system NPO-10140	B67-10246	01	Quality control criteria for acceptance testing of cross-wire welds MSC-627	B66-10587	05
<b>VISCOSITY</b>			Simplified technique demonstrates magnetic domain switching M-FS-13153	B67-10342	02
Absolute viscosity measured using instrumented parallel plate system JPL-874	B67-10041	01	<b>VISUAL PERCEPTION</b>		
Flowmeter determines mix ratio for viscous adhesives M-FS-2308	B67-10378	01	Distant objects detected visually with optical filters LANGLEY-166	B65-10252	02
<b>VISCOUS DAMPING</b>			Torque wrench allows readings from inaccessible locations M-FS-598	B66-10204	05
Viscous-pendulum damper suppresses structural vibrations			Instrument transmits vanishing point to illustration point MSC 207A	B66-10324	01

Polarized light reveals stress in machined laminated plastics LEWIS-10018	B67-10383	03	Digitally controlled pulse-level discriminator operates over wide voltage range GSFC-324	B66-10129	01
<b>VLASOV EQUATION</b> Computer programs calculate potential and charge distributions in a plasma M-FS-871	B66-10553	01	Standard arc welders provide high amperage direct current source LANGLEY-267	B66-10441	01
<b>VDCODER</b> Analog voicing detector responds to pitch GSFC-10085	B67-10571	01	Series transistors isolate amplifier from flyback voltage MSC-11023	B67-10468	01
<b>VOLATILITY</b> New cobalt alloys have high-temperature strength and long life in vacuum environments LEWIS-47	B63-10351	03	Converter provides constant electrical power at various output voltages GSFC-519	B67-10481	01
Fluid-bed fluoride volatility process recovers uranium from spent uranium alloy fuels ARC-232	B67-10032	03	<b>VOLTAGE AMPLIFIER</b> Mosfet analog memory circuit achieves long duration signal storage M-FS-860	B66-10603	01
<b>VOLT-AMPERE CHARACTERISTICS</b> Didymium compound improves nickel-cadmium cell GSFC-295	B65-10083	03	Voltage regulator/amplifier is self-regulated MSC-1240	B67-10156	01
<b>VOLTAGE</b> Igniting system for mercury vapor lamps protects transistorized sustaining supply JPL-421	B63-10262	01	Limit circuit prevents overdriving of operational amplifier NUC-10082	B67-10343	01
Two-stage emitter follower is temperature stabilized MSC-20	B63-10493	01	<b>VOLTAGE BREAKDOWN</b> Spherical electrode eliminates high-voltage breakdown LEWIS-155	B65-10139	01
Simple circuit provides adjustable voltage with linear temperature variation JPL-W00-029	B63-10537	01	Cryogenic cooling reduces high voltage arcing between electrodes operating in a vacuum ARG-109	B66-10499	02
Transistorized trigger circuit is frequency-controllable GSFC-111	B63-10553	01	<b>VOLTAGE GENERATOR</b> Pressure sensor responds only to shock wave M-FS-238	B65-10184	01
Liquid switch is remotely operated by low dc voltage GSFC-119	B63-10599	01	Dual-voltage power supply has increased efficiency LEWIS-107A	B66-10002	01
Temperature-sensitive network drives astable multivibrator GSFC-137	B63-10609	01	Simple, one transistor circuit boosts pulse amplitude GSFC-501	B66-10480	01
Efficient circuit triggers high-current, high-voltage pulses MSC-14	B64-10024	01	<b>VOLTAGE REGULATOR</b> Field effect transistors used as voltage-controlled resistors M-FS-174	B64-10163	01
Auxiliary silver electrode eliminates two-step voltage discharge characteristic of silver-zinc cells GSFC-169	B64-10114	01	Transistorized converter provides nondissipative regulation GSFC-238	B64-10305	01
Voltage generator sweeps oscillator frequency linearly with time M-FS-219	B64-10320	01	Inductor flyback characteristic gives voltage regulator fast response GSFC-361	B65-10257	01
Bandwidth switching is transient-free, avoids loss of loop lock W00-054	B64-10349	01	Constant-current regulator improves tunnel diode threshold-detector performance GSFC-239	B65-10282	01
Transistor voltage comparator performs own sensing GSFC-228	B65-10028	01	Improved chopper circuit uses parallel transistors M-FS-468	B66-10113	01
Variable voltage supply uses zener diode as reference GSFC-262	B65-10097	01	Soldering iron temperature is automatically reduced ARC-57	B66-10203	01
Variable load automatically tests dc power supplies GSFC-291	B65-10105	01	Circuit protects regulated power supply against overload current GSFC-453	B66-10292	01
Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01	Circuit prevents overcharging of secondary cell batteries GSFC-454	B66-10492	01
Modular thermoelectric cell is easily packaged in various arrays GSFC-339	B65-10199	01	Preregulator feedback circuit utilizes light actuated switch M-FS-1180	B66-10542	01
			Electronic circuit provides accurate sensing and control of dc voltage NU-0089	B66-10591	01

