NASA SP-5021 (16)

INDEX TO NASA TECH BRIEFS 1975

- Abstracts
- Subject Index
- Author Index
- Center Number/B Number Cross Reference

NASA SP-5021(16) Index to NASA Tech Briefs 1975 February 1976

Introduction

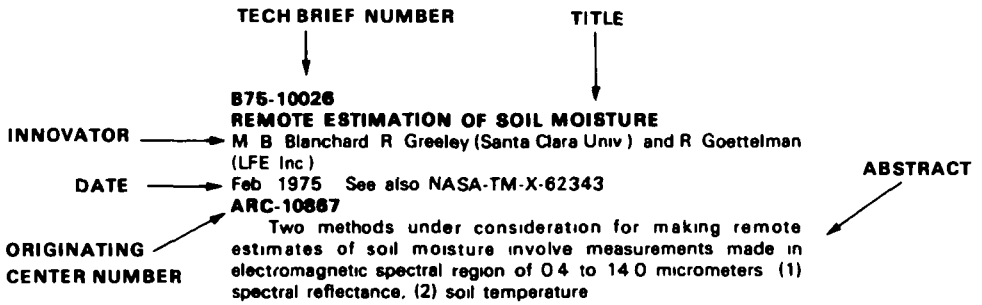
Tech Briefs are short announcements of new technology derived from the research and development activities of the National Aeronautics and Space Administration These briefs emphasize information considered likely to be transferrable across industrial, regional, or disciplinary lines and are issued to encourage commercial application

This *Index to NASA Tech Briefs* contains abstracts and four indexes—subject, personal author, originating Center, and Tech Brief number—for 1975 Tech Briefs

Abstract Section

The abstract section is divided into nine categories Electronics/Electrical, Electronic/Electrical Systems, Physical Sciences, Materials/Chemistry, Life Sciences, Mechanics, Machinery, Equipment, and Tools, Fabrication Technology, and Computer Programs Within each category, abstracts are arranged sequentially by Tech Brief number

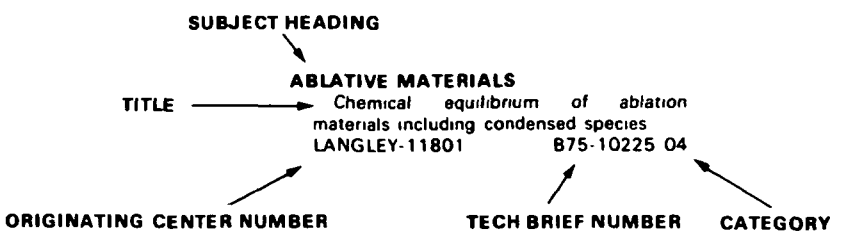
A typical abstract entry has these elements



The originating Center number in each entry includes an alphabetical prefix that identifies the NASA Center where the Tech Brief originated A list of prefixes and the corresponding Center names are given on page iii

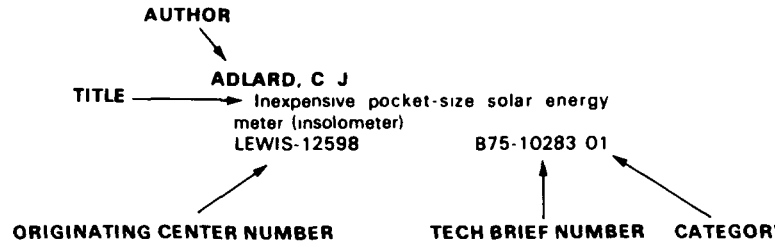
Indexes

Four indexes are provided The first is a subject index, arranged alphabetically by subject heading Each entry in the subject index includes a Tech Brief number and a category number to aid the user in locating pertinent entries in the abstract section

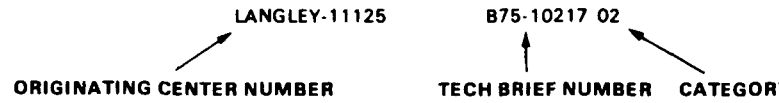


The January 1976 edition of the *NASA Thesaurus* (NASA SP-7050) is used as the authority for the indexing vocabulary that appears in the subject index The *NASA Thesaurus* should be consulted in examining the current indexing vocabulary, including associated cross-reference structure Only the subject terms that have been selected to describe the documents abstracted in this issue appear in the subject index Copies of the *NASA Thesaurus* may be obtained from the National Technical Information Service or the U S Government Printing Office at $23 50 for the two-volume set

The second index is a personal author index Entries in this index are arranged alphabetically by author's name Tech Brief and category numbers are supplied to help the user find the appropriate entries in the abstract section



The third index relates each originating Center number to the corresponding Tech Brief number and category Entries in this index are arranged in alphanumeric order by Center number



The fourth index relates each Tech Brief number to its originating Center number Entries are arranged in ascending Tech Brief number order

Originating Center Prefixes

ARC	Ames Research Center
GSFC	Goddard Space Flight Center
HQ	NASA Headquarters
KSC	Kennedy Space Center
LANGLEY	Langley Research Center
LEWIS	Lewis Research Center
M-FS	Marshall Space Flight Center
MSC	Johnson Space Center (formerly Manned Spacecraft Center)
NPO	Jet Propulsion Laboratory/NASA Pasadena Office

Availability of NASA Tech Briefs

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TABLE OF CONTENTS

Abstract Section

Indexes

Index to NASA Tech Briefs

February 1976

Abstract Section

01 ELECTRONICS/ELECTRICAL

B75-10014
ISOMETRIC SCAN METHOD FOR ULTRASONIC EVALUATION OF COMPOSITE PANELS
A Vary and R L Sorg
Apr 1975
LEWIS-12437
I-scan form of data presentation provides more direct information on nature and severity of flaws present in test specimen and is more easily interpreted by inspector than conventional C-scans currently used It also offers potential savings in inspection time and cost

B75-10025
TRIELECTRODE CAPACITIVE PRESSURE TRANSDUCER
G W Coon
Feb 1975
ARC-10711
Capacitive transducer eliminates adverse effects of temperature and humidity it is especially suited for measuring pressure changes in high-temperature environment Transducer basically is three-electrode device

B75-10031
VARACTOR DIODE ASSEMBLY WITH LOW PARASITIC REACTANCES
L E Dickens (Westinghouse Elec Corp)
Apr 1975
GSFC-11617
Development of varactor diode assembly overcomes parasitic reactances of conventional varactor packages In specially constructed assembly very high idler-frequency to signal-frequency ratios are used to obtain low-noise operation over maximum bandwidth

B75-10036
INTERFACE CONTROL SCHEME FOR COMPUTER HIGH-SPEED INTERFACE UNIT
B K Ballard (RCA)
Apr 1975
M-FS-23083
Control scheme is general and performs for multiplexed and dedicated channels as well as for data-bus interfaces Control comprises two 64-pin dual in-line packages each of which holds custom large-scale integrated array built with silicon-on-sapphire complementary metal-oxide semiconductor technology

B75-10039
IMPROVED PRINTED-WIRING BOARDS FOR HIGH-RELIABILITY CIRCUITS
W J Patterson
Apr 1975
M-FS-23147
Experimental board includes three layers of special tridirectionally woven fabric Alumina particles play major role in reducing coefficient of expansion They also serve as heat sink for heat-generating components

B75-10049
SHOCK AND VIBRATION ISOLATION MOUNT FOR SMALL ELECTRONIC COMPONENTS
F R Dillon (Martin Marietta Corp) and C R Mayne
Apr 1975
NPO-13253
Mount includes metallic cup and support ring placed in mold fixture Viscoelastic material is injected between these parts by means of large hypodermic needle Circular projections on cup and ring extend into material and are kept in place without dependence on quality of adhesion between material and metal

B75-10069
HIGH-TEMPERATURE CAPACITIVE STRAIN MEASUREMENT SYSTEM
J E Wilson and L R Egger (Boeing Co)
May 1975
FRC-10053
Capacitive strain gage and signal conditioning system measures stress-induced strain and cancels thermal expansion strain at temperatures to 1 500 F (815 C) Gage does not significantly restrain or reinforce specimen

B75-10070
FOURIER WAVEFORM ANALYZER
F J Sutton
May 1975
GSFC-11747
Real-time Fourier analysis is provided by bucket brigade charge-transfer shift register Device is small inexpensive integrated circuit which does analog-to-digital-to-analog conversion, data processing and time delay

B75-10071
HEATER IMPROVES COLD-TEMPERATURE CAPACITY OF SILVER-CADMIUM BATTERIES
W H Webster Jr and P T Jackson
May 1975
GSFC-11913
Eight heaters are included in 14-cell package to provide 14-Vdc Each heater is 11-ohm self-adhesive strip placed across broad face of each pair of cells They are installed before cells are wired Heaters are in series and are connected through pair of redundant thermostats

B75-10088
ONE-DIMENSIONAL MULTIMODE AND MULTISTATE OSCILLATOR A CONCEPT
M H Aumann (Wisconsin Univ)
Jun 1975

HQ-10851

Device s voltage amplitude distribution is similar to that of standing waves on transmission line It can be used for fast efficient information encoding decoding and memory Device operates in response to brief tone burst setting up standing-wave mode of oscillation which is unique for each possible burst frequency

B75-10091
DUAL-BAND RIDGED WAVEGUIDE
M J Franke
Jun 1975
LANGLEY-11781

Waveguide-in-waveguide technique involves routing two waveguides through same passageway Smaller waveguide can be soft or silver soldered inside X-band waveguide to form single ridge guide and to propagate frequencies at C-band

B75-10096
INTERACTIVE GRAPHICAL COMPUTER-AIDED DESIGN SYSTEM
M T Edge
Jun 1975
M-FS-23157

System is used for design layout and modification of large-scale-integrated (LSI) metal-oxide semiconductor (MOS) arrays System is structured around small computer which provides real-time support for graphics storage display unit with keyboard slave display unit hard copy unit and graphics tablet for designer/computer interface

B75-10101
HIGH-PERFORMANCE SCHOTTKY DIODES ENDURE HIGH TEMPERATURES
E L Dickens (Westinghouse Elec Corp) G F Trageser (Westinghouse Elec Corp) and B H Kim (Westinghouse Elec Corp)
Jun 1975
M-FS-23184

Fabrication process and aluminum/GaAs (gallium arsenide) coupling are used to produce Schottky diodes that have high cutoff frequencies and can withstand operating temperatures in excess of 500 C

B75-10102
INTEGRATED-CIRCUIT BALANCED PARAMETRIC AMPLIFIER
E L Dickens (Westinghouse Elec Corp)
Jun 1975
M-FS-23193

Amplifier fabricated on single dielectric substrate has pair of Schottky barrier varactor diodes mounted on single semiconductor chip Circuit includes microstrip transmission line and slot line section to conduct signals Main features of amplifier are reduced noise output and low production cost

B75-10109
FLUORESCENT COLOR CODING OF POWER RECEPTACLES
C C Oleson (Rockwell Intern Corp) and D A Vidana (Rockwell Intern Corp)
Jun 1975
MSC-19504

Receptacles color coded according to power ratings can be easily located Low-light visibility of fluorescent paint saves considerable time during repair or replacement Technicians using flashlights have located and identified painted receptacles from as far away as 50 feet (15 meters)

B75-10120
MICROELECTRONIC FABRICATION OF SUPERCONDUCTING DEVICES AND CIRCUITS
K R Kirschman E J Mercereau and A H Notarys
Jun 1975
NPO-13419

It is expected that thin-film superconductors can be used as detectors or sources of infrared and microwave radiation as magnetometers as voltage standards, and for voltage and current measurements, for electronic signal processing, and in digital circuitry

B75-10171
SYSTEM FOR SIMULTANEOUS, BIDIRECTIONAL DATA TRANSMISSION
C C Schmidt (Lockheed Electronics Co)
Aug 1975
MSC-14810

Single inexpensive system uses two identical circuits for simultaneous bidirectional data transmission Frequency response with currently available amplifiers is from dc to over 70 kHz

B75-10195
STRIPE-LINE COIL FOR MAGNETIC-FIELD GENERATION IN BUBBLE MEMORY DEVICES
T T Chen (Rockwell Intern Corp) and E J Ypma (Rockwell Intern Corp)
Sep 1975
LANGLEY-11705

Coil etched from conductive film has better field uniformity than wire-wound coils and less coil loss at high-frequency operation

B75-10196
LOW-LOSS STRIPE-LINE COIL FOR MAGNETIC BUBBLE MEMORY
T T Chen (Rockwell Intern Corp) and L C Zachry (Rockwell Intern Corp)
Sep 1975 See also B75-10195
LANGLEY-11707

Stripe-line pattern is etched on both sides of double-sided film Since conductor thickness is only half that of single-sided film problems in wrapping and etching are greatly reduced

B75-10197
BUBBLE-DOMAIN CIRCUIT WAFER EVALUATION COIL SET
T T Chen (Rockwell Intern Corp) and L J Williams (Rockwell Intern Corp)
Sep 1975
LANGLEY-11728

Coil structures have been designed to permit nondestructive testing of bubble wafers Wafers can be electrically or optically inspected and operated from quasi-static frequency to maximum device operating frequency

B75-10213
MICROWAVE DIODE AMPLIFIERS WITH LOW INTERMODULATION DISTORTION
W H Cooper (Westinghouse Elec Corp) M Cohn (Westinghouse Elec Corp) and C D Buck (Westinghouse Elec Corp)
Oct 1975
GSFC-11668

Distortions can be greatly reduced in narrow-band applications by using the second harmonic The ac behavior of simplified diode amplifier has negative resistance depending on slope of equivalent I-V curve

B75-10219
OPEN COIL STRUCTURE FOR BUBBLE-MEMORY-DEVICE PACKAGING
T T Chen (Rockwell Intern Corp) and E J Ypma (Rockwell Intern Corp)
Oct 1975
LANGLEY-11704

Concept has several important advantages over close-wound system memory and coil chips are separate and interchangeable interconnections in coil level are eliminated by packing memory chip and electronics in single structure and coil size can be adjusted to optimum value in terms of power dissipation and field uniformity

B75-10220
IMPROVED PHOTOVOLTAIC DEVICES, USING TRANSPARENT CONTACTS

H J Hovel (IBM) and J M Woodall (IBM)
Oct 1975
LANGLEY-11761
Transparent conducting coating is applied to narrow pn junction surface to provide ohmic contact for majority carrier flow Coating can be made thick to prevent series resistance problem

B75-10221
VARIABLE-GAP BIAS STRUCTURE FOR MAGNETIC BUBBLE MEMORY PACKAGE
T T Chen (Rockwell Intern Corp)
Oct 1975
LANGLEY-11765
Size and thickness of field adjusting plate can be varied Memory chip specification is relaxed since chips in structure need not be matched in bias margin

B75-10222
A 1-1/2-LEVEL ON-CHIP-DECODING BUBBLE MEMORY CHIP DESIGN
T T Chen (Rockwell Intern Corp)
Oct 1975
LANGLEY-11766
Design includes multi-channel replicator which can reduce chip-writing requirement selective annihilating switch which can effectively annihilate bubbles with minimum delay and modified transfer switch which can be used as selective steering-type decoder

B75-10230
ELLIPSOMETER MEASUREMENTS OF EPITAXIAL GAAS LAYERS A CONCEPT
J D DeSmet (Alabama Univ)
Oct 1975
M-FS-23238
Report discusses analysis involving Maxwell s equations formed in a 6-by-6 matrix By applying boundary conditions at proper points in sample equation for propagation of light through anisotropic medium is reduced to eigenvalue problem resulting in 4-by-4 matrix

B75-10233
100-AMPERE-HOUR NICD BATTERY SYSTEM
Innovator not given (Grumman Aerospace Co) Oct 1975 See also NASA-CR-140380 NASA-CR-140381 NASA-CR-141600
MSC-14774
Cells use potassium hydroxide electrolyte and are hermetically sealed in stainless steel casings Each cell provides 1 56 volts and has a minimum operating life of 17 000 hours and a maximum of approximately 48 000 hours

B75-10255
START/STOP SWITCHES FOR TESTING DETONATION VELOCITY OF EXPLOSIVES
P J Wise and E W Grimes
Oct 1975
KSC-10793
Printed-circuit process produces ordnance-initiated start/stop switches Method is faster and less costly than fabriction by hand and produces switches of uniform quality