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## WAVE DRAG

Low input voltage converter/regulator minimizes external disturbances GSFC-527	B66-10689	01	beryllia washer MSC-194	B66-10144	01
Voltage regulator/amplifier is self-regulated MSC-1240	B67-10156	01	Bimetallic devices help maintain constant sealing forces down to cryogenic temperatures M-FS-800	B66-10325	02
Switching-type regulator circuit has increased efficiency MSC-1063	B67-10190	01	<b>WASTE</b> Analytical technique characterizes all trace contaminants in water MSC-11032	B67-10243	03
Battery charge regulator is coulometer controlled GSFC-561	B67-10446	01	<b>WASTE UTILIZATION</b> Concept for cryogenic liquid reclamation system NPO-10322	B67-10420	02
Digital voltage-controlled oscillator GSFC-512	B67-10449	01	<b>WATER</b> Reaction heat used in static water removal from fuel cells M-FS-532	B66-10013	01
MOSFET improves performance of power supply regulator GSFC-10022	B67-10569	01	Coating permits use of strain gage in water and liquid hydrogen M-FS-594	B66-10192	01
<b>VOLTMETER</b> Digital-output cardiometer measures rapid changes in heartbeat rate MSC-133	B65-10143	01	Modular Porous Plate Sublimator /MPPS/ requires only water supply for coolant M-FS-1374	B66-10409	01
<b>VOLUME</b> Volumetric system calibrates meters for large flow rates WDO-130	B65-10323	05	Ultrasonic water column probe speeds up testing of welds HQ-58	B66-10577	01
Large volume continuous counterflow dialyzer has high efficiency HQ-10055	B67-10395	04	Water cooled anode increases life of high temperature arc lamp NPO-10180	B67-10247	02
<b>VORTEX INJECTOR</b> Study of vortex valve for medium temperature solid propellants LANGLEY-204	B66-10524	01	<b>WATER CONTENT</b> Trace levels of metallic corrosion in water determined by emission spectrography MSC-1193	B66-10701	03
<b>W</b>					
<b>WAFER</b> Process controls introduction of selected impurities into semiconductor wafers GSFC-523	B67-10303	01	<b>WATER FLOW</b> Low rate flow switch can be used for gas or liquid JPL-867	B66-10696	01
High-temperature /1100 degrees F/ capacitors operate without supplement cooling LEWIS-10324	B67-10550	01	<b>WATER INJECTION</b> Computer program calculates peripheral water injection cooling of axisymmetric subsonic diffuser NUC-10541	B67-10543	06
<b>WALL</b> Device transmits rotary motion through hermetically sealed wall JPL-303	B63-10198	05	<b>WATER PURIFICATION</b> Emergency solar still desalts seawater MSC-135	B65-10214	03
Shaped superconductor cylinder retains intense magnetic field JPL-381	B63-10238	01	<b>WATERPROOFING</b> Electrical cabling withstands severe environmental conditions M-FS-1585	B66-10427	01
Test device prevents molecular bounce-back GSFC-82	B63-10546	03	High energy forming facility M-FS-14026	B67-10588	05
<b>WALL TEMPERATURE DISTRIBUTION</b> Variable-transparency wall regulates tempera- tures of structures LANGLEY-25	B63-10528	03	<b>WAVE</b> Auxiliary circuit enables automatic monitoring of EKG MSC-106	B65-10142	01
<b>WARNING SIGNAL</b> Multiple meter monitoring circuits served by single alarm MSC-10984	B67-10369	01	<b>WAVE ATTENUATION</b> Modified filter prevents conduction of micro- wave signals along high-voltage power supply leads JPL-63	B63-10091	01
<b>WARNING SYSTEM</b> Security warning system monitors up to fifteen remote areas simultaneously KSC-66-39	B66-10548	01	<b>WAVE DETECTION</b> Logic circuit detects both present and missing negative pulses in superimposed wavetrains M-FS-12518	B67-10565	01
<b>WASHER</b> New package for belleville spring permits rate change, easy disassembly JPL-392	B63-10247	05	<b>WAVE DRAG</b> Program computes zero lift wave drag of entire aircraft LANGLEY-10079	B67-10530	06
Composite seal reduces alkaline battery leakage GSFC-337	B65-10271	01			
Mounting improves heat-sink contact with					

## WAVE FUNCTION

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## WAVE FUNCTION

Quantum mechanical calculations of reactive scattering cross sections in bimolecular encounters  
M-FS-13594

B67-10527 03

## WAVE GENERATION

Variable frequency magnetic multivibrator generates stable square-wave output  
GSFC-AE-21

B65-10124 01

Development of detonation reaction engine  
M-FS-14020

B67-10652 01

## WAVE INCIDENCE CONTROL

Reference black body is compact, convenient to use  
ARC-3

B63-10004 03

## WAVE PROPAGATION

Ultrasonics used to measure residual stress  
M-FS-12449

B67-10428 02

## WAVEFORM

Low-power transistorized circuit provides staircase waveform  
GSFC-48

B64-10007 01

Improved electrode gives high-quality biological recordings  
MSC-17

B64-10025 04

Analog device simulates physiological waveforms  
MSC-51

B64-10109 01

Function generator eliminates necessity of series summation  
GSFC-214

B66-10351 01

## WAVEGUIDE

Cryogenic waveguide window is sealed with plastic foam  
JPL-559

B63-10613 01

Process reduces secondary resonant emission in electronic components  
JPL-934

B66-10685 01

Liquid hydrogen densitometer utilizes open-ended microwave cavity  
LEWIS-390

B67-10115 01

Dielectric prisms would improve performance of quasi-optical microwave components  
EHC-10011

B67-10416 01

Reflectometer for receiver input system  
NPD-10843

B67-10657 01

## WAVELENGTH

A continuously operating source of vacuum ultraviolet below 500 angstrom  
GSFC-545

B66-10576 01

X-ray source uses interchangeable target anodes to vary X-ray wavelength  
NPD-10036

B67-10218 02

Glancing incidence telescope for far ultraviolet and soft X-rays  
GSFC-10052

B67-10508 02

## WEAR

Improved fluid control valve extends diaphragm life  
JPL-345

B65-10147 05

Dispensing system eliminates torsion in deployed hoses  
MSC-80

B65-10185 05

Bearing alloys with hexagonal crystal structures provide improved friction and wear characteristics  
LEWIS-320

B66-10373 03

Wear studies made of slip rings and gas bearing components

M-FS-12882

B67-10403 05

## WEB

Novel shock absorber features varying yield strengths  
MSC-63A

B64-10138 03

Web belt load measuring instrument has excellent stability  
MSC-921

B67-10242 01

## WEDGE

Frictional wedge shock mount is inexpensive, has good damping characteristics  
JPL-IT-1001