B75-10260
SIMPLE TEMPERATURE SENSOR WITH DIRECT READOUT
W A Love (Rockwell Intern Corp)
Oct 1975
LANGLEY-11818
Sensor is easy to construct requires only one operational amplifier and has very fast response It provides direct readout of temperature on digital voltmeter

B75-10274
RESPONSE OF TANTALUM CAPACITORS TO FAST TRANSIENT OVERVOLTAGES
A J Zill and D K Castle
Oct 1975 See also NASA-TM-X-58152
MSC-14822
Report describes tests used to determine minimum time for capacitors to fail due to overvoltage and maximum amount of overvoltage that capacitors could sustain without permanent damage

B75-10277
HIGHLY STABLE ANALOG-TO-DIGITAL CONVERTER
H C Lucas
Oct 1975
NPO-13385
Device has been developed for use in pulse-height analyzer of gamma-ray telescope Unit shows integral linearity of 0 05 percent and differential linearity of less than 2 percent

B75-10283
INEXPENSIVE POCKET-SIZE SOLAR ENERGY METER (INSOLOMETER)
F A Forestieri, M T Klucher, J C Adlard and K R Shaltens
Nov 1975
LEWIS-12598
Device directly measures amount of energy available in sunlight falling on the earth over range from 1 to 1250 watts per square meter Insolometer is ideally suited to making on-site measurements of available solar energy

B75-10289
SOLAR POWER ROOF SHINGLE
F A Forestieri F A Ratajczak, and G L Sidorak
Dec 1975
LEWIS-12587
Silicon solar cell module provides both all-weather protection and electrical power Module consists of array of circular silicon solar cells bonded to fiberglass substrate roof shingle with fluorinated ethylene propylene encapsulant

B75-10304
MICROCIRCUIT TESTING AND FABRICATION, USING SCANNING ELECTRON MICROSCOPES
P D Nicolas
Dec 1975
M-FS-23159
Scanning electron microscopes are used to determine both user-induced damages and manufacturing defects subtle enough to be missed by conventional light microscopy Method offers greater depth of field and increased working distances

B75-10306
TEMPERATURE-STABLE GUNN-DIODE OSCILLATOR
E J Dengenford (Westinghouse Elec Corp) E L Dickens (Westinghouse Elec Corp), W D Maki, and A B Newman (Westinghouse Elec Corp)
Dec 1975
M-FS-23242
Oscillator consisting of Gunn diode embedded in coaxial circuit has excellent temperature stability and low fabrication costs as compared with automatic-frequency-control crystal oscillators

B75-10312
QUALITY CONTROL OF MICROELECTRONIC WIRE BONDS
A R Thiel (Gen Dyn Corp) and D C Schmidt (Gen Dyn Corp)
Dec 1975
M-FS-23327
Report evaluates ultrasonic bonding of small-diameter aluminum wire joined to ceramic substrates metalized with thin-film and thick-film gold Quick testing technique for nondestructive location of poor wire bonds is also presented

B75-10324
ACID/ALKALI BROMIDE SECONDARY BATTERY
C England
Dec 1975
NPO-13237
Secondary electrochemical battery has been developed which has high energy/ weight density Battery is rechargeable and works on reaction between hydrogen and bromine

B75-10330
HIGHLY-EFFICIENT HORN/REFLECTOR ANTENNA
A K Green (Microwave Res Corp)
Dec 1975
NPO-13568
Antenna has beam efficiency of 96 percent Configuration is compact and relatively inexpensive

B75-10337
TRIGGER CIRCUIT FORCES IMMEDIATE SYNCHRONIZATION OF FREE-RUNNING OSCILLATOR
S Nagano
Dec 1975
NPO-13646
Device provides positive triggering for inverter synchronization in uninterruptible power supplies Integrated-circuit oscillator frequency may be higher lower, or the same as that of the synch pulse and is always synchronized by first clock pulse

02 ELECTRONIC/ELECTRICAL SYSTEMS

B75-10012
IN-SERVICE TURBINE WHEEL CRACK MONITOR
P J Barranger
Apr 1975 See also NASA-TN-D-7483
LEWIS-12422
System can be utilized in flight or at flight line It monitors disk rim for surface cracks emanating from blade root interface System consists of eddy-current sensor mounted approximately 1 1/2 mm (1/16 in) away from face of disk and remotely located electrical capacitance-conductance bridge and signal analyzer

B75-10037
FILL-IN BINARY LOOP PULSE-TORQUE QUANTIZER
C B Lory (Charles Stark Draper Lab Inc)
Apr 1975
M-FS-23100
Fill-in binary (FIB) loop provides constant heating of torque generator an advantage of binary current switching At the same time it avoids mode-related dead zone and data delay of binary an advantage of ternary quantization

B75-10046
MULTIBEAM-ANTENNA FEED SYSTEM TO ISOLATE ORTHOGONALLY POLARIZED BEAMS
J E Ohlson and W F Williams
Apr 1975
NPO-13140
System is polarization tracker and comprises variable polarizer polarization control and receiver servo loop System simultaneously receives desired signal and undesired signal which are approximately orthogonal They can be either paired as left and right circular polarizations or as cross-linear polarizations

B75-10059
BUFFER CONTROL UNIT FOR COMPUTER COMMUNICATIONS
A K Okinaka (Hawaii Univ)
Apr 1975
ARC-10870
Unit provides character echoing for keyboard display parity and syndrome generation (error detection) half or full data-packet generation automatic retransmission of packets and keyboard lock-up

B75-10068
A TEST AND MEASUREMENT TECHNIQUE FOR DETERMINING POSSIBLE LIGHTNING-INDUCED VOLTAGES IN AIRCRAFT ELECTRICAL CIRCUITS
J A Plumer (GE) and L C Walko (GE)
Jul 1975 See also NASA-CR-2348
LEWIS-12109
Transient analyzer consists of four 0 5 microfarads capacitors chargeable by self-contained solid state 50 KV dc power supply operating from standard 110 Vac line voltage Unit can circulate unidirectional current impulses of up to 500 amperes through aircraft at waveshapes similar to those of natural lightning strokes

B75-10073
AUTOMATED DATA ACQUISITION AND REDUCTION SYSTEM FOR TORSIONAL BRAID ANALYZER
G L Carl A T Inge N J Johnston and S K Dalal (Wyle Labs Inc)
May 1975
LANGLEY-11578
Automated Data Acquisition and Reduction System (ADAR) evaluates damping coefficient and relative rigidity by storing four successive peaks of waveform and time period between two successive peaks Damping coefficient and relative rigidity are then calculated and plotted against temperature or time in real time

B75-10086
TECHNIQUES FOR DECODING SPEECH PHONEMES AND SOUNDS A CONCEPT
D C Lokerson and H G Holby
Jun 1975
GSFC-11898
Techniques studied involve conversion of speech sounds into machine-compatible pulse trains (1) Voltage-level quantizer produces number of output pulses proportional to amplitude characteristics of vowel-type phoneme waveforms (2) Pulses produced by quantizer of first speech formants are compared with pulses produced by second formants

B75-10092
MINIATURE SONAR FISH TAG
R W Lovelady and R L Ferguson
Jun 1975
LANGLEY-11814
Self-powered sonar device may be implanted in body of fish It transmits signal that can be detected with portable tracking gear or by automatic detection-and-tracking system Operating life of over 4000 hours may be expected Device itself may be used almost indefinitely

B75-10103
CENTRAL CONTROL ELEMENT EXPANDS COMPUTER CAPABILITY
R A Easton (Hughes Aircraft Co)
Jun 1975
M-FS-23216
Redundant processing and multiprocessing modes can be obtained from one computer by using logic configuration Configuration serves as central control element which can automatically alternate between high-capacity multiprocessing mode and high-reliability redundant mode using dynamic mode switching in real time

B75-10107
HIGH-EFFICIENCY K-BAND TRACKING ANTENNA FEED
R L Beavin (McDonnell Aircraft Co) and A I Simanyi (McDonnell Aircraft Co)
Jun 1975 See also NASA-CR-134193
MSC-14717
Antenna feed features high aperture efficiency of multimode near-field horn and develops tracking signals without conventional monopulse bridge Feed assembly is relatively simple and very compact However feed is sensitive to cross-polarized energy which couples into orthogonal error channel

B75-10108
HIGH-POWER AC/DC VARIABLE LOAD SIMULATOR

K P Joncas (Avco Corp) S Birnbach (Avco Corp) L D Bruce (Avco Corp), and L Smith (Avco Corp)
Jun 1975 See also B73-10305 NASA-CR-140331
MSC-14788

Design of medium-power dynamic electrical load simulator has been extended to permit simulation of ac as well as dc loads and to provide for operation at higher power levels Simulator is internally protected against reverse voltage overvoltage overcurrent and overload conditions

B75-10114
QUASARS AS VERY-ACCURATE CLOCK SYNCHRONIZERS
W J Hurd and R M Goldstein
Jun 1975
NPO-13276

Quasars can be employed to synchronize global data communications, geophysical measurements, and atomic clocks It is potentially two to three orders of magnitude better than presently-used Moon-bounce system Comparisons between quasar and clock pulses are used to develop correction or synchronization factors for station clocks

B75-10122
TRANSMITTER SWITCH FOR HIGH-POWER MICROWAVE OUTPUT
C P Wiggins and R K Leu
Jun 1975
NPO-13439

Combiner system can be used for combining output powers of two transmitters or for switching from one to the other This can be done when pair of transmitters operate on same frequency and carriers are phase coherent as by excitation from single exciter

B75-10129
HIGH-SPEED DATA WORD MONITOR
M N Wirth
Jun 1975
ARC-10899

Small portable self-contained device provides high-speed display of bit pattern or any selected portion of transmission can suppress filler patterns so that display is not updated and can freeze display so that specific event may be observed in detail

B75-10136
WIND ENERGY UTILIZATION A BIBLIOGRAPHY
Innovator not given (New Mexico Univ) Jul 1975
LEWIS-12518

Bibliography cites documents published to and including 1974 with abstracts and references and is indexed by topic author organization, title and keywords Topics include Wind Energy Potential and Economic Feasibility, Utilization Wind Power Plants and Generators Wind Machines Wind Data and Properties, Energy Storage and related topics

B75-10150
SOLID STATE REMOTE POWER CONTROLLERS FOR 120 VDC POWER SYSTEMS
G R Sundberg and D E Baker (Westinghouse Elec Corp)
Oct 1975 See also NASA-CR-134772
LEWIS-12523

Solid state remote power controllers can be applied to any dc power system up to 120 Vdc and distribute power up to 3 6 kW per hour Devices have demonstrated total electrical efficiencies of 98 5 percent to 99 0 percent at rated load currents

B75-10152
LOW-COST, COMPACT, COOLED PHOTOMULTIPLIER ASSEMBLY FOR USE IN MAGNETIC FIELDS UP TO 1400 GAUSS
R W Patch, R A Tashjian and T A Jentner
Sep 1975 See also NASA-TM-X-71635
LEWIS-12445

Use of vortex tube for cooling and concentric shielding have produced smaller and more compact unit than was previously available Future uses of device could include installation in gas chromatographs and mass spectrometers Additional uses would include measurements and controls in magnetohydrodynamic power generators and fusion reactors

B75-10153
DIGITAL TAPE DRIVE MONITOR
R T McKenna
Aug 1975
GSFC-11925

Network checks skew and character spacing of digital tape drive systems automatically Tape drive is set up and calibrated to check any written tape when tape is read back It will indicate track errors or character spacing errors should they exceed specifications

B75-10154
VOLTAGE MONITORING SYSTEM
C L Canicatti
Aug 1975
KSC-10736

System serves as central station which can monitor voltage variations through transmission lines connnected to equipment scattered in different locations Voltage-controlled oscillator is optional It is used in some systems to condition signal to make it compatible with certain types of oscillographs

B75-10156
NONDESTRUCTIVE MEASUREMENT OF CAPILLARY TUBE INTERNAL DIAMETER
W W Ho (Rockwell Intern Corp), A W Love (Rockwell Intern Corp), and M J VanMelle (Rockwell Intern Corp)
Aug 1975
LANGLEY-11647

Technique provides nondestructive method of making quick accurate determination by measuring electrical resistance of capillary tube when it is filled with electrolyte of known conductivity Apparatus consists of conductivity cell and equipment for measuring resistance and for monitoring and controlling temperature

B75-10161
PAGE COMPOSER TO TRANSLATE BINARY ELECTRICAL DATA TO OPTICAL FORM
G A Bailey and L S Cosentino (RCA)
Aug 1975
M-FS-22589, M-FS-23173

Composer converts binary data to optical form for storage as hologram Device consists of an array of deformable metal membranes controlled by MOSFETs Device is fast produces high contrast ratios does not degrade with extended use and can be addressed from diverse angles

B75-10162
ZENER-REGULATED SOLAR ARRAY/BATTERY POWER SYSTEM
J T Eliason (Sperry Rand Corp)
Aug 1975
M-FS-23195

Zener diode limits solar cell voltage used to charge battery System improves life and reliability of solar cells

B75-10169
A HYBRID GENERAL-PURPOSE BIT SYNCHRONIZER
J J Stiffler (Raytheon Co) and A H VanDoren (Raytheon Co)
Aug 1975 See also NASA-CR-115751
MSC-14330

Synchronizer is not affected by severe noise environments Device uses both analog and digital techniques in its tracking loop It accommodates any one of three signal formats Rapid acquisition sequences are used to minimize acquisition time

B75-10175
FAST FOURIER TRANSFORMATION COMPUTER USING FAST COUNTERS
S Zohar

Aug 1975
NPO-13110
Two designs have been developed for cost-effective fast transformation of data points in small batches (where N is equal to or less than 32) One design is applicable to N prime and *one to all* N

B75-10180
NEW BROADBAND SQUARE-LAW DETECTOR
M S Reid R A Gardner, and C T Stelzried
Aug 1975
NPO-13410
Compact device has wide dynamic range accurate square-law response good thermal stability high-level dc output with immunity to ground-loop problems ability to insert known time constants for radiometric applications and fast response times compatible with computer systems

B75-10184
PROGRAMED ASYNCHRONOUS SERIAL DATA INTERROGATION IN A TWO-COMPUTER SYSTEM
N A Schneberger (Honeywell Inc)
Sep 1975
GSFC-11778
Technique permits redundant computers with one unit in control mode and one in MONITOR mode to interrogate the same serial data source Its use for program-controlled serial data transfer results in extremely simple hardware and software mechanization

B75-10191
HIGH-VOLTAGE STEPPING SUPPLY WITH FAST SETTLING TIME
H Doong and M H Acuna
Sep 1975
GSFC-11844
Waveform generator is used to derive low-voltage staircase waveform that feeds relatively long response time power supply Power supply has high output voltage that is predetermined multiple of the input voltage

B75-10192
VIDEO SWITCHER FOR COUPLING VIDEO CAMERAS TO SINGLE TV MONITOR
I A Richter
Sep 1975
KSC-10782
Device couples up to 60 TV cameras to single monitor Video switching is provided by diode matrix arranged in a 60-by-1 configuration Switcher can be operated manually or automatically

B75-10204
MEASUREMENT OF TRAP DENSITY IN DIELECTRIC FILM
J E Guisinger and J Maserjian
Sep 1975
NPO-13443
Method uses basic circuit to examine quality and trap density of film used in insulated gate field effect transistors Data are measured as function of performance and life expectancy

B75-10205
REAL-TIME SPEECH ANALYZER
J P Hong
Sep 1975
NPO-13465
System uses phase-locked loops to give real-time information on speech spectrum by tracking the fundamental and its first 19 harmonics

B75-10215
VARIABLE-BEAMWIDTH ANTENNA WITHOUT MOVING PARTS
L F Deerkoski and R F Schmidt
Oct 1975 See also B74-10041 B74-10257
GSFC-11924
Basic configuration consists of large parabolic dish reflector smaller hyperboloidal subreflector, and two sets of monopulse feeds located in conjugate focal region on boresight axis of dish

B75-10217
AUTOMATED STATISTICAL ANALYSIS PROGRAM (ASAP)
S J Bavuso
Oct 1975
LANGLEY-11125
Pattern recognition subprogram is used to produce table which indicates sections of input data Program then uses data to write set of Kirchhoff equations algebraically solved by Gaus reduction method

B75-10218
CONTINUOUS-PHASE FREQUENCY-SHIFT-KEYED GENERATOR
M S Feryszka
Oct 1975
LANGLEY-11638
Device combines features of crystal oscillator frequency stability and voltage-controlled oscillator phase continuity

B75-10240
HIGH-ACCURACY PROGRAMABLE SQUARE-LAW DETECTOR SYSTEM
M S Reid R A Gardner and C T Stelzried
Oct 1975 See also B75-10180
NPO-13525
Programable system introduces correction factor to compensate for detector deviation from square-law response If detector output voltage is V the corrected output voltage is determined as V corrected = aV squared where a is correction factor Factor is determined and used automatically with digital computer techniques

B75-10247
THREE-PHASE DC MOTOR DECODER
P A Studer
Oct 1975
GSFC-11824
Circuit minimizes components required to provide six properly timed drive signals from three equal-interval sensor inputs

B75-10254
PORTABLE HEADSET MICROPHONE CHECKER
J Davenport J A Foster and W R Langley
Oct 1975
KSC-10699
Simple and reliable test system gives go/no-go indication of output level of headset microphones Portable system has its own internal battery power supply and can be used in field or in laboratory with wide variety of headset types

B75-10265
REAL-TIME VIDEO CORRELATOR
P E Geise (Sperry Rand Corp) M Petcher (Sperry Rand Corp) and D F Cornwell (Sperry Rand Corp)
Oct 1975
M-FS-23200
Device provides two-dimensional correlation of video data Operation is reliable accurate and predictable

B75-10275
LASER-EXCITED FLUORESCENCE FOR MEASURING ATMOSPHERIC POLLUTION
R T Menzies
Oct 1975
NPO-13231
System measures amount of given pollutant at specific location Infrared laser aimed at location has wavelength that will cause molecules of pollutant to fluoresce Detector separates fluorescence from other radiation and measures its intensity to indicate concentration of pollutant

B75-10281
LOW-NOISE K(U)-BAND RECEIVER INPUT SYSTEM

R W Berwin P R Dachel and E R Weibe
Oct 1975
NPO-13645
Improved maser and superconducting magnet which operates in vacuum of closed-cycle helium refrigerator comprise a low-noise reliable field-operational receiver input system

B75-10291
DELAY-LOCK-LOOP CODE-CORRELATION SYNCHRONIZER
C T Pardoe (Johns Hopkins Univ)
Dec 1975
GSFC-11868
Temperature dependence and sensitivity to noise are greatly reduced in system designed to process biphase-level pulse-code-modulated signals

B75-10296
MONITOR FOR CHECKING ELECTRIC-FIELD METERS
L D Holley
Dec 1975
KSC-10851
Portable monitor can be used to check electric-field meters on location Faulty communication line or faulty unit can be determined on the spot

B75-10297
TIME-OF-ARRIVAL LIGHTNING ACTIVITY LOCATION SYSTEM
C L Lennon
Dec 1975
KSC-11006
System fixes location of charge buildup in clouds It provides range azimuth and elevation in real-time so that warning of charge buildup can be implemented

B75-10316
SOLID-STATE MOTOR CONTROL AND MONITOR SYSTEM
L G Monford, Jr
Dec 1975
MSC-12721
Compact solid-state system may be used for multifunction motor control System can provide 12 control functions for under $100

B75-10323
MULTICHANNEL HIGH-SPEED CORRELATOR
T O Anderson
Dec 1975
NPO-13097
Device is used in real-time signal processing system for detection of radar signals in noise

B75-10325
SYNCHRONIZER FOR RANDOM BINARY DATA
T O Anderson J K Holmes and W J Hurd
Dec 1975
NPO-13286
Simplified binary-data transition detector for synchronization of relatively noise-free signals can be used with radio or cable data-control links It permits reception of binary data in absence of clock signal or self-clocking coder

B75-10326
COMPUTER/COMPUTER INTERFACE
T O Anderson
Dec 1975
NPO-13428
System synchronizes data transfer between two computers by generating data strobe pulses when computers are ready for data transfer In addition interface filters noise by sampling

03 PHYSICAL SCIENCES

B75-10001
A SUPERIOR PROCESS FOR FORMING TITANIUM HYDROGEN ISOTOPIC FILMS
R Steinberg D L Alger and D W Cooper
Mar 1975
LEWIS-12083
Process forms stoichiometric continuous strongly bonded titanium hydrogen isotopic films Films have thermal and electrical conductivities approximately the same as bulk pure titanium ten times greater than those of usual thin films

B75-10004
PROPERTIES OF AIR AND COMBUSTION PRODUCTS OF FUEL WITH AIR
D J Poferl and R Svehla
Mar 1975 See also NASA-TN-D-5452, NASA-TN-D-7488
LEWIS-12402
Thermodynamic and transport properties have been calculated for air the combustion products of natural gas and air and *combustion products of ASTM-A-1 jet fuel and air Properties* calculated include ratio of specific heats molecular weight viscosity specific heat, thermal conductivity Prandtl number and enthalpy

B75-10008
UNIFORM HIGH IRRADIANCE SOURCE
A R Lunde (Boeing Co) A Fortini and D R Buchele
Apr 1975 See also NASA-CR-134523, NASA-SP-298
LEWIS-12360
New 50 Kw xenon short arc lamp mounted within elliptical collector provides irradiance levels up to 4 4 x 10 to the 7th power watts/sq m with non-uniformity ratio of 3 30 Energy mixer or light pipe between lamp source and target improves non-uniformity to required ratio

B75-10017
A METHOD FOR MEASURING COOLING AIR FLOW IN BASE COOLANT PASSAGES OF ROTATING TURBINE BLADES
C H Liebert and F G Pollack
Apr 1975 See also NASA-TN-D-7697
LEWIS-12433
Method accurately determines actual coolant mass flow rate in cooling passages of rotating turbine blades Total and static pressures are measured in blade base coolant passages Mass flow rates are calculated from these measurements of pressure measured temperature and known area

B75-10024
ELECTRICAL GAS HEATER WITH LARGE FLOW RANGE CAPABILITY
B A Benson (Boeing Co) and A Fortini
May 1975 See also NASA-CR-134523
LEWIS-12361
Auxiliary heat transfer device in form to tightly-wound helical tube was incorporated into conventional heater design to provide hydrogen heater with turn-down ratio greater than 100 Device greatly increases low flow rate capacity of heater by providing maximum heat-transfer area for low mass flows

B75-10026
REMOTE ESTIMATION OF SOIL MOISTURE
M B Blanchard R Greeley (Santa Clara Univ) and R Goettelman (LFE Inc)
Feb 1975 See also NASA-TM-X-62343
ARC-10867
Two methods under consideration for making remote estimates of soil moisture involve measurements made in electromagnetic spectral region of 0 4 to 14 0 micrometers (1) spectral reflectance (2) soil temperature

B75-10028
STUDY OF FLUID FLOW BY CHARGED PARTICLES
M Deluca (Ohio State Univ) and H R Velkoff (USAAMRDL)
Feb 1975
ARC-10925
Analytical and experimental effort explores possibility of using charged particles as diagnostic tool in study of fluid flows Test program involved right circular cylinder and airfoil located in large wind tunnel ions were injected into flow and resulting currents at surfaces were monitored

B75-10034
COAXIAL, SELF-ALIGNING OPTICAL SCANNING SYSTEM
D B Rhodes
May 1975
LANGLEY-11711
System provides fast way to sequentially focus optical energy (light) at preselected points in space It transmits optical energy to point in space while at same time receiving any optical energy generated at that point and then moves on to next selected point and repeats this transmit-and-receive operation

B75-10035
TRANSMISSION OSCILLATOR ULTRASONIC SPECTROMETER (TOUS) A NEW RESEARCH INSTRUMENT
J S Heyman F D Stone, M S Conradi (Washington Univ) and J G Miller (Washington Univ)
Apr 1975
LANGLEY-11735
TOUS is capable for measuring very small changes in acoustic attenuation and phase velocity Its high sensitivity to small changes in ultrasonic absorption results in part from operation under marginal conditions In spite of high sensitivity TOUS system is relatively simple inexpensive and compact

B75-10040
VIEWFINDER/TRACKING SYSTEM FOR SKYLAB
W L Casey (Martin Marietta Corp)
Apr 1975 See also NASA-CR-133967 NASA-TM-X-69040
MSC-14407
Basic component of system is infrared spectrometer designed for manual target acquisition pointing and tracking and data-take initiation System incorporates three main subsystems which include (1) viewfinder telescope (2) control panel and electronics assembly and (3) IR-spectrometer case assembly

B75-10043
REFRACTING LENS SYSTEM FOR LOW-SCATTER STAR-TRACKER A CONCEPT
Innovator not given (Optics Res Laboratories) Apr 1975 See also NASA-CR-134224
MSC-14724
'Low Scatter Lens Design/Development discusses studies of low-scatter lens system Two sections cover optical design and scattering analysis for model of lens system which rejects radiation Result of computations are shown on computer printouts attached to report

B75-10047
ACOUSTICALLY CONTROLLED INTEGRATED LASER FOR COMMUNICATIONS SYSTEMS
C Elachi
Apr 1975
NPO-13175
Acoustic wave creates fringes by producing periodic stresses in substrate and in film Laser carrier frequency is then changed by simply changing acoustical frequency When two acoustical sources are applied off beam axis, beam can be scanned at very rapid rates

B75-10048
AUTOMATICALLY-FOCUSING MICROSCOPE SYSTEM FOR LIVE TISSUE OBSERVATION
M N Mansour C P Chapman and H J Wayland
Apr 1975
NPO-13215
System includes focus-sensing arrangement which controls servo to keep microscope constantly focused on target Microscope objective is moved along optical axis System includes two video cameras that are used as transducers for sensing focus Incoming visual image is split by beam splitter so that one-half of information is fed to each camera

B75-10050
RESONANT CHAMBERS FOR SUSPENDING MATERIALS IN AIR
T G Wang, M W Saffren and D D Elleman
Apr 1975
NPO-13263
Acoustical pressure of standing wave is used to suspend materials inside resonant chambers Material is driven to standing-wave antinodes where pressure is lowest Pressure at nodes is greatest which prevents suspended material from collecting there Material can be moved inside chambers by changing wave patterns

B75-10075
HANDBOOK OF NOISE RATINGS
K S Pearsons (Bolt Beranek and Newman, Inc) and R L Bennet (Bolt Beranek and Newman, Inc)
May 1975 See also NASA-CR-2376
LANGLEY-11799
Handbook announced in Tech Brief is compendium of information describing multifarious noise methods now in use Reference material gives user better access to definitions application, and calculation procedures of current noise rating methods

B75-10080
DATA PROCESSING LARGE QUANTITIES OF MULTISPECTRAL INFORMATION
R E Haskell (Oakland Univ)
May 1975
MSC-14472
Method is combination of digital and optical techniques Multispectral data is coded into binary matrix format and then encoded onto photographic film Film is holographically correlated with spectral signature to generate single-class classification map Number of maps are optically superimposed to produce full-color multiclass classification map

B75-10081
INFRARED TUNABLE LASER A CONCEPT
K W Billman
May 1975
ARC-10463
Apparatus in which laser wavelengths of two dyes are mixed in intracavity nonlinear crystal provides intense source of coherent laser radiation which is tunable from visible through infrared wavelengths of electromagnetic spectrum

B75-10082
A NONDISPERSIVE INFRARED ANALYZER
J Dimeff
May 1975 See also B72-10198 B74-10243
ARC-10631
Apparatus retains all advantages of prior nondispersive infrared analysis systems and provides significantly more innumity to type of errors that may be introduced by geometric changes in analysis system Technique also permits construction of instruments of lower weight smaller volume and smaller power consumption

B75-10087
ANTIRESONANT RING INTERFEROMETER FOR LASER CAVITY DUMPING, MODE LOCKING, AND OTHER APPLICATIONS
A E Siegman (Stamford Univ)
Jun 1975
HQ-10844
Applications in lasers for antiresonant ring interferometer include coupled laser cavities variable laser-output coupling

intercavity harmonic-output coupling mode locking cavity dumping, and pulse code modulation

B75-10090
HOLOGRAPHIC DIRECT-VISION SPECTROSCOPE
J M Franke
Jun 1975
LANGLEY-11750
Spectroscope incorporates two prisms combined with holographic grating as dispersing element This provides high dispersion with selective undeviated wavelength Prisms with different indices of refraction and/or angles for construction and reconstruction may be used Also different prisms for input and output may be used

B75-10097
SUPERCONDUCTING QUANTUM-INTERFERENCE DEVICES
P N Peters and L B Holdeman
Jun 1975
M-FS-23163
Published document discusses devices which are based on weak-link Josephson elements that join superconductors Links can take numerous forms and circuitry utilizing links can perform many varied functions with unprecedented sensitivity Theoretical review of Josephson s junctions include tunneling junctions point contact devices microbridges and proximity-effect devices

B75-10098
LARGE-SCALE SOLAR THERMAL COLLECTOR CONCEPTS
L W Brantley
Jun 1975
M-FS-23167
Thermal collector could be used ultimately to power steamplant to produce electricity Collector would consist of two major subsystems (1) series of segmented tracking mirrors with two axes of rotation and (2) absorber mounted on centrally located tower

B75-10099
DICHROMATED-GELATIN HOLOGRAM PROCESS FOR IMPROVED OPTICAL QUALITY
W C Stewart (RCA)
Jun 1975
M-FS-23170
Optical distortions are eliminated by use of wetting agency followed by sequential immersion in several alcohol-water baths of increasing alcohol concentration Dehydration proceeds uniformly over surface of gelatin Dried plate is free of optically-distorting thickness variations

B75-10105
WIDE-FIELD BIREFRINGENT ELEMENTS
A Miller (RCA)
Jun 1975
MSC-12677
Birefrigent array consists of two plates with retardation properties nearly independent of direction of incident light over unlimited range of wavelengths Array can be used as birefrigent color filter Optical properties of plates may also be changed electro-optically rather than thermally

B75-10112
LASER SCANNED IMAGE SENSORS USING PHOTOCONDUCTORS WITH DEEP TRAPS
J Maserjian
Jun 1975
NPO-13131
Photoconductor records image when holes and electrons are trapped inside it due to incident photons Image can be read out by exposing photoconductor to scanning laser beam Photons from scanning laser empty traps generating photocurrent Image information is obtained by detecting this photocurrent synchronously with laser scan

B75-10115
CHEMICAL-IONIZATION VISIBLE AND ULTRAVIOLET GAS LASERS A CONCEPT
J B Laundenslager
Jun 1975
NPO-13289
Charge-transfer reactions or Penning ionization reactions are used to produce population inversions between electronic states of molecular ions which should result in stimulated emission in ultraviolet and visible regions Such lasers could be used in study of short-lived reaction intermediates crystal structure and scattering and photolysis

B75-10116
HEAT-OPERATED CRYOGENIC ELECTRICAL GENERATOR
T G Wang M M Saffern and D D Elleman
Jun 1975
NPO-13303
Generator operation is based upon unusual hydrodynamic properties exhibited by liquid helium below superfluid critical point Below that temperature liquid behaves as though it is mixture of two interpenetrating fluids When transition takes place between superfluid and normal states conservation of momentum is always balanced by normal fluid

B75-10118
HIGH-ENERGY LASERS BY USING DISTRIBUTED REFLECTION A CONCEPT
M M Saffren
Jun 1975
NPO-13346
Lasers may be made with higher energy photons than heretofore possible It has been proposed that vacuum ultraviolet lasing can be obtained by bombarding superfluid helium with electron beam while coupling acoustic energy into helium to set up standing waves in fluid

B75-10119
LASER-TO-ELECTRICITY ENERGY CONVERTER FOR SHORT WAVELENGTHS
J R Stirn and Y C M Yeh
Jun 1975
NPO-13390
Short-wavelength energy converter can be made using Schottky barrier structure It has wider band gap than p-n junction silicon semiconductors, and thus it has improved response at wavelengths down to and including ultraviolet region