B63-10289 05

## WEIGHT

Regenerative fuel cell combines high efficiency with low cost  
WOO-090

B65-10363 01

## WEIGHTLESSNESS

Magnetic fluid readily controlled in zero gravity environment  
LEWIS-126

B65-10335 03

Automatic fluid separator supplies own driving power  
WOO-085

B66-10008 02

Hole saw drill attachment has zero force reaction  
MSC-543

B66-10604 05

## WELD STRENGTH

Probe tests microweld strength  
WOO-118

B65-10111 05

Ultrasonic recording scanner used for nondestructive weld inspection  
M-FS-284

B66-10220 01

Dot patterns provide reproducible flaw areas for study of adhesive bonds  
M-FS-862

B66-10367 05

Braze alloy holds bonding strength over wide temperature range  
LEWIS-337

B66-10519 03

Ultrasonic water column probe speeds up testing of welds  
HQ-58

B66-10577 01

Composite weld rod corrects individual filler weaknesses  
M-FS-1923

B67-10107 05

Fixture facilitates helium leak testing of pipe welds  
M-FS-2167

B67-10178 05

## WELDED JOINT

Method of welding joint in closed vessel improves quality of seam  
JPL-170

B63-10139 05

Sleeve and cutter simplify disconnecting welded joint in tubing  
JPL-384

B63-10240 05

Force controlled solenoid drives microweld tester  
WOO-125

B65-10182 01

Weld leaks rapidly and safely detected  
M-FS-362

B65-10265 01

O-ring tube fittings form leakproof seal in hydraulic systems  
M-FS-481

B66-10020 05

Portable power tool machines weld joints in field  
M-FS-258

B66-10145 05

Simple device facilitates inert-gas welding of tubes  
M-FS-558

B66-10155 05



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## WELDING MACHINE

Electron beam welding of copper-MONEL facilitated by circular magnetic shields M-FS-569 B66-10215 05	Inert-gas welding and brazing enclosure fabricated from sheet plastic LEWIS-220 B65-10338 05
Welds chilled by liquid coolant manifold M-FS-679 B66-10354 05	Calibrated clamp facilitates pressure application MSC-298 B66-10059 05
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Electromagnetic hammer removes weld distortions from aluminum tanks M-FS-287 B65-10342 05	Welding, bonding, and sealing of refractory metals by vapor deposition LEWIS-123 B67-10232 03
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Heat treatment stabilizes welded aluminum jig and tool structures MSC-800 B66-10458 03	Welding torch and wire feed manipulator M-FS-13102 B67-10385 05
Large seals fabricated from small segments reduce procurement lead time M-FS-1117 B66-10464 05	Study made to establish parameters and limitations of explosive welding M-FS-13006 B67-10393 05
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Compact coaxial connector for printed circuit adds reliability MSC-57 B64-10016 01	Fingertip current control facilitates use of arc welding gun MSC-289 B66-10092 05
Welding procedure improves quality of welds, offers other advantages M-FS-32 B64-10309 01	

Special mandrel permits uniform welding of out-of-round tubing M-FS-706	B66-10323	05	measurements LANGLEY-4	B63-10311	03
Power arc welder touch-started with consumable electrode M-FS-1485	B66-10641	05	Welded pressure transducer made as small as 1/8th-inch in diameter ARC-11	B63-10429	03
Portable machine welding head automatically controls arc M-FS-12763	B67-10272	05	Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05
Eccentric drive mechanism is adjustable during operation M-FS-2576	B67-10373	05	<b>WINDOW</b> Cryogenic waveguide window is sealed with plastic foam JPL-559	B63-10613	01
<b>WETTING</b> Etching process mills pH 14-8 Mo alloy steel to precise tolerances MSC-270	B66-10110	03	High pressure cryogenic liquid flow sight assembly provides streamlined flow for easy observation LEWIS-310	B66-10394	01
<b>WHEATSTONE BRIDGE</b> Electronic ohmmeter provides direct digital output GSFC-363	B65-10274	01	Aluminized thin-window proportional-counter tube is stronger, more responsive in long wavelength region JPL-689	B67-10015	01
Photoresistance analog multiplier has wide range GSFC-360	B65-10287	01	<b>WING PLANFORM</b> Computer program calculates wing aerodynamic characteristics for fixed wings with dihedral and variable-sweep wings at subsonic speeds LANGLEY-10191	B67-10666	06
Improved strain-wire flowmeter has fast response time LEWIS-241	B65-10304	01	<b>WIRE</b> Cooling method prolongs life of hot-wire transducer LEWIS-41	B63-10344	02
High voltage potential divider calibrated by simple device ARG-83	B66-10497	01	Connector for thermocouple leads saves costly wire, makes reliable connectors LANGLEY-26	B63-10529	01
Resistance thermometer has linear resistance-temperature coefficient at low temperatures WDO-190	B66-10612	01	Cantilever springs maintain tension in thermally expanded wires LEWIS-136	B65-10149	05
<b>WHEEL</b> Lateral ring metal elastic wheel absorbs shock loading M-FS-1312	B66-10663	05	Improved solderless connector is easily disconnected JPL-SC-060	B65-10197	01
<b>WHISKER</b> Boron carbide whiskers produced by vapor deposition HQ-24	B65-10261	03	Improved wire memory matrix uses very little power JPL-SC-167	B65-10359	01
Radial furnace shows promise for growing straight boron carbide whiskers HQ-50	B67-10070	03	Vacuum chamber provides improved insulation and support for cryostat M-FS-415	B65-10368	02
<b>WIDEBAND COMMUNICATION</b> Omnidirectional antennas transmit and receive over large bandwidth GSFC-436	B66-10133	01	Wire bundle formed into grids with minute interstices WDO-089	B65-10372	03
Wideband, high efficiency optical modulator requires less than 10 watts drive power M-FS-12733	B67-10289	01	Tungsten wire and tubing joined by nickel brazing M-FS-394	B65-10391	05
<b>WIND PROFILE</b> New anemometer has fast response, measures dynamic pressure directly LANGLEY-28	B63-10530	05	Automatic reel controls filler wire in welding machines MSC-416	B66-10236	05
Rough surface improves stability of air-sounding balloons M-FS-320	B65-10326	05	Inspection of fine wires simplified by capillary tube wire holder MSC-358	B66-10329	05
<b>WIND TUNNEL</b> Flexible fastener allows thermal expansion LANGLEY-40	B64-10145	05	Metal oxide silicon /MOS/ transistors protected from destructive damage by wire device ARC-65	B66-10419	01
<b>WIND TUNNEL APPARATUS</b> Electric arc heater is self starting LANGLEY-208	B66-10230	03	Silver-base ternary alloy proves superior for slip ring lead wires M-FS-1540	B66-10540	03
Jet engine powers large, high-temperature wind tunnel M-FS-13544	B67-10621	02	Emergency escape system uses self-braking mechanism on fixed cable KSC-66-44	B66-10575	05
<b>WIND TUNNEL MODEL</b> Oil-smeared models aid wind tunnel			Improved memory word line configuration allows high storage density GSFC-559	B66-10617	01