B75-10123
DOUBLE-DISCHARGE COPPER-VAPOR LASER
J C Chen N M Merheim and G R Russell
Jun 1975
NPO-13348
Power supply for discharge pulses consists of two capacitors that are made to discharge synchronously with adjustable time intervals First pulse is switched with hydrogen thyratron and second by spark gap Lasing action peaks for appropriate combination of these two parameters

B75-10124
QUARTZ CRYSTAL MICROBALANCES TO MEASURE WIND VELOCITY AND AIR HUMIDITY
J B Stephens and E G Lave
Jun 1975
NPO-13462
Instrument includes four temperature-sensing Y-cut quartz crystals to determine wind direction velocity and temperature Two additional AT-cut crystals are used to determine air humidity Entire signal processing is provided by built-in electronics circuits

B75-10125
SCHOTTKY BARRIER SOLAR CELL PROMISES IMPROVED EFFICIENCY
R J Stirn
Jun 1975 See also B75-10119
NPO-13482

Higher current and higher voltage can be obtained by using Schottky barrier device with wide band-gap semiconductor as top layer and lower band-gap semiconductor underneath Significant amount of solar radiation that is not absorbed by side band-gap material will be absorbed by narrow band-gap material

B75-10126
TRANSMISSION LINE FOR S-BAND MASERS
R C Clauss and E R Wiebe
Jun 1975
NPO-13504
Transmission-line is coaxial Its outer conductor is made of thin-wall stainless-steel tube, inside is plated with 0 0025 mm copper and 0 0003 mm gold This combination gives little microwave loss and adequate thermal isolation

B75-10127
LASER ACTION GENERATED WITHIN A LIGHT PIPE A CONCEPT
C Elachi, G A Evans, and C Yeh
Jun 1975
NPO-13531
Laser light could be generated within light pipe itself thereby eliminating coupling losses Theoretical calculations have shown feasibility of light-pipe laser propagating in circularly-polarized TE mode It is predicted that fiber-optic distributed-feedback laser would have gain on order of 25 dB

B75-10128
LASER USING LEAD CHLORIDE VAPOR
C J Chen
Jun 1975
NPO-13615
By applying electric discharge lead chloride vapor in tube is dissociated into lead and chlorine atoms Population inversion of lead atoms is attained subsequently by second discharge, before chemical recombination of lead and chlorine has occurred Optimum time interval between two discharges is required for maximum laser output

B75-10138
LIFE PREDICTION OF MATERIALS EXPOSED TO MONOTONIC AND CYCLIC LOADING A TECHNOLOGY SURVEY AND BIBLIOGRAPHY
W F Stuhrke (Martin Marietta Corp) J L Carpenter Jr (Martin Marietta Corp) N Moya (Martin Marietta Corp) and G Mandel
Aug 1975 See also B75-10139 NASA-CR-134750, NASA-CR-134751, NASA-CR-134752 NASA-CR-134-753 NASA-CR-134754
LEWIS-12502
Announced survey directs attention toward low cycle fatigue and thermal fatigue experienced at elevated temperatures equivalent to those found in hot end of gas turbine engine Majority of bibliographic references are on life prediction for materials exposed to monotonic and cyclic loading in high temperature environments

B75-10139
FRACTURE TOUGHNESS TESTING DATA A TECHNOLOGY SURVEY AND BIBLIOGRAPHY
W F Stuhrke (Martin Marietta Corp) J L Carpenter Jr (Martin Marietta Corp) N Moya (Martin Marietta Corp) and G Mandel
Aug 1975 See also B75-10138 NASA-CR-134750 NASA-CR-134751 NASA-CR-134752 NASA-CR-134753 NASA-CR-134754
LEWIS-12503
Announced survey includes reports covering fracture toughness testing for various structural materials including information on plane strain and developing areas of mixed mode and plane strain test conditions Bibliography references cite work and conclusions in fracture toughness testing and application of fracture toughness test data, and in fracture mechanics analysis

B75-10141
LASER VELOCIMETER MEASUREMENTS OF HIGH-SPEED COMPRESSIBLE FLOWS
D A Johnson
Jul 1975
ARC-10781
Laser velocimeter results were compared and found to be consistent with those obtained with conventional measurement techniques and existing compressible boundary layer theory Turbulence information at supersonic speed has been successfully obtained in compressible boundary layer with laser system

B75-10142
QUICK-CHANGE ABSORPTION COLUMN
G N McEwen Jr (Natl Res Council) and B A Williams
Jul 1975
ARC-10952
Column has end caps held in place by springs prefilled packs of absorbent can be exchanged quickly Both ends of metal or plastic body tube of size which can hold adequate amount of absorbent are machined to provide seat for perforated plate and groove for its spring retainer ring

B75-10147
AN EXPERIMENTAL 100 KILOWATT WIND TURBINE GENERATOR
R L Thomas R L Puthoff J M Savino and W R Johnson
Aug 1975 See also NASA-TM-X-71701
LEWIS-12509
Experimental generator consists of two blades mounted on 100 foot tower, driving transmission train and electric generator mounted on top of tower Machine generates 100 kW of electricity at wind speeds from 18 to 60 miles per hour Yaw control mechanism automatically orients machine into wind

B75-10149
INVESTIGATIONS OF MULTIPLE JETS IN A CROSSFLOW
R E Walker (Aerojet-Gen Corp) and D L Kors (Aerojet-Gen Corp)
Oct 1975 See also NASA-CR-121217
LEWIS-12102
Study was conducted to determine penetration and mixing characteristics of multiple jets of ambient temperature air injected perpendicularly into ducted mainstream of hot combustion gases

B75-10158
ANGULAR DEVICE FOR OPTICAL FILTERS
L W Overbay
Aug 1975
LANGLEY-11796
Device provides a means for precise angular adjustment of optical filters in Raman calibration detector units Device prevents stray light from entering system and has the capability of repeated alignments to predetermined angles

B75-10160
AUTOMATED ELECTRONIC SYSTEM FOR MEASURING THERMOPHYSICAL PROPERTIES
T R Creel, Jr R A Jones R R Corwin (Beta Industries Inc) and J S Kramer (Beta Industries Inc)
Aug 1975 See also B73-10447, NASA-CR-2511
LANGLEY-11883
Phase-charge coatings are used to measure surface temperature accurately under transient heating conditions Coating melts when surface reaches calibrated phase-charge temperature Temperature is monitored by infrared thermometer and corresponding elapsed time is recorded by electronic data-handling system

B75-10176
COMPACT LASER THROUGH IMPROVED HEAT CONDUCTANCE
L C Yang
Aug 1975
NPO-13147
A 16-joule-pulse laser has been developed in which a boron nitride heat-conductor enclosure is used to remove heat from

the elements Enclosure is smaller and lighter than systems in which cooling fluids are used

B75-10181
A TWO-DEGREE KELVIN REFRIGERATOR
J B Stephens and C G Miller
Aug 1975
NPO-13459
Open-cycle cryogenic refrigerator maintains temperature as low as 2K for periods up to six months Designed to cool an infrared detector refrigerator can be used in cooling Josephson-junction devices magnetic bubble domains and superconducting devices

B75-10182
ECONOMICAL SOLAR-HEATING OR COOLING SYSTEM WITH NEW SOLAR-ENERGY CONCENTRATORS
K Shimada
Aug 1975
NPO-13497
Economical solar energy collector, made from array of cylindrical Fresnel lenses does not require tracking mechanism As the sun changes position lenses focus solar energy on different collector elements

B75-10183
HIGH-POWER CW LASER USING HYDROGEN-FLUORINE REACTION
P I Moynihan
Aug 1975
NPO-13623
Continuous-wave laser has been proposed based on reaction of hydrogen and fluorine Hydrogen is produced by dissociation of hydrazine which can be stored as liquid in light containers at room temperature

B75-10185
CHARACTERISTICS AND PERFORMANCE STUDY OF MASS SPECTROMETER RESIDUAL GAS ANALYZERS
W W Hultzman
Sep 1975 See also NASA-TN-D-7554
LEWIS-12393
Types of instruments studied were magnetic sector, omegatron quadrupole, and monopole Experimental results obtained included absolute sensitivity to argon relative sensitivity to ten gases (hydrogen helium neon nitrogen carbon monoxide oxygen argon, carbon dioxide krypton and xenon) and cracking patterns for these gases

B75-10189
COMPARATIVE PERFORMANCE OF TWENTY-THREE TYPES OF FLAT PLATE SOLAR ENERGY COLLECTORS
F F Simon
Sep 1975 See also B74-10086 NASA-TM-X-3059, NASA-TM-X-71793
LEWIS-12511
Report compares efficiencies of 23 solar collectors for four different purposes operating a Rankine-cycle engine heating or absorption air conditioning heating hot water and heating a swimming pool

B75-10202
WIDE-ANGLE SUN SENSORS
L L Schumacher
Sep 1975
NPO-13327
Two sensors have been developed one single-axis device is cylindrical the other, two-axis device is spherical Multiple surface deposits of photosensitive material such as cadmium sulfide serve as redundancy ensuring high reliability

B75-10206
DIFFUSED GUIDES FOR DISTRIBUTED-FEEDBACK LASERS
C Elachi
Sep 1975 See also B75-10127
NPO 13544
Proposed waveguide is hollow cylindrical pipe Inside channel surface is infused with gas or metal molecules, forming periodic cross sections along entire length Light is scattered at periodic infusions resulting in distributed feedback Configuration is suited for capillary gas lasers

B75-10210
SECONDARY REFLECTORS FOR ECONOMICAL SUN-TRACKING ENERGY COLLECTION SYSTEM A CONCEPT
C G Miller and J B Stephens
Sep 1975 See also B75-10209
NPO 13580
Mechanism is simpler and lower in cost because it moves heat-collector pipe to stay in focus with sun instead of moving heavy reflectors

B75-10223
OPTICAL FEEDBACK TECHNIQUE EXTENDS FREQUENCY RESPONSE OF PHOTOCONDUCTORS
S J Katzberg
Oct 1975 See also NASA-TN-D-7727
LANGLEY-11768
Feedback circuit consists of high-gain light-to-voltage converter with frequency-limited nonlinear photoconductor inside feedback loop Feedback element is visible light-emitting diode with light-out versus current-in characteristic that is linear over several decades

B75-10224
GUST ALLEVIATION SYSTEM TO IMPROVE RIDE COMFORT OF LIGHT AIRPLANES
E C Stewart W H Phillips and D E Hewes
Oct 1975
LANGLEY-11771
System consists of movable auxiliary aerodynamic sensors mounted on fuselage and connected to trailing-edge flaps by rigid mechanical linkages System achieves alleviation by reducing lift-curve slope of airplane to such a small value that gust-induced angles of attack will result in small changes in lift

B75-10226
APPLICATION OF MONOCHROMATIC OCEAN WAVE FORECASTS TO PREDICTION OF WAVE-INDUCED CURRENTS
L R Poole
Oct 1975 See also NASA-TN-D-7861
LANGLEY-11809
Stoke s wave-induced currents are compared, for variety of wind conditions resulting in partially developed seas and for two water depths with currents induced by average and significant monochromatic waves related to Bretschneider spectrum

B75-10227
NEW AIRCRAFT INSTRUMENT INDICATES TURBULENCE INTENSITY
R A Champine and C W Meissner Jr
Oct 1975
LANGLEY-11833
System consists of accelerometer, indicator and necessary electronic circuits for summing and averaging accelerations Averaging-time feature enables pilot to see large values of accelerations over a short time or smaller accelerations over longer period of time

B75-10228
VISUAL ALIGNMENT AID
J M Franke
Oct 1975
LANGLEY-11842
Device consists of beam-splitter cube and two 90 deg prisms cemented together Various components can be made as two pieces eliminating seams except beam-splitter diagonal

B75-10229
STEAM AUTOMOBILE ANALYSIS
J A Peoples
Oct 1975
M-FS-23188
Report includes many charts that present graphically the effects of design parameters on performance Equations and data are given which can assist designer in selecting among such factors as working medium horsepower and engine components

B75-10232
LEVITATION OF OBJECTS USING ACOUSTIC ENERGY
R R Whymark (Intersonics Inc)
Oct 1975
M-FS-23261
Activated sound source establishes standing-wave pattern in gap between source and acoustic reflector Solid or liquid material introduced in region will move to one of the low pressure areas produced at antinodes and remain suspended as long as acoustic signal is present

B75-10235
MULTISPECTRAL DATA ANALYSIS LARSYS III
D A Landgrebe (Purdue Univ)
Oct 1975
MSC-14823
System uses pattern recognition and interactive data handling techniques applied to remotely sensed data Basic analysis concept consists of locating data points which are believed to be representative of classes of interest

B75-10236
TABLE-LOOKUP ALGORITHM FOR PATTERN RECOGNITION ELLTAB (ELLIPTICAL TABLE)
W C Jones, III and W G Eppler
Oct 1975 See also B75-10235
MSC-14866
Remotely sensed unit is assigned to category by merely looking up its channel readings in four-dimensional table Approach makes it possible to process multispectral scanner data using a minicomputer

B75-10237
AUTOMATIC SOLAR TRACKER
B L Conroy
Oct 1975
NPO-13630
Mechanism uses differential pressure of condensable fluid against fixed piston to equalize radiant energy on pair of blackbody elements

B75-10239
SOFT X-RAY LASERS USING DISTRIBUTED-FEEDBACK REFLECTION A CONCEPT
F J Grunthaner
Oct 1975
NPO-13532
Proposed arrangement consists of large evacuated chamber containing smaller Dewar chamber into which liquid neon is introduced Zeolite crystal is mounted in wall of chamber with one side in contact with neon and other exposed to evacuated chamber Electron gun is used to bombard crystal

B75-10244
CALCULATION PROCEDURE FOR TRANSIENT HEAT TRANSFER TO A COOLED PLATE IN A HEATED STREAM WHOSE TEMPERATURE VARIES ARBITRARILY WITH TIME
J Sucec
Nov 1975 See also NASA-TM-X-3238
LEWIS-12558
Heat transfer equations have been developed to calculate surface temperature and surface heat flux for cooled flat plate when temperature of fluid passing over leading edge varies arbitrarily

B75-10245
A NEW HIGH TEMPERATURE NOBLE METAL THERMOCOUPLE PAIRING
G E Glawe
Nov 1975
LEWIS-12545
Investigation has revealed reasonably oxidation resistant thermocouple pairing suitable for use in combustor gas streams at temperatures above 1873 K and at pressures above 20 atmospheres

B75-10248
VARIABLE-VOLUME ATOMIC STORAGE VESSEL FOR HYDROGEN MASERS
H F Peters
Oct 1975
GSFC-11895
Vessel located in maser cavity is made from cylindrical, convoluted flexible bellows which can be expanded or contracted along the cylinder axis vertically Inner surface area remains constant with changing volume permitting measurement of frequency deviations of excited atoms

B75-10250
OPTICAL DESIGN COMPUTER PROGRAM LENS II
Oct 1975
GSFC-11951
Differential-correction program evaluates optical lens design

B75-10256
DESIGN PROCEDURE FOR LOW-DRAG SUBSONIC AIRFOILS
J B Peterson and A B Chen (National Res Council)
Oct 1975
LANGLEY-11351
Airfoil has least amount of drag under given restrictions of boundary layer transition position lift coefficient, thickness ratio and Reynolds number based on airfoil chord It is suitable for use as wing and propeller aircraft sections operating at subsonic speeds and for hydrofoil sections and blades for fans compressors turbines and windmills

B75-10262
TUNEABLE DIODE LASER SPECTROMETER WITH INTEGRAL GRATING
P C vonThuna (Arthur D Little Inc)
Oct 1975
LANGLEY-11830
Grating is used in place of required folding mirror Arrangement eliminates separate monochromator unit and uses retroreflector for alignment

B75-10266
INCREASING TERMINAL STRIP EFFICIENCY AT CRYOGENIC TEMPERATURES
L B Holdeman
Oct 1975
M-FS-23234
Single-crystal sapphire and quartz have been used to fabricate termally shorting electrically insulating terminal boards for incorporation in metal heat-sink blocks