# SUBJECT INDEX

# XENON LIGHT

Wire material reduces compressor blade vibration LEWIS-357	B66-10666	03	LEWIS-10111	B67-10216	02
Improved method of edge coating flat ribbon wire M-FS-902	B66-10684	03	X-ray source uses interchangeable target anodes to vary X-ray wavelength NPO-10036	B67-10218	02
Technique for stripping Teflon insulated wire M-FS-1774	B67-10048	05	<b>X-RAY DIFFRACTION</b> Spherical model provides visual aid for cubic crystal study LEWIS-108	B65-10065	03
Composite weld rod corrects individual filler weaknesses M-FS-1923	B67-10107	05	Specimen holder design improves accuracy of X-ray powder analysis JPL-SC-165	B66-10075	02
Evaluation of high temperature stranded hookup wire M-FS-2478	B67-10122	03	<b>X-RAY EQUIPMENT</b> Densitometer system for liquid hydrogen has high accuracy, fast response M-FS-909	B66-10438	01
Traveling wire electrode increases productivity of electrical discharge machining /EDM/ equipment ARG-136	B67-10238	05	Electron beam parallel X-ray generator MSC-11022	B67-10372	02
<b>WIRE BRIDGE CIRCUIT</b> Pulse technique provides more accurate checkout of exploding bridge wire device HQ-62	B66-10561	01	Method for X-ray study under extreme temperature and pressure conditions MSC-11232	B67-10474	02
<b>WIRE MESH</b> Wire mesh isolator protects sensitive electronic components GSFC-347	B65-10216	05	Ultrasonic hand tool allows convenient diagnostic scanning of bone integrity M-FS-14102	B67-10486	02
Three-dimensional wire-mesh capacitor system measures fluid density WOO-194	B65-10379	01	Mechanizes X-ray inspection system for large tanks M-FS-12867	B67-10564	02
Strainer fits inside flared-tube fittings LANGLEY-180	B65-10388	05	<b>X-RAY INSPECTION</b> Magnets position X-ray film for weld inspection M-FS-253	B65-10110	05
<b>WIRE WINDING</b> Fiberglass parts cured during filament winding eliminates oven, saves time M-FS-14	B65-10088	03	<b>X-RAY IRRADIATION</b> Study made of relationship between growth and metabolism ARG-10046	B67-10604	04
High transients suppressed in electromagnetic devices KSC-66-13	B67-10031	01	<b>X-RAY PHOTOGRAPHY</b> Commercial film produces positive X-ray photo in ten seconds M-FS-521	B66-10307	02
<b>WIRING SYSTEM</b> Modified RF coaxial connector ends vacuum chamber wiring problem GSFC-150	B64-10010	01	Digital computer processing of X-ray photos JPL-792	B67-10005	04
Thermocouples easily installed in hard-to-get-to places M-FS-1946	B66-10653	01	Polaroid film helps locate objects in inaccessible areas quickly MSC-960	B67-10008	02
Logic circuitry used to automatically test shielded cables HQ-60	B66-10659	01	<b>X-Y PLOTTER</b> Recording and time expansion technique for high-speed, single-shot transient video signal ARC-10003	B67-10139	01
Flat pack interconnection structure simplifies modular electronic assemblies JPL-819	B67-10560	01	Oscilloscope used as X-Y plotter or two-dimensional analyzer LEWIS-311	B67-10269	01
<b>WORK FUNCTION</b> Photoelectric scanner makes detailed work function maps of metal surface JPL-SC-176	B66-10440	01	X-Y plotter adapter developed for SDS-930 computer NPO-10220	B67-10654	06
Thermionic scanner pinpoints work function of emitter surfaces JPL-SC-177	B66-10444	01	<b>XENON COMPOUND</b> Xenon forms stable compound with fluorine ARG-4	B66-10467	03
<b>X</b>			Xenon fluoride solutions effective as fluorinating agents ARG-217	B67-10133	03
<b>X-RAY</b> Multiple element soft X-ray source produces wide range of radiation GSFC-286	B65-10082	02	Xenon fluorides show potential as fluorinating agents ARG-113	B67-10185	03
An improved soft X-ray photoionization detector GSFC-540	B67-10072	02	Pure xenon hexafluoride prepared for thermal properties studies ARG-10056	B67-10577	03
Electron beam welder X-rays its own welds			<b>XENON LIGHT</b> High-intensity flashing beacon powered by		

mercury cells  
 LANGLEY-80 B65-10361 01

## Y

## YAGI ANTENNA

Modified interelement spacing improves Yagi  
 antenna array  
 LANGLEY-130 B65-10183 01

## YEAST

Ultraviolet microscopy aids in cytological  
 and biomedical research  
 ARG-178 B67-10590 04

## YIELD STRENGTH

Tungsten fiber-reinforced copper composites  
 form high strength electrical  
 conductors  
 LEWIS-338 B66-10572 03

Treatment increases stress-corrosion  
 resistance of aluminum alloys  
 M-FS-1840 B66-10595 05

Simplified method measures changes in  
 tensile yield strength using least number  
 of specimens  
 NUC-10075 B67-10266 03

## YTTRIUM-IRON GARNET /YIG/ CRYSTAL

Study of yttrium iron garnet rods reveals  
 new magnetostatic echo mode  
 ERC-37 B67-10153 01

## Z

## ZENER DIODE

Temperature-sensitive network drives astable  
 multivibrator  
 GSFC-137 B63-10609 01

Zener diode function generator requires no  
 external reference voltage  
 JPL-33 B65-10013 01

Zener diode is starter for transistor-  
 regulated power supply  
 NU-0015 B65-10052 01

Variable voltage supply uses zener diode as  
 reference  
 GSFC-262 B65-10097 01

Zener diode controls switching of large  
 direct currents  
 MSC-188 B65-10350 01

## ZERO GRAVITY

Magnetic fluid readily controlled in zero  
 gravity environment  
 LEWIS-126 B65-10335 03

## ZERO LIFT

Program computes zero lift wave drag of  
 entire aircraft  
 LANGLEY-10079 B67-10530 06

## ZINC

New method used to fabricate gallium arsenide  
 photovoltaic device  
 WOO-062 B64-10019 01

Adherent protective coatings plated on  
 magnesium-lithium alloy  
 M-FS-365 B65-10294 03

Solubility data are compiled for metals in  
 liquid zinc  
 ARG-149 B67-10191 03

Magnesium-zinc reduction is effective in  
 preparation of metals  
 ARG-10050 B67-10579 03

Study made of resistance of stainless steels  
 to zinc-vapor corrosion  
 ARG-10055 B67-10582 03

## ZINC ALLOY

New brazing alloy eliminates metal-stress  
 cracking  
 WOO-249 B65-10397 03

## ZINC SELENIDE

Thin-film semiconductor rectifier has improved  
 properties  
 MSC-207 B66-10012 01

## ZIRCONIUM

Intergranular metal phase increases thermal  
 shock resistance of ceramic coating  
 M-FS-1862 B66-10651 03

Oxide film on metal substrate reduced to  
 form metal-oxide-metal layer structure  
 ARG-48 B67-10187 03

Newly developed foam ceramic body shows  
 promise as thermal insulation material at  
 3000 deg F  
 M-FS-11968 B67-10441 03

## ZIRCONIUM ALLOY

Zirconium alloys with small amounts of iron  
 and copper or nickel show improved corrosion  
 resistance in superheated steam  
 ARG-226 B67-10050 03

## ZIRCONIUM COMPOUND

Protective coating withstands high temperature  
 in oxidizing atmosphere  
 M-FS-529 B66-10044 03

## ZIRCONIUM OXIDE

Refractory oxides evaluated for  
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A method of determining combustion gas  
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 M-FS-13757 B67-10455 03