B75-10268
SINGLE CRYSTALS OF METAL SOLID SOLUTIONS A STUDY
J F Miller (Battelle Memorial Institute) and S H Gelles (Battelle Memorial Institute)
Oct 1975
M-FS-23268
Report describes growth of silver-alloy crystals under widely varying conditions of growth rate temperature gradient, and magnetic field Role of gravitation and convection on crystal substructure is analyzed as well as influence of magnetic fields applied during crystallization

B75-10272
ULTRAVIOLET HYDROGEN-DISCHARGE LAMP
D E Kerr (Johns Hopkins Univ)
Oct 1975 See also NASA-CR-140316
MSC-14793
Device provides stable flux output for calibration of ultraviolet spectrum

B75-10279
REFLECTED-WAVE MASER
R C Clauss
Oct 1975
NPO-13490
Reflected wave maser amplifier has significantly greater bankwidth than conventional maser amplifiers Unit needs no retuning to receive wide range of frequencies

B75-10285
APPARATUS FOR STUDY OF PLASMAS AT ELEVATED TEMPERATURES
J D Christian and W P Gilbreath
Nov 1975
ARC-10958
Microwave discharge plasmas take place within heated zone Changes in weight of specimens in plasma as well as temperature of sample and plasma can be obtained facilitating determinations of reaction rates and recombination coefficients

B75-10286
SOUND SEPARATION PROBE
M T Moore (GE) and E B Smith (GE)
Nov 1975
LEWIS-12507
Probe separates sound waves from turbulent flow pressure fluctuations in ducted airstreams by using principle that sound waves and turbulent flow pressure perturbations travel at different velocities

B75-10288
INDUCTION HEATING SIMPLIFIES METAL EVAPORATION FOR ION PLATING
T Spalvins and W A Bainard
Dec 1975
LEWIS-12595
Evaporation by induction heating produces significant degree of metal ionization enhancing degree of penetration of evaporant on substrate

B75-10305
READ-ONLY OPTICAL STORAGE MEDIUM
R A Gange (RCA)
Dec 1975
M-FS-23169
Photosensitive recording medium consists of thin-film silicone resin deposited on photoconductive substrate Medium is useful for holographic interferometry studies

B75-10307
SIGNAL MIXER FOR OPTICAL HETERODYNE RECEIVER
S Levinson (United Aircraft Corp)
Dec 1975
M-FS-23251
Incoming signal is mixed with local oscillator signal by a beam splitter inside laser cavity Laser power can be reduced by 50 to 100 times

B75-10311
THE IMPACT OF WATER ON FREE-FALLING BODIES
H A Wright (Bolt Beranek and Newman Inc), P J Remington (Bolt Beranek and Newman Inc) and R Madden (Bolt Beranek and Newman Inc)
Dec 1975
M-FS-23310
Report discussed measures to cushion impact on body falling into water Heavy loads are generated by impact and by pressures of water cavity collapsing onto the body

B75-10315
OPTICAL-NOISE SUPRESSION UNIT A CONCEPT
J L Horner (Dept of Transportation)
Dec 1975
MSC-12640
*Device is used with coherent optical-processing spatial-*filtering computer It is isexpensive to manufacture and is made from readily available standard components Its alignment is not critical

B75-10328
ELECTRO-OPTICAL DETECTOR TO IMPROVE SENSITIVITY OF A FOCAL-PLANE MASS SPECTROMETER
C E Giffin
Dec 1975
NPO-13524
Wedge-shaped microchannel electron multiplier array has been proposed to improve sensitivity of focal-plane mass spectrometer by two to four orders of magnitude

B75-10329
COLLIMATION OF ELECTRON AND X-RAY BEAMS USING ZEOLITE CRYSTALS
F J Grunthaner
Dec 1975
NPO-13557
Zeolite crystals can be used to collimate electron and X-ray beams Faujasite naturally occuring crystal in this group provides structure necessary for collimation

B75-10332
DEVELOPMENTS IN SPECTROPHOTOMETRY I AN INSTRUMENT FOR HIGH-RESOLUTION MEASUREMENTS OF OPTICAL INTENSITY AND POLARIZATION
A L Fymat
Dec 1975 See also B75-10333 B75-10335 B75-10338
NPO-13604
Device has resolution required to analyze polarization of the spectra of unknown gases, liquids or solids (or a mixture of these phases) Such resolution has not been available on conventional instruments

B75-10333
DEVELOPMENTS IN SPECTROPHOTOMETRY II A MULTIPLE-FREQUENCY PARTICLE-SIZE SPECTROMETER
A L Fymat
Dec 1975 See also B75-10332 B75-10334 B75-10338
NPO-13606
Instrument can be used to remotely determine complete spectrum of sizes of particles of unknown composition suspended in gas or liquid Device does not required direct physical sample of particles

B75-10335
DEVELOPMENTS IN SPECTROPHOTOMETRY III MULTIPLE-FIELD-OF-VIEW SPECTROMETER TO DETERMINE PARTICLE-SIZE DISTRIBUTION AND REFRACTIVE INDEX
A L Fymat
Dec 1975 See also B75-10332 B75-10333, B75-10338
NPO-13614
Instrument is based on inverse solution to equations for light scattered by a transparent medium Measurements are taken over several angles of incidence rather than over several frequencies Measurements can be used to simultaneously determine chemical and physical properties of particles in mixed gas or liquid

04 MATERIALS/CHEMISTRY

B75-10007
LIGHTWEIGHT PROTECTIVE CLOTHING FOR THE SAFE HANDLING OF HIGH-INTENSITY PRESSURIZED LAMPS
J G Ewashinka
Mar 1975 See also NASA-TM-X-3147
LEWIS-12073
Five commercially available clothing materials, selected for their high cutting resistance high strength light weight and pliability were tested by exposing them to exploding lamps located less than 60 cm (2 ft) away Face shield material tested initially was commercial high-strength polycarbonate plastic

B75-10016
THIN KAPTON POLYIMIDE FILMS VACUUM FORMED AT HIGH TEMPERATURE RETAIN THEIR SHAPE AT TEMPERATURES TO 450 K (350 F)
K F Burr (Union Carbide Corp) and G E Nies (Union Carbide Corp)
Apr 1975 See also NASA-CR-121166
LEWIS-12412
Purpose of investigation was to identify candidate materials for self-evacuating multilayer insulation systems to be used on liquid hydrogen tanks on space shuttle which would survive re-entry temperatures and mechanical and thermal cycling of one hundred flights

B75-10023
HIGH STRENGTH FORGEABLE TANTALUM BASE ALLOY
R W Buckman Jr (Westinghouse Elec Corp)
May 1975 See also B66-10558, B71-10010 NASA-CR-120818, NASA-CR-120931, NASA-CR-121096 NASA-CR-134606
LEWIS-11386
Increasing tungsten content of tantalum base alloy to 12-15% level will improve high temperature creep properties of existing tantalum base alloys while retaining their excellent fabrication and welding characteristics

B75-10027
METHOD FOR EVALUATING EFFECTIVENESS OF DRY FIRE-EXTINGUISHING CHEMICALS
R L Altman
Feb 1975
ARC-10869
Apparatus used in method is commercially available powder-deposition type oxy-acetylene torch that has been modified to provide electronically timed operations and more uniform powder flow, usual torch tips are replaced by burner head with pilot flame

B75-10038
CURABLE POLYPHOSPHAZENES
K A Reynard (Horizons Res Inc) and A H Gerber (Horizons Res , Inc)
Apr 1975
M-FS-23134
Class of polyphosphazene polymers can be cured at moderate temperatures by action of moisture In addition polymers maintain flexibility when exposed to low temperatures

B75-10042
HIGH-TEMPERATURE, REUSABLE SURFACE INSULATION SYSTEM
Innovator not given (Lockheed Missiles and Space Co) Apr 1975 See also NASA-CR-115582 NASA-CR-115583 NASA-CR-115712, NASA-CR-134326 NASA-CR-134327
MSC-14688
System is capable of withstanding extreme temperature environments ranging from -250 to 2300 F (116 K to 1543 K) System includes impervious, high-density high-thermal-emittance outer coating which has low coefficient of thermal expansion matching that of insulation

B75-10056
LOW-DENSITY POLYBENZIMIDAZOLE FOAMS FOR THERMAL INSULATION AND FIRE PROTECTION
D A Kourtides J A Parker C Deland (Whittaker Corp) and R Milligan (Whittaker Corp)
Apr 1975
ARC-10823
Fire-resistant and nonsmoking foam can be prepared in desirable density range of 24 to 50 kg/cu m by controlled thermal crosslinking of polybenzimidazole prepolymer Reproducible foams of specific density can be produced by controlling volative content and melting temperature of prepolymer

B75-10062
FIBER-MODIFIED POLYURETHANE FOAM FOR BALLISTIC PROTECTION
R H Fish, J A Parker and R W Rosser
Apr 1975
ARC-10714
Closed-cell semirigid fiber-loaded self-extinguishing polyurethane foam material fills voids around fuel cells in aircraft Material prevents leakage of fuel and spreading of fire in case of ballistic incendiary impact It also protects fuel cell in case of exterior fire

B75-10066
FABRICATION OF COMPOSITE FAN BLADES USING PMR A-TYPE POLYIMIDE RESIN AND GRAPHITE FIBER REINFORCEMENT
W E Winters (TRW Equipment) and P J Cavano (TRW Equipment)
Jul 1975 See also B71-10442, NASA-CR-134727
LEWIS-12366
PMR polyimides are safe easy to handle can be processed with relatively wide process controls and offer excellent mechanical properties with thermo-oxidative stability Procedures staging and cure schedules fully dense crackfree, dimensionally controlled complex structure high tip speed fan blades 1 27 cm (0 5 in) thick

B75-10067
SURVEY OF COATINGS FOR SOLAR COLLECTORS
G E McDonald
Jul 1975 See also NASA-TM-X-3136 NASA-TM-X-71730
LEWIS-12510
Optimum solar selective properties of black chrome require some tailoring of current and time for plating solution being used Black zinc is produced from high zinc electroplate by subsequent conversion with chromate dip Measurements have also been made of reflectance of previously known solar selective coatings of black copper and electroplated black nickel

B75-10072
FILM MOUNTING METHOD FOR THERMOMECHANICAL ANALYSIS
H D Burks
May 1975
LANGLEY-11330
Mounting clamps attach polymeric film sample to thermomechanical analyzer Using this technique temperature at which polymer passes from relatively nonflexible or glasslike state to rubbery condition where it exhibits marked increase in flow properties is readily determined

B75-10076
THERMOELECTRICALLY-COOLED QUARTZ MICROBALANCE
D McKeown (Faraday Labs Inc)
May 1975
M-FS-23101
Temperature of microbalance can be maintained at ambient temperature or held at some other desired temperature Microbalance has tow-stage thermoelectric device that controls temperature of quartz crystal Heat can be pumped to or from balance by Peltier effect

B75-10084
DIELECTRIC FILMS IMPROVE LIFE OF POLYMERIC INSULATORS

M Hudis and T Wydeven
May 1975
ARC-10892
Degradation of polymeric insulators may be significantly reduced when polymer surfaces are coated with film having gradation of dielectric constants larger where it is in contact with polymer and smaller at its exposed surface

B75-10104
METHOD OF ATTACHING INSULATION TILES
L J Leger
Jun 1975
MSC-12619
Felt pads attached underneath tiles add very little weight and retain flexibility at low temperatures Very thin layer of room-temperature vulcanizing silicone adhesive is applied to tile Then felt pad is attached to adhesive Finally, tile-felt combination is attached to metal surface by means of similar adhesive layer

B75-10113
PROCESSING FOR OBTAINING GOOD QUALITY WATER FROM SEWAGE
M F Humphrey
Jun 1975
NPO-13224
Sewage treatment method incorporates aqueous slurry of activated carbon and ash Process eliminates smell and greatly reduces amounts of solids requiring disposal Solids consist only of sterile ash

B75-10117
IMPROVED ION EXCHANGE MEMBRANE
A Rembaum S P S Yen and E Klein
Jun 1975
NPO-13309
Membrane, made from commercially-available hollow fibers is used in reverse osmosis or dialysis Fiber has skin layers which pass only small molecules Macromolecules cannot penetrate skin Fibers can also be used to remove other undesirable anions, such as phosphate sulfate, carbonate and uranium in form of uranium-sulfate complex

B75-10121
IONENE TREATMENT OF SURFACES STIMULATES CELL GROWTH
A Rembaum, M Ingram A S Schmink and D E Rounds (Pasadena Found for Med Res)
Jun 1975
NPO-13421
Number of cells adhering to walls of container can be increased by chemically pretreating walls Polyelectrolyte ionene, gives more effective pretreatment than any currently used chemicals

B75-10137
TAILOR MAKING HIGH PERFORMANCE GRAPHITE FIBER REINFORCED PMR POLYIMIDES
T T Serafini and R D Vannucci
Jul 1975 See also B71-10442 NASA-TM-X-71616 NASA-TN-D-6877
LEWIS-12416
Studies have demonstrated versatility of PMR approach for tailor making polyimide matrix resins with side range of flow characteristics By simply adjusting molar ratio of reactants in monomer mixture, resins having flow values of as much as 20% can be achieved

B75-10144
REFLECTING HEAT SHIELDS MADE OF MICROSTRUCTURED FUSED SILICA
W M Congdon (Martin Marietta Corp)
Jul 1975 See also NASA-CR-137574
ARC-10949
Heat sheidls constructed from selected monodisperse distributions of high-purity fused-silica particles are efficient reflectors of visible and near-UV radiation generated in shock-layer of space probe during atmospheric entry

B75-10157
DETERMINATION OF WATER CONTENT USING MASS SPECTROMETRY
G M Wood B T Upchurch (Old Dominion Coll) and D B Hughes (E I du Pont de Nemours and Co)
Aug 1975
LANGLEY-11774
Mass spectrometer is used to measure small quantities of water present in different materials System has been applied in measuring water and gases desorbed from microcircuitry insulation can also be used with foods polymeric materials and organic solvents

B75-10159
DYNAMIC DELTA METHOD FOR TRACE GAS ANALYSIS
G M Wood B T Upchurch (Old Dominion Coll) and D B Hughes (E I du Pont de Nemours and Co)
Aug 1975
LANGLEY-11800
Method has been developed in which measurements are made only over viscous flow range eliminating fractionation before the molecular leak and problems due to surface elution

B75-10163
FABRICATION OF POROUS PLUGS FOR CONTROL OF LIQUID HELIUM
L B Holdeman (Natl Res Council)
Aug 1975
M-FS-23218
Method of producing porous copper plugs combines hydrogen annealing and oxygen annealing Plugs have high thermal conductivity and small pore size

B75-10174
NONGASSING NICD BATTERY CELL
G L Juvinall E M Cohn A A Uchiyama and H A Frank
Aug 1975
NPO-11853
Method of constructing nickel cadmium batteries prevents excessive gas buildup and allows hermetic sealing of battery for increased service life and reduced maintenance cost

B75-10178
IMPROVED MULTIPLE-TARGET SPUTTERING EQUIPMENT
R Shima
Aug 1975
NPO-13345
Sputtering chamber has been developed with multiple target Several film layers can be deposited without repeated evacuation and refilling Contamination through exposure to air is eliminated

B75-10193
RISK MANAGEMENT TECHNIQUE FOR LIQUEFIED NATURAL GAS FACILITIES
O H Fedor and W N Parsons (Boeing Co)
Sep 1975 See also NASA-CR-139183
KSC-11005
Checklists have been compiled for planning, design construction startup and debugging and operation of liquefied natural gas facilities Lists include references to pertinent safety regulations Methods described are applicable to handling of other hazardous materials

B75-10198
HANDBOOK FOR ESTIMATING TOXIC FUEL HAZARDS
R K Dumbauld (GCA Corp) J R Jorkland (GCA Corp) H E Cramer (GCA Corp) and F A Record (GCA Corp)
Sep 1975
M-FS-21114
Computer program predicts, from readily available meteorological data concentration and dosage fields downwind from ground-level and elevated sources of toxic fuel emissions

Mathematical model is applicable to hot plume rise from industrial stacks and should also be of interest to air pollution meteorologists

B75-10200
ALUMINUM ALLOYS WITH IMPROVED STRENGTH
R Deiasi (Grumman Aerospace Co) and P Adler (Grumman Aerospace Co)
Sep 1975
M-FS-23239
Mechanical strength and stress corrosion of new BAR and 7050 alloys that include Zn instead of Cr have been studied and compared with those of 7075 aluminum alloy Added mechanical strength of new alloys is attributed to finer grain size of 5 to 8 micrometers, however susceptibility to stress corrosion attack is increased

B75-10207
LIQUID ETHYLENE-PROPYLENE COPOLYMERS
R A Rhein J D Ingham and M F Humphrey
Sep 1975
NPO-13555
Oligomers are prepared by heating solid ethylene-propylene rubber in container that retains solid and permits liquid product to flow out as it is formed Molecular weight and viscosity of liquids can be predetermined by process temperature Copolymers have low viscosity for given molecular weight

B75-10225
CHEMICAL EQUILIBRIUM OF ABLATION MATERIALS INCLUDING CONDENSED SPECIES
C W Stroud and K L Brinkley
Oct 1975
LANGLEY-11801
Equilibrium is determined by finding chemical composition with minimum free energy Method of steepest descent is applied to quadratic representation of free-energy surface Solution is initiated by selecting arbitrary set of mole fractions from which point on free-energy surface is computed

B75-10231
SOLAR-CELL INTERCONNECTS
Innovator not given (EMR Aerospace Sciences) Oct 1975
M-FS-23257
Study findings concluded that useful bonds can be formed with silver ribbon silver-plated copper ribbon and aluminum ribbon Bonds were formed at from 300 C to 400 C and with enough contact pressure to produce some deformation of ribbon

B75-10246
SUPERIOR HIGH TEMPERATURE PROPERTIES AVAILABLE IN DIRECTIONALLY SOLIDIFIED NICKEL-BASE EUTECTIC ALLOYS
F D Lemkey (United Technologies Corp)
Nov 1975 See also NASA-CR-2278
LEWIS-12562
Alloy has high temperature properties exceeding strength of all known superalloys It exhibits inherent resistance to oxidation and high temperature hot corrosion

B75-10271
INFLUENCE OF HEAT TREATMENT ON MECHANICAL PROPERTIES OF 300M STEEL
L J Youngblood and M Raghavan (National Res Council)
Oct 1975
MSC-14792
Tests show that 300M steel should be austenitized at temperatures above 1 800 deg F to yield best combintion of strength and thickness Tempering should be performed at temperatures between 400 and 600 deg F

B75-10280
IMPROVED POLYELECTROLYTE FOR ION EXCHANGE FIBERS
A Rembaum
Oct 1975
NPO-13530

Technique increases ion exchange capacity of hollow-fiber-substrate ion exchange resins Procedure increases number of quaternary sites on polyquaternary copolymer by 15 to 35 percent

B75-10290
CERAMIC THERMAL PROTECTIVE COATING WITHSTANDS HOSTILE ENVIRONMENT OF ROTATING TURBINE BLADES
C H Liebert and S Stecura
Dec 1975
LEWIS-12554
Ceramic coatings have low thermal conductivity They provide potential for increased engine performance reduced fuel consumption use of less costly materials or construction procedures and increased life and durability

B75-10293
LOW-COST THIN-LAYER SILICON SOLAR CELLS
L T Chu (Southern Methodist Univ)
Dec 1975
GSFC-12023
Two methods have been found to lower cost of polycrystalline silicon solar cells Successive layers of polycrystalline silicon are deposited over supporting substrates of relatively inexpensive metallurgical-grade polycrystalline silicon graphite or steel

B75-10308
CONTACT-EUTECTIC-LENS FABRICATION TECHNIQUE
G F Allen (California Univ) S A Yue (California Univ) and G J Yu (California Univ)
Dec 1975
M-FS-23275
Method enables use of crystal or semiconductor materials with selective spectral-response characteristics (ultraviolet visible or infrared wavelengths) in fabrication of contact lenses reading glasses and photographic processing equipment

B75-10310
FLAMMABILITY STUDY OF MATERIALS IN OXYGEN ENVIRONMENTS
G J Austin W J Bransford, and F C Key
Dec 1975
M-FS-23306
Report presents flame-propagation rates and flammability ratings of 780 specimens of commercially available plastics elastomers coatings, fabrics, and other sheet materials Test results are also given for over 1970 samples of most commonly used electrical harnesses connectors and potting compounds

B75-10314
USING PERMEABLE MEMBRANES TO PRODUCE HYDROGEN AND OXYGEN FROM WATER
P A Sanders J R Williams R W Downs and H McBryar
Dec 1975
MSC-12600
Concept may make it profitable to obtain hydrogen fuel from water Laboratory tests have demonstrated that method enables decomposition of water several orders of magnitude beyond equilibrium state where only small amounts of free hydrogen are present

B75-10320
A FLAME-RESISTANT MODIFIED POLYSTYRENE
W D Karle (Ultrasystems Inc), H R Kratze (Ultrasystems Inc) and L K Pacioren (Ultrasystems, Inc)
Dec 1975 See also NASA-CR-141932
MSC-14903
Several modified polystyrenes have been developed that are self-extinguishing in air Information is included in report that also describes molding and fabrication properties toxicology, and thermal behavior of the polymers

B75-10321
REPAIR OF DAMAGED INSULATION TILES
D Mui (Rockwell Intern Corp)
Dec 1975 See also B75-10042 B75-10104

MSC-19549
High-temperature reusable surface insulation tiles are repaired quickly and economically using prefabricated tile plugs

B75-10327
COVALENT BONDING OF POLYCATIONS TO SMALL POLYMERIC PARTICLES
A Rembaum
Dec 1975 See also B75-10336
NPO-13487
Process produces small spherical polymeric particles which have polycations bound to them In emulsion form particles present large positively charged surface which is available to absorb polyanions This properly can be used in removing heparin from blood or bile acids from the digestive tract Other anions such as DNA and RNA can also be removed from aqueous solutions

B75-10336
NEW UREA-ABSORBING POLYMERS FOR ARTIFICIAL KIDNEY MACHINES
W A Mueller G C Hsu, and H E Marsh
Dec 1975 See also B75-10327
NPO-13620
Etherified polymer is made from modified cellulose derivative which is reacted with periodate It will absorb 2 grams of urea per 100 grams of polymer Indications are that polymers could be used to help remove uremic wastes in artificial kidneys, or they could be administered orally as therapy for uremia

B75-10339
RECONSTITUTED ASBESTOS MATRIX FOR FUEL CELLS
H McBryar
Dec 1975
MSC-12568
Method is described for reprocessing commercially available asbestos matrix stock to yield greater porosity and bubble pressure (due to increased surface tension) improved homogeneity and greater uniformity

05 LIFE SCIENCES

B75-10030
ACCELERATION OF THE AGING PROCESS BY OXYGEN
J Miquel, R P Lunderen and G K Bensch (Stanford Univ)
Feb 1975
ARC-10928
Tissue changes induced by hyperoxia have been compared with those of normal aging Results of investigations using male flies prompt conclusion that normal aging, radiation syndrome and hyperoxic injury share at least one common feature--lipid peroxidation damage to all mambranes resulting in accumulation of age pigment

B75-10041
PORTABLE AUTOMATIC BLOOD ANALYZER
L P Coleman (Orion Res Inc)
Apr 1975 See also NASA-CR-134373
MSC-14627
Analyzer employs chemical-sensing electrodes for determination of blood gas, and ion concentrations It is rugged easily serviced and comparatively simple to operate System can analyze up to eight parameters and can be modified to measure other blood constituents including nonionic species such as urea glucose, and oxygen

B75-10045
IMPROVED EXTRACTION TECHNIQUE FOR BIOLOGICAL FLUIDS
V J Jahnsen
Apr 1975 See also B74-10213
NPO-13084
Liquid-liquid extraction technique speeds up separation of biological fluids into number of compounds This eliminates agitation emulsion formation centrifugation mechanical separation of phases filtration and other steps that have been used previously Extraction efficiencies are equal or better than current manual liquid-liquid extraction techniques

B75-10051
SUBMINIATURE TRANSDUCERS FOR MEASURING FORCES AND DEFORMATION OF HEART MUSCLE
C Feldstein V J Osher W G Lewis H R Silver and N E Duran
Apr 1975
NPO-13423, NPO-13519
Two subminiature transducers one measuring muscle forces and one measuring muscle displacement can be inserted into heart muscle without interfering with it Probe approximately 1 mm (0 04 in), causes no damage to heart muscle Probe can be rotated to different positions to measure muscle forces from various directions

B75-10057
HAND TREMOR AND ACTIVITY SENSOR
E Konigsberg (Konigsberg Instruments Inc)
Apr 1975
ARC-10849
System detects hand tremor and activity and transmitting signals over distance of at least 3 meters to receiver system Designed for use in studies of effect of fatigue on individual s judgement or reaction time, sensor is installed within mounting of finger-ring no external wiring or power source is needed

B75-10061
ULTRASTRUCTURAL ALTERATION OF MOUSE LUNG BY PROLONGED EXPOSURE TO MIXTURES OF HELIUM AND OXYGEN
A G Harrison and D J Solomon (Union Carbide Corp)
Apr 1975
ARC-10929
Observed changes consist mainly of blebbing of capillary endothelium and alveolar epithelium which is quite possibly indicative of cellular edema also there can be observed highly-convoluted basement membrane alveolar debris and increased numbers of platelets

B75-10077
MOBILE AUTOMATIC METABOLIC ANALYZER
G B Bynum and R J Currie
May 1975
M-FS-23143
Two flexible pipes attached to face mask are connected to spirometers in mobile cart Inhaled air volume is measured as it is drawn from one spirometer and exhaled air volume is measured as it is breathed into second spirometer Sensor is used to monitor heartbeat rate

B75-10079
OXYGEN COCOON FOR PATIENTS UNDER INTENSIVE CARE
W J Maas
May 1975
MSC-12663
Cocoon is made from Teflon film It includes full-length pressure zipper on top side and bottom part is rigid pad constructed of burn-resistant material Cocoon includes oxygen supply port with exhaust port at opposite end

B75-10083
REGULATOR FOR INTRAVENOUS FEEDING
J Dimeff
May 1975
ARC-10758
Float valve maintains constant level of solution, providing constant drop rate as long as solution can flow into patient s

vein Second float valve allows solution to enter vein but prevents entry of air

B75-10148
HIP-JOINT SIMULATOR ACCURATELY DUPLICATES HUMAN WALKING PATTERN
L B Johnson and A M Swikert
Oct 1975
LEWIS-12515
Device simulates all three motions of walking and provides realistic variable loading during each step Simulator will enable laboratory evaluation of all known types of total hip prostheses

B75-10166
HIGHLY-VISIBLE AIR-SEA RESCUE MARKER
I M Radnofsky and J Naimer
Aug 1975
MSC-12564
Sea marker is made from sheets of polyolefin material Material, attached to inflatable polyethylene tube, is coated with bright dye and is effective even in choppy water

B75-10167
MICROBIAL LOAD MONITOR
W P Jones (McDonnell Aircraft Co) C Aldridge Jr (McDonnell Aircraft Co) T J Holen (McDonnell Aircraft Co) D R Vannest (McDonnell Aircraft Co) and F S Gibson
Aug 1975 See also NASA-CR-114922
MSC-14062
Device can detect and identify a number of medically important microorganisms in an average of approximately 8 hours Monitor consists of cartridges containing special selective media and solid state electro-optical detectors

B75-10168
DETERMINATION OF BONE MINERAL MASS IN VIVO
R J Cameron (Wisconsin Univ) and F P Judy (Wisconsin Univ)
Aug 1975
MSC-14276
Radiographic equipment incorporates two radiation sources generating high-energy and low-energy beams Recording equipment measures amount of radiation that has penetrated limb Data are fed into computer that determines mass of the examined bone

B75-10170
CONTINUOUS DETECTION OF VIABLE MICROORGANISMS BY CHEMILUMINESCENCE
S Witz (AMB Co) C Linnecke (AMB Co) and W Hartung (AMB Co)
Aug 1975
MSC-10170
System monitors quality of reclaimed water continuously and automatically Incubated samples are compared with unincubated ones by measuring their respective chemiluminescence

B75-10177
IMPLANTABLE PROSTHETIC PUMP BOOSTS BLOOD PRESSURE A CONCEPT
W J Fish
Aug 1975
NPO-13626
Prosthetic pump is proposed which can improve liver blood supply by boosting blood pressure locally to the organ Device has potential use in treatment of cirrhosis of the liver

B75-10211
CATHETER-TIP FORCE TRANSDUCER FOR CARDIOVASCULAR RESEARCH
C Feldstein W G Lewis H R Silver and H V Culler
Sep 1975
NPO-13643
Sensor can be installed in left ventricle by means of procedures available for inserting catheter into an artery at body s extremities and manipulating it through vessel and past aortic valve Metallic tines of device can be used as internal electrode for electrocardiogram

B75-10253
RAPID METHOD FOR DETERMINATION OF ANTIMICROBIAL SUSCEPTIBILITIES PATTERN OF URINARY BACTERIA
L G Picciolo W L Chapelle, J M Barza (New England Medical Center) L Weinstein (New England Medical Center) A S Tuttle (New England Medical Center) and H Vellend (New England Medical Center)
Oct 1975
GSFC-12039
Method determines bacterial sensitivity to antimicrobial agents by measuring level of adenosine triphosphate remaining in the bacteria Light emitted during reaction of sample with a mixture of luciferase and luciferin is measured

B75-10269
ELECTROCARDIOGRAM SIGNAL ANALYZER
M W Portnoy (Texas Technological Univ) H Dirilten (Texas Technological Univ) and E C Burton (Southwest Res Institute)
Oct 1975
MSC-12710
Algorithm based on Taylor series expansion of Fourier transform has been developed and used for detection of cardiac arrhythmias in real-time electrocardiogram signal

B75-10303
LIGHTWEIGHT ORTHOTIC BRACES
M R Baucom E H Johns, and C R Evans
Dec 1975
LANGLEY-11894
Leg brace is constructed of fiber-reinforced polymer material Composite material is stiffer stronger and lighter than most metals

B75-10317
CONTROL OF NONENZYMATIC BROWNING IN INTERMEDIATE-MOISTURE FOODS
A K Buckle (Minnesota Univ) P T Iabuza (Minnesota Univ) and C H Warmbier (Minnesota Univ)
Dec 1975
MSC-14835
Series of compounds called humectants were found to decrease rate of browning when added to intermediate-moisture foods Twenty percent level of humectant can increase shelf life of foods by factor of 5 or 6

B75-10331
AUTOMATED MASS SPECTROMETER/ANALYSIS SYSTEM A CONCEPT
G H Boettger E C Giffin J W Dreyer and A Kuppermann
Dec 1975
NPO-13572
System performs rapid multiple analyses of entire compound classes or individual compounds on small amounts of sample and reagent Method will allow screening of large populations for metabolic disorders and establishment of effective-but-safe levels of therapeutic drugs in body fluids and tissues

06 MECHANICS

B75-10003
LOW-COST, PORTABLE FIRE HOSE TESTER
F P Jocke and E R Miller
Mar 1975
LEWIS-12365
Availability of pumping unit permits scheduling and performing required periodic hose tests in proper manner while retaining

full fire equipment readiness Use of pumping unit preserves operating life and capability of pumper truck

B75-10009
DESIGN CRITERIA MONOGRAPH ON AXIAL FLOW TURBINES
Apr 1975 See also NASA-SP-8110
LEWIS-12376
Monograph provides guidelines for predicting turbine performance sizing gas-path elements, and avoiding problems associated with mechanical design and development Material in monograph is organized along lines of design and development effort necessary to produce turbine that satisfies requirements imposed on it

B75-10010
DESIGN CRITERIA MONOGRAPH ON TURBOPUMP GEARS
Apr 1975 See also NASA-SP-8100
LEWIS-12377
Turbopump power gears were brought to acceptable levels of usefulness and reliability through refinements in interdependent areas of design, materials processing, and quality control combined with extensive development testing that explored problem areas and evaluated potential solutions

B75-10013
DESIGN CRITERIA MONOGRAPH FOR METAL TANKS AND TANK COMPONENTS
Apr 1975 See also NASA-SP-8088
LEWIS-12434
Significant elements in detail tank design are wall and end structures, weld joints at bulkhead and attachment junctures and ports and access openings Additional design considerations are influence and effect of fabrication processes on tank component design, and finally testing and inspection that are required to establish confidence in tank design

B75-10022
LONG LIFE, HIGH SPEED, THRUST-LOAD BALL BEARINGS
H Signer (Ind Tectonics, Inc), N E Bamberger (GE), and V E Zaretsky
May 1975 See also NASA-TM-X-68264 NASA-TN-D-7837
LEWIS-12269
Long-term bearing operation at three million DN can be achieved with high degree of reliability using full combination of sophisticated but currently available state-of-the-art bearing materials and designs lubricants and lubricating techniques

B75-10044
HIGH-STRENGTH RIVET DOES NOT REQUIRE AGING
F J Charles (Rockwell Intern Corp)
Apr 1975
MSC-19301
Aluminum rivet is simpler to handle It does not need aging and provides better high-temperature and shear properties than conventional rivets Tests at upset height of up to 1 7 diameters have shown rivets to have exceptionally good crack resistance

B75-10052
GAS BEARING OPERATES IN VACUUM
S G Perkins
Apr 1975
NPO-13425
Bearing has restrictions to reduce air leaks and is connected to external pumpout facility which removes exhausted air Token amount of air which is lost to vacuum is easily removed by conventional vacuum pump

B75-10055
LOW-PROFILE LANDING-GEAR ASSEMBLY
M P Harper (Boeing Co) and D F Neumann (Boeing Co)
Apr 1975
ARC-10786
Assembly of cylinders links actuators, and gears permits landing-gear unit to be retracted into shadow of main engine intake ducts of supersonic transport aircraft This is accomplished without adding to frontal area of aircraft or appreciably increasing total aircraft drag

B75-10058
MOTOR-DRIVEN RACK-POSITIONING DEVICE
E M Crissey (Martin Marietta Corp)
Apr 1975
ARC-10864
Ramped clutch plate prevents damage to gear traing and provides ample linear motion for actuation of microswitch Operation of device is not affected by number of revolutions which pinion shaft must make to produce required translations Since ramps in spur gear are conical device will actuate identically at each mechanical stop

B75-10063
DESIGN CURVES FOR OPTIMIZING STABILITY OF HERRINGBONE-GROOVED JOURNAL BEARINGS
P D Fleming and J B Hamrock
May 1973 See also NASA-TN-D-7803
LEWIS-12442
Curves span wide range of operating conditions including lubricant compressibility numbers from 0 to 80 bearing length-to-diameter ratios from 1/4 to 2 and either rotating or stationary grooved members

B75-10064
SCANNING-ELECTRON-MICROSCOPE USED IN REAL-TIME STUDY OF FRICTION AND WEAR
A W Brainard and D H Buckley
Jun 1975 See also NASA-TN-D-7700
LEWIS-12448
Small friction and wear apparatus built directly into scanning-electron-microscope provides both dynamic observation and microscopic view of wear process Friction and wear tests conducted using this system have indicated that considerable information can readily be gained

B75-10065
DIFFUSION PUMP MODIFICATION PROMOTES SELF-CLEANSING AND HIGH EFFICIENCY
A E Buggele
Jul 1975 See also NASA-TM-X-2932
LEWIS-12323
Modifications eliminate contaminant substances from pump fluid during operation which are principal causes of torpidity on evaporative surface Diffusion pump is also acting as still Resulting 100 percent vigorous working surface provides much greater molecular throughput and greatly improved efficiency

B75-10074
AIRFOIL DISPERSES SMOKESTACK EFFLUENTS UPWARD
R C Costen
May 1975
LANGLEY-11669
System consists of negative-lift airfoil mounted at or near top of smokestack without obstructing flow of effluents from stack Controls adjust negative lift and drag of airfoil for changing orientation of airfoil to maintain proper airflow over foil and for adjusting its vertical location with respect to top of smokestack

B75-10085
TORQUE CONTROL SYSTEM
D K Studenick A L Tyler and W Squillari
Jun 1975
GSFC-11077
System stabilizes aximuth of gondolas which are carried by high-altitude balloons as platforms for tracking telescopes When telescopes must be constantly aimed at specific targets control system stabilizes gondola to within 5 arc-seconds

B75-10095
SIMPLE AND EFFECTIVE METHOD TO LOCK BUOY POSITION TO OCEAN CURRENTS
W A Vachon (Charles Stark Draper Lab Inc) and J M Dahlen

(Charles Stark Draper Lab , Inc)
Jun 1975
M-FS-23140
Window-shade drogue used with drifting buoys to keep them moving with current at speed as close to that of current as possible, has drag coefficient of 1 93 compared to maximum of 1 52 for previous drogues It is remarkably simple to construct use and store

B75-10110
CRYOGENIC LINE INSULATION MADE FROM PREFABRICATED POLYURETHANE SHELLS
G Lerma (Rockwell Intern Corp)
Jun 1975
MSC-19523
Prefabricated polyurethane foam insulation is inexpensive and easily installed on cryogenic lines Insulation sections are semicircular half shells Pair of half shells is placed to surround cryogenic line Cylindrically-shaped knit sock is pulled over insulation then covered with polyurethane resin to seal system

B75-10111
POWERED FIRE NOZZLE FOR FAST PENETRATION OF STRUCTURES A CONCEPT
J F Parker (Rockwell Intern Corp) and R L Robbins (Rockwell Intern Corp)
Jun 1975
MSC-19528
Nozzle has been proposed with tip that will punch through wall very quickly It would allow extinguishing agent to be delivered inside closed structure in minimum amount of time Two versions of nozzle have been conceived one operated from hydraulic pressure source and one activated by explosive charge

B75-10131
MINIMIZATION OF JET AND CORE NOISE BY ROTATION OF FLOW
I R Schwartz
Jun 1975
ARC-10712
Jet and core noise can be reduced and flame lengths may be significantly decreased when exhaust gases are caused to rotate or swirl about longitudinal axis of exhaust Combustion in rotating flows is steady and quiet and is not accompanied by pulsations or violent fluctuations

B75-10132
NEW DESIGN OF HINGELESS HELICOPTER ROTOR IMPROVES STABILITY
R A Ormiston (USAAMRDL) W G Bousman (USAAMRDL) D H Hodges (USAAMRDL) and D A Peters (USAAMRDL)
Jun 1975
ARC-10807
Cantilever blades are attached directly to rotor hub thereby substantially reducing cost and complexity and increasing reliability of helicopter rotor Combination of structural flap-lag coupling and pitch-lag coupling provides damping of 6 to 10% depending on magnitude of coupling parameters

B75-10134
SILICON NITRIDE USED AS A ROLLING-ELEMENT BEARING MATERIAL
R J Parker and E V Zaretsky
Jul 1975 See also NASA-TN-D-7794
LEWIS-12447
Rolling-element fatigue tests were conducted with hot-pressed silicon nitride to determine its ability to withstand concentrated contacts in rolling-element bearings If hot-pressed silicon nitride is used for both balls and races attention must be paid to fitting both shaft and bearing housing

B75-10135
DESIGN CRITERIA MONOGRAPH ON TURBOPUMP SYSTEMS
Jul 1975 See also NASA-SP-8107
LEWIS-12499

Turbopump assembly for modern liquid propellant rocket engine is complete system in itself It consists of many components, some of which are themselves subsystems Monograph deals with turbopump as system covering selection of proper system type for each application and integration of components into working system

B75-10151
GRAPHITE FIBER-POLYIMIDE COMPOSITE ROD END BEARINGS FOR HIGH-TEMPERATURE HIGH-LOAD APPLICATIONS
H E Sliney and T P Jacobson
Oct 1975 See also NASA-TN-D-7880
LEWIS-12514
Self-aligning plain spherical and plain cylindrical oscillating bearings with self-lubricating elements are composed of 50 weight-percent chopped graphite fibers and 50 weight-percent polyimide

B75-10165
SOLAR RESIDENTIAL HEATING AND COOLING SYSTEM
D E Melton and W R Humphries
Aug 1975
M-FS-23260
System has been placed in operation to verify technical feasibility of using solar energy to provide residential heating and cooling Complete system analysis was performed,to provide design information

B75-10173
LIGHTWEIGHT DUCTS FABRICATED FROM REINFORCED PLASTICS AND ELASTOMERS
F S Dawn T J Ballentine, R E Bishop (Rockwell Intern Corp), and C R Roussean (Rockwell Intern Corp)
Aug 1975
MSC-19482
Method has been developed for fabrication of lightweight ducts that are three times stronger than aluminum ducts Method can be used to produce either flexible or rigid ducts

B75-10190
IMPROVED AIR ATOMIZING SPLASH-GROOVE FUEL INJECTOR REDUCES POLLUTANT EMISSIONS FROM TURBOJET ENGINES
R D Ingebo and C T Norgren
Oct 1975 See also NASA-TM-X-3255
LEWIS-12417
Device produces finely atomized sprays which improve performance characteristics and reduce pollutant emissions of advanced high-pressure and high-temperature turbojet engines

B75-10199
MARSHALL VEHICLE-ENGINEERING SIMULATION SYSTEM (MARVES)
W E Keenum (Computer Sci Corp)
Sep 1975
M-FS-21701
Computer language was developed to furnish programmers with standardized system for handling digital computer simulation of trajectories System contains collection of models which represent problem to be solved and description of one or more events peculiar to the problem

B75-10201
ULTRASONIC DETECTION OF FLAWS IN LARGE STRUCTURAL AREAS
F E Sugs (Rockwell Intern Corp) and C C Kammerer (Rockwell Intern Corp)
Sep 1975
MSC-19499
System s transducer consists of three piezoelectric elements that produce relatively-wide ultrasonic beam which covers significantly larger area and can monitor from a fixed point

B75-10203
GAS GENERATORS PRODUCE HYDROGEN-RICH FUEL

J Houseman R Kushida and J H Rupe
Sep 1975 See also B75-10208
NPO-13342, NPO-13464
Resulting fuel which is produced from gasoline and water can be burned by gasoline engines with significantly reduced pollution and improved fuel economy

B75-10208
HYDROGEN-RICH GAS GENERATORS TO REDUCE AIR POLLUTION AND IMPROVE GASOLINE ECONOMY
J Houseman and D Cerini
Sep 1975 See also B75-10203
NPO-13560, NPO-13561
Thermal generator consisting of burner reaction chamber and heat exchanger produces gas from gasoline/air mixture Units can be utilized with spark ignition engine

B75-10209
LOW-COST SOLAR TRACKING SYSTEM
C G Miller and J B Stephens
Sep 1975 See also B75-10210
NPO-13579
Smaller heat-collector is moved to stay in focus with the sun, instead of moving reflector Tracking can be controlled by storing data of predicted solar positions or by applying conventional sun-sensing devices to follow solar movement

B75-10214
APPARATUS FOR MEASURING STATIC COEFFICIENT OF FRICTION UNDER COMPRESSIVE LOADS
C L Haehner and J L Tarpley
Oct 1975
GSFC-11893
Device includes load cell attached to rigid structure Crosshead directly beneath cell is connected to constant-speed electrical motor Crossarm supported by crosshead serves as platform on which bodies are tested Test data are recorded on X-Y recorder which is connected to load cell and motor

B75-10234
MULTIPLE-COMPARTMENT VENTING PROGRAM
L P LeBlanc (Rockwell Intern Corp)
Oct 1975
MSC-19428
Computer program solves time-dependent energy and state equations for gas reservoirs using the solutions of conductor conservation equations as mass and energy rate changes to reservoirs

B75-10251
SINGLE RADIAL MAGNETIC BEARING A CONCEPT
P A Studer
Oct 1975
GSFC-11978
Proposed bearing has increased stability Magnetic structure keeps inner and outer bearing halves aligned Electronic feedback circuit keeps bearing radially centered

B75-10258
REDUCING FLOW REQUIREMENTS OF FLUID ACTUATORS
M J Long and S C Irick
Oct 1975
LANGLEY-11540
Method reduces volumetric rate of hydraulic fluid or air to drive actuator at high speed Method can be used with any positive displacement actuator with multiple chambers

B75-10259
TWO-DIRECTIONAL ACTIVE DAMPER
C S Chang (New Technology, Inc)
Oct 1975 See also NASA-CR-132550
LANGLEY-11815
Damper system to be used in studies of payload isolation technology is suitable as a laboratory apparatus It provides easily adjustable damping and acts as multichannel shaker system

B75-10264
BRAKING ACTION OF WHEELED VEHICLES IS CONTROLLED AUTOMATICALLY DURING MINIMUM-DISTANCE STOPS
D E Barthlome
Oct 1975 See also NASA-TM-X-72665
LANGLEY-11897
System prevents tire skid during panic stops Two mutually dependent accelerometers directly control solenoid valve which regulates braking pressure

B75-10270
SUSPENSION SYSTEM FOR LIGHTWEIGHT CRYOGENIC TANK
J Lester (Beech Aircraft Corp) and D A Wendling (Beech Aircraft Corp)
Oct 1975
MSC-14080
System is composed of three interwoven fiberglass bands that encircle tank surface in basketweave configuration Fiberglass support is lightweight with low thermal conductivity

B75-10282
REMOVAL OF ICE AND MARINE GROWTH FROM SHIP SURFACES A CONCEPT
A J Bauman
Oct 1975
NPO-13658
Proposed surface is structured from sections of low-melting-point alloy Sections are separated by network of passages for compressed air Ice or barnacles are removed by passing electrical current through alloy and bursts of compressed air through passages

B75-10284
IMPROVED AIRCRAFT REACTION NOZZLES
J R Rogers
Nov 1975
ARC-10906
Reaction control nozzle requires low operating forces and has linear and predictable jet thrust vs nozzle exit area and position Nozzle thrust vector is controllable by single rotary motion

B75-10287
TURBINE DESIGN REVIEW TEXT
Innovator not given Dec 1975 See also NASA SP-290 Vols I II III
LEWIS-12560
Three-volume publication covers theoretical, design and performance aspects of turbines Volumes cover thermodynamic and fluid-dynamic concepts velocity diagram design turbine blade aerodynamic design turbine energy losses supersonic turbines radial-inflow turbines, turbine cooling and aerodynamic performance testing

B75-10298
STATIC AEROELASTIC PROGRAM
J Roskam (Kansas Univ)
Dec 1975
LANGLEY-11602
Set of programs computes geometric mass aerodynamic and structural effects on fighter and transport type aircraft at subsonic and supersonic speeds

B75-10300
AMPLIFYING RIBBON EXTENSOMETER
V L Alley Jr and A D McHatton
Dec 1975
LANGLEY-11825
Device provides accurate measurement of strain on flexible membranes and fabrics It is compact and lightweight, has strain-amplification capability up to five, and has an accuracy better than one percent

B75-10313
COMPOUND HEAT PIPE OPERATES OVER BROAD TEMPERATURE RANGE
H B McKee (McDouglas Douglas Corp)
Dec 1975
M-FS-23329
Device is combination of two or more heat pipes running adjacent to each other Each pipe carries different working fluid in high-temperature pipe melts and begins to conduct heat

07 MACHINERY, EQUIPMENT AND TOOLS

B75-10011
DESIGN CRITERIA MONOGRAPH ON TRANSMISSION SEALS
S T Hayden (Sikorsky Aircraft) and C H Keller Jr (Sikorsky Aircraft)
Apr 1975 See also NASA-CR-120997
LEWIS-12403
Guide is based on experience obtained in wide variety of applications using lip circumferential and face seals Particular attention is given to capabilities and lubrication of various seal types Special limitations as a result of storage requirements quality control installation operation and removal are discussed

B75-10054
LOW-COST TOOL SET FOR REMOVING BRAZED FITTINGS
A Giandomenico
Apr 1975
NPO-13495
Set includes crimping tool and pull tube Crimping tool is modified vise-grip pliers which has special jaws designed to crimp fittings Pull tube has single thread on each end Tube can be used once on each end before discarding

B75-10078
FERROLUBRICANTS
A F Whitaker
May 1975
M-FS-23151
Ferrolubricants have magnetized angstrom-size iron particles which stick oil to moving surfaces at all times significantly reducing frictional wear Magnetic fluids can be produced in families of various fluids having widely-varying chemical and physical properties

B75-10241
SAFETY MANAGEMENT OF A COMPLEX R&D GROUND OPERATING SYSTEM
J Connors and R A Mauer
Oct 1975 See also NASA-TM-X-71697
LEWIS-12559
Report discusses safety program implementation for large R&D operating system Analytical techniques are defined and suggested as tools for identifying potential hazards and determining means to effectively control or eliminate hazards

B75-10249
POSITION SENSING MATERIALS WOUND ON A REEL
R M Muller
Oct 1975
GSFC-11902
Electro-optical counter measures number of layers of web wound on reel and indicates layer number and web position digitally without physically contacting reel or requiring numerical interpolation from mechanical readout device

B75-10276
RELIABILITY COMPUTATION FROM RELIABILITY BLOCK DIAGRAMS
P O Chelson and E Y Eckstein (VIP Engineering)
Oct 1975
NPO-13304
Computer program computes system reliability for very general class of reliability block diagrams Four factors are considered in calculating probability of system success active block redundancy standby block redundancy partial redundancy and presence of equivalent blocks in the diagram

B75-10322
FAST SEMIAUTOMATIC DIMENSIONAL TEST SET AND DATA LOGGER
G E Meunier (Rockwell Intern Corp)
Dec 1975
MSC-19554
System measures and records tolerance deviations of thermal-protection ceramic tiles in less than 30 seconds Accuracy of the machine is within 0 001 inch

B75-10334
SIMPLIFIED HEAT ENGINE
W H Higa
Dec 1975
NPO-13613
In Sterling-cycle heat engine pneumatic system is used to drive displacer/regenerator eliminating mechanical linkages and valves

08 FABRICATION TECHNOLOGY

B75-10006
INHIBITING KIRKENDALL VOID GROWTH IN WELDED BIMETALLIC STRUCTURES
F G Arcella (Westinghouse Astronucl Lab) G A Lessman (Westinghouse Astronucl Lab) and R A Lindberg
Mar 1975 See also NASA-CR-134490, NASA-CR-134526
LEWIS-11573
Technique employs pre-aged void-free junction composed of parent materials Basic process for Kirkendall void inhibition can be applied to thermionic power systems high temperature seals high temperature junctions between any two metals of differing melting points where Kirkendall void formation would be detrimental

B75-10089
SPUTTERED GOLD MASK FOR DEEP CHEMICAL ETCHING OF SILICON
B P Pisciotta, C Gross and R S Olive
Jun 1975
LANGLEY-11661
Sputtered mask resists chemical attack from acid and has adherence to withstand prolonged submergence in etch solution without lifting from silicon surface Even under prolonged etch conditions with significant undercutting gold mask maintained excellent adhesion to silicon surface and imperviousness to acid

B75-10145
MOUNTING TECHNIQUE FOR PRESSURE TRANSDUCERS MINIMIZES MEASUREMENT INTERFERENCES
R N Lanham (Northrop Corp), C E Taylor (Northrop Corp) C E Balmer (Northrop Corp), and C Hwang (Northrop Corp)
Jul 1975
ARC-10933
Miniaturized transducers are fabricated from commercially available four-arm semiconductor gages transducers are connected as bridge circuit and mounted on internal face of small diaphragm Jacket made of conductive plastic may be needed to avoid buildup or static charges

B75-10164
FABRICATION AND REPAIR OF GRAPHITE/EPOXY LAMINATES
J R Lager (Martin Marietta Corp) and B Burke (Martin Marietta Corp)
Aug 1975
M-FS-23228, M-FS-23229
New forming and patching methods have been developed for high-quality graphite/epoxy laminates Laminates range in thickness from 0 012 to 0 018 in (0 31 to 0 46 mm)

B75-10179
THREE-DIMENSIONAL MODELS AID VISUALIZATION OF ENGINEERING DRAWINGS
A R McDougal and C E Aardahl
Aug 1975
NPO-13394
Inexpensive cut-and-paste method allows construction of complex three-dimensional models in less than an hour Models are constructed from film or paper copies made on office copier

B75-10212
IMPROVED CHEMICAL VAPOR-DEPOSITION REACTOR
S S Chern and J Maserjian
Sep 1975
NPO-13650
Formation of large particles on substrate is eliminated by actively exhausting reacted gases Effluent gas backflow is prevented by pumping in curtain of nitrogen above fresh reactive gases from several directions

B75-10216
MACHINE FOR FABRICATION OF BATTERY-ELECTRODE PLAQUES
W C Harsch (Eagle-Picher Industries Inc)
Oct 1975
GSFC-12004
Functional parts of device are built to close tolerances of 0 001 inch (0 025 mm) and can be adjusted within range of plus or minus 0 005 inch (plus or minus 0 0127 mm)

B75-10238
DIP MOLDING TO FORM INTRICATELY-SHAPED MEDICAL ELASTOMER DEVICES
H F Broyles
Oct 1975
NPO-13535
Preshaped mandrel mounted on rotating mechanism is partially immersed in tank filled with liquid elastomer While mandrel rotates elastomer film forms on mandrel surface due to surface tension and capillary behavior of liquid Devices with well-defined flanges can be made using process

B75-10257
PROCESS FOR PREPARING POLYIMIDE ADHESIVES
D J Progar, V L Bell, and T L St Clair (Virginia Polytechnic Institute and State Univ)
Oct 1975
LANGLEY-11397
High bonding strengths are obtained for metals and fiber-reinforced organic resin composites with no significant loss in thermo-oxidative stability of the adhesive resin

B75-10261
DIAMINE CURING AGENTS FOR POLYURETHANES
V L Bell and T L St Clair (Virginia Polytechnic Institute and State Univ)
Oct 1975
LANGLEY-11829
Three aromatic diamines have properties that make them promising candidates as curing agents for converting isocyanates to polyurethanes with higher adhesive strengths higher softening temperatures better toughness and improved abrasion resistance

B75-10267
INDUSTRIAL LASER WELDING AN EVALUATION
R Hella (Avco Everett Res Lab), E Locke (Avco Everett Res Lab) and S Ream (Avco Everett Res Lab)
Oct 1975
M-FS-23237
Report describes 10-kW laser welding system designed to weld large structures made from 1/4-inch and 1/2-inch aluminum (2219) and D6AC steel

B75-10299
FORMATION OF INTERNALLY-CONFINED SEMICONDUCTOR LASERS
V M Cannuli (RCA)
Dec 1975
LANGLEY-11770
In technique for fabrication of strip lasers current constriction is accomplished by diffusing blocking regions into n-type substrate prior to growth Current flow is controlled by blocking layers which results in reduction of threshold current and better heat dissipation

B75-10301
LOW-COST HOT-AIR SOLAR COLLECTOR
E P Herndon and K G Anthony
Dec 1975
M-FS-23272
System has only three components per cell Cell parts are fabricated from readily available materials and following a construction procedure which requires use of only simple handtools can be mounted in place by one person

B75-10309
FOAM-MACHINING TOOL WITH EDDY-CURRENT TRANSDUCER
W P Copper (Martin Marietta Corp)
Dec 1975
M-FS-23298
Three-cutter machining system for foam-covered tanks incorporates eddy-current sensor Sensor feeds signal to numerical controller which programs rotational and vertical axes of sensor travel, enabling cutterhead to profile around tank protrusions

B75-10319
BIAXIAL COMPRESSION TEST TECHNIQUE
E T Hansard (Gen Dyn Corp)
Dec 1975
MSC-14883
Fixture and technique have been developed for predicting behavior of stiffened skin panels under biaxial compressive loading Tester can load test panel independently in longitudinal and transverse directions Data can also be obtained in combined mode

09 COMPUTER PROGRAMS

B75-10002
COMPUTER PROGRAM FOR THERMODYNAMIC ANALYSIS OF OPEN-CYCLE MULTISHAFT POWER SYSTEM
A J Glassman
Mar 1975
LEWIS-12324
Program computes specific power output specific fuel consumption and cycle efficiency for power systems having any number os shafts up to maximum of five Maximum temperatures should be no higher than about 2000 K (3140 F) because molecular dissociation is not included in stoichiometry

B75-10005
COMPUTER PROGRAM TO GENERATE ENGINE INLET

FLOW CONTOUR MAPS AND DISTORTION PARAMETERS
J H Dicus
Mar 1975
LEWIS-12247
Program generates inlet contour maps with choice of mapping parameters Contour maps are represented by symbols on picture produced by line printer Program also generates variety of simple circumferential and radial distortion parameters that enable calculation of almost any specific distortion parameter

B75-10015
REGENERATIVE COOLING DESIGN AND ANALYSIS COMPUTER PROGRAM
J G Gerstley (Rockwell Intern Corp) and R D Tobin (Rockwell Intern Corp)
Apr 1975
LEWIS-12110
Program evaluates influences of heat transfer, stress and cycle life Coolant passages may be tubes or channels with or without gas-side wall coating Program options include two-dimensional thermal analysis model of tube or channel cross-section using relaxation technique with variable number of nodes

B75-10018
COMPUTER PROGRAMS FOR CALCULATING POTENTIAL FLOW IN PROPULSION SYSTEM INLETS
N O Stockman and S L Button
Apr 1975
LEWIS-12152
Calculational procedure evolved in process of designing inlets Douglas axisymmetric potential flow program called EOD calculates incompressible potential flow about arbitrary bodies Program SCIRCL generates input for EOD from inlet components Program COMBYN takes basic solutions output by EOD and combines them into solutions of interest and applied compressibility correction

B75-10019
COMPUTER PROGRAMS FOR HANDLING PROPULSION SYSTEM NOISE DATA
F J Montegani
Apr 1975
LEWIS-12285
Computer programs have been developed for efficient handling of one-third-octave band noise data originating from outdoor full-scale fan noise facility and engine acoustic facility at Lewis Research Center

B75-10020
COMPRESSIBLE FLOW COMPUTER PROGRAM FOR GAS FILM SEALS
J Zuk and P J Smith
Apr 1975
LEWIS-12286
Computer program, AREAX calculates properties of compressible fluid flow with friction and area change Program carries out quasi-one-dimensional flow analysis which is valid for laminar and turbulent flows under both subsonic and choked flow conditions Program was written to be applied to gas film seals

B75-10021
COMPUTER PROGRAM FOR DEFINITION OF TRANSONIC AXIAL-FLOW COMPRESSOR BLADE ROWS
J E Crouse
Apr 1975
LEWIS-12325
Particular type of blade element used has two segments which have centerlines and surfaces described by constant change of angle with path distance on cone Program is result of rework of earlier program to give major gains in accuracy reliability and speed It also covers more steps of overall compressor design procedure

B75-10029
ANALYTIC MODEL FOR ASSESSING THERMAL PERFORMANCE OF SCUBA DIVERS
L D Montgomery
Feb 1975
ARC-10927
To assist design of adequate protective clothing, mathematical model of man s thermoregulatory system has been developed so that body thermal responses under immersed conditions can be predicted accurately Experimental data encompassed wide range of water temperatures, protective clothing, breathing-gas mixtures, and durations of immersion

B75-10032
VIEW FACTOR COMPUTER PROGRAM (VIEW)
C E Jackson, Jr and E F Puccinelli
Apr 1975
GSFC-11910
Existing view factor program RAVFAC was modified to accept NASTRAN and/or RAVFAC surface descriptions Output formatting was altered to produce view factor matrices which could be directly input to NASTRAN

B75-10033
EXTENSIVE SET OF MACROS FOR STRUCTURED PROGRAMING IN OS/360 ASSEMBLY LANGUAGE (STRCMACS)
C W Barth
Apr 1975
GSFC-11938
Development of consistent assembly language structured programming techniques has been enhanced by use of assembly macros developed for structured programing Set of macros was written for IBM OS/360 Assembly language

B75-10053
JPL TRANSIENT RADIATION ANALYSIS BY COMPUTER PROGRAM (JTRAC)
S Weinstein
Apr 1975
NPO-13470
Digital computer program JTRAC simulates time response of electronic circuit to arbitrary forcing functions which may include electrical and/or radiation stimuli Program is designed to solve linear and nonlinear simultaneous equations which characterize mathematical models used to predict circuit response for electrical and/or radiation input

B75-10060
PREDICTION OF AIRCRAFT NOISE SOURCE AND ESTIMATION OF NOISE-LEVEL CONTOURS
N A Peart (Boeing Co)
Apr 1975
ARC-10880
Two computer programs aid aircraft designers who need to identify noise characteristics of various aircraft and engine configurations calculated noise levels can then be compared with community goals for noise limitation

B75-10093
FOUR-DIMENSIONAL WORLDWIDE ATMOSPHERIC MODELS ANYPT AND ANYRG
D Johnson C Brown D Spiegler (Environ Res and Technol) and M Fowler (Environ Res and Technol)
Jun 1975
M-FS-22838
Computer programs read magnetic-tape data bases and computer meteorological profiles for any position time and height (from zero to 25 km) System assists in analyses of distortion of information obtained from aircraft-mounted or spacecraft-mounted electromagnetic sensors

B75-10094
COMPUTER PROGRAM FOR NUMERICAL ANALYSIS OF STIFFENED SHELLS OF REVOLUTION
J Key and V Valbonas (Grumman Aerospace Co)
Jun 1975
M-FS-23027
Programs using Love-Reissner first-order shell theory can analyze orthotropic thin shells of revolution subjected to

unsymmetric distributed loading or concentrated line loads and thermal strains They can perform stability or vibration analysis of thin shells of revolution subjected to axisymmetric distributed loading or concentrated line loads and thermal strains

B75-10100
PROGRAM FOR ANALYSIS OF NONLINEAR EQUILIBRIUM AND STABILITY (PANES)
R G Vos (Boeing Co)
Jun 1975
M-FS-23172
PANES utilizes improved techniques for analysis of structures with material and geometric nonlinearities including limit point and bifurcations behavior which occurs in buckling and collapse problems Incremental loading Newton-Raphson iteration, and higher order methods are used in program

B75-10106
COMPUTER PROGRAM FOR ANALYSIS OF VECTORCARDIOGRAMS (VECTAN II)
G W Hoffler D P Golden (Technol Inc) and R A Wolthuis (Technol Inc)
Jun 1975
MSC-14386
VECTAN II accepts as input digitized three-lead VCG data sampled at 320 samples/second/lead, analyzing one VCG complex in each 5-second interval for experiments of up to 25 minutes duration Program calibrates these data locates major waveforms performs waveform analyses and produces statistical summary of analyzed data

B75-10130
COMPUTER MODELING OF ARC DRIVERS
R E Dannenberg and P I Slapnicar (Stanford Univ)
Jun 1975
ARC-10955
Model is generated from description of element connections involved in complete arc network list of corresponding circuit element values description of circuit current excitation and list of out-puts desired Waveform of current is determined by structure of capacitor storage system, driver geometry and preset driver conditions

B75-10133
MULTIPLEXING TECHNIQUE FOR COMPUTER COMMUNICATIONS VIA SATELLITE CHANNELS
R Binder (Hawaii Univ)
Jun 1975
ARC-10879
Multiplexing scheme combines technique of dynamic allocation with conventional time-division multiplexing Scheme is designed to expedite short-duration interactive or priority traffic and to delay large data transfers as result, each node has effective capacity of almost total channel capacity when other nodes have light traffic loads

B75-10140
METHOD OF IDENTIFYING CLUSTERS REPRESENTING STATISTICAL DEPENDENCIES IN MULTIVARIATE DATA
W J Borucki, D H Card and G C Lyle
Jul 1975
ARC-10744
Approach is first to cluster and then to compute spatial boundaries for resulting clusters Next step is to compute from set of Monte Carlo samples obtained from scrambled data estimates of probabilities of obtaining at least as many points within boundaries as were actually observed in original data

B75-10143
ALGORITHM FOR NONLINEAR STATIONARY NAVIER-STOKES PROBLEM
R E Gabrielsen and S Karel
Jul 1975
ARC-10960
Results of applications of algorithm suggest that it has potential application to variety of related fluid flow problems, such as presently intractable separation problem of aerodynamics Details of mathematical development as well as computation of explicit error estimates are available

B75-10146
SIMPLE COMPUTER METHOD PROVIDES CONTOURS FOR RADIOLOGICAL IMAGES