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B67-10543	06	.....	NUC-10541	B67-10627	03	.....	NUC-10145
B67-10544	01	.....	M-FS-13481	B67-10628	05	.....	NUC-10524
B67-10545	01	.....	M-FS-12938	B67-10629	01	.....	NUC-10146
B67-10546	01	.....	LEWIS-10326	B67-10630	06	.....	NPO-10042
B67-10547	05	.....	M-FS-13546	B67-10631	06	.....	M-FS-13058
B67-10548	01	.....	GSFC-10521	B67-10632	06	.....	NPO-10265
B67-10549	06	.....	FRC-10017	B67-10633	02	.....	NPO-10402
B67-10550	01	.....	LEWIS-10324	B67-10634	03	.....	NPO-10373
B67-10551	03	.....	GSFC-10004	B67-10635	01	.....	M-FS-13111
B67-10552	01	.....	WSO-340	B67-10636	02	.....	M-FS-12583
B67-10553	01	.....	NPO-10338	B67-10637	01	.....	LANGLEY-217
B67-10554	01	.....	LEWIS-10328	B67-10638	05	.....	LEWIS-10123
B67-10555	05	.....	LEWIS-10280	B67-10639	05	.....	LEWIS-10134
B67-10556	04	.....	ARG-177	B67-10640	02	.....	ARG-10037
B67-10557	01	.....	JPL-807	B67-10641	03	.....	ARG-10068
B67-10558	01	.....	M-FS-13598	B67-10642	01	.....	NPO-09828
B67-10559	01	.....	GSFC-532	B67-10643	01	.....	GSFC-10213
B67-10560	01	.....	JPL-819	B67-10644	02	.....	GSFC-10188
B67-10561	01	.....	JPL-649	B67-10645	03	.....	M-FS-14059
B67-10562	01	.....	MSC-11147	B67-10646	01	.....	GSFC-08259
B67-10563	05	.....	M-FS-12849	B67-10647	03	.....	M-FS-12705
B67-10564	02	.....	M-FS-12867	B67-10648	02	.....	ERC-10026
			M-FS-12868	B67-10649	01	.....	M-FS-14107
			M-FS-13065	B67-10650	01	.....	M-FS-14108
			M-FS-13815	B67-10651	06	.....	GSFC-10231
			M-FS-12518	B67-10652	01	.....	M-FS-14020
B67-10565	01	.....	NUC-10070	B67-10653	02	.....	M-FS-14041
B67-10566	06	.....	NUC-10034	B67-10654	06	.....	NPO-10220
B67-10567	05	.....	NUC-10011	B67-10655	05	.....	M-FS-13304
B67-10568	06	.....	GSFC-10022	B67-10656	01	.....	GSFC-10221
B67-10569	01	.....	MSC-11342	B67-10657	01	.....	NPO-10843
B67-10570	03	.....	GSFC-10085	B67-10658	01	.....	HQ-10031
B67-10571	01	.....	MSC-11327	B67-10659	03	.....	HQ-10032
B67-10572	01	.....	MSC-11496	B67-10660	03	.....	HQ-10035
B67-10573	03	.....	M-FS-1214	B67-10661	01	.....	HQ-10037
B67-10574	01	.....	M-FS-1221	B67-10662	01	.....	HQ-10018
			NPO-10008	B67-10663	04	.....	HQ-33
B67-10575	01	.....	MSC-11595	B67-10664	06	.....	M-FS-14292
B67-10576	01	.....	ARG-10056	B67-10665	06	.....	NUC-10143
B67-10577	03	.....	ARG-10045	B67-10666	06	.....	LANGLEY-10191
B67-10578	03	.....	ARG-10050	B67-10667	05	.....	M-FS-14079
B67-10579	03	.....	ARG-10039	B67-10668	01	.....	GSFC-217
B67-10580	03	.....	M-FS-13776	B67-10669	01	.....	ARC-10054
B67-10581	05	.....	ARG-10055	B67-10670	05	.....	M-FS-12968
B67-10582	03	.....	ARG-10013	B67-10671	02	.....	NPO-10468
B67-10583	03	.....	LEWIS-10316	B67-10672	01	.....	NPO-10404
B67-10584	03	.....	NPO-10201	B67-10673	05	.....	M-FS-12986
B67-10585	01	.....	GSFC-10360	B67-10674	01	.....	GSFC-10184
B67-10586	03	.....	GSFC-10396	B67-10675	01	.....	MSC-10013
B67-10587	01	.....	M-FS-14026	B67-10676	01	.....	NPO-10166
B67-10588	05	.....	MSC-11395	B67-10677	05	.....	MSC-12052
B67-10589	03	.....	ARG-178	B67-10678	06	.....	NUC-10141
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B67-10591	05	.....	ARG-10082				
B67-10592	03	.....	M-FS-13434				
B67-10593	03	.....	NUC-10525				
B67-10594	05	.....	M-FS-12955				
B67-10595	01	.....	ARG-241				
B67-10596	03	.....	ARG-10071				
B67-10597	02	.....	ARC-10033				
B67-10598	01	.....	GSFC-10007				
B67-10599	03	.....	M-FS-12988				
B67-10600	03	.....	LANGLEY-285				
B67-10601	02	.....	M-FS-14022				
B67-10602	02	.....	LANGLEY-68				
B67-10603	01	.....	ARG-10046				
B67-10604	04	.....	ARG-10009				
B67-10605	02	.....	GSFC-10021				
B67-10606	01	.....	M-FS-13303				
B67-10607	05	.....	M-FS-13991				
B67-10608	03	.....	GSFC-10170				
B67-10609	02	.....					

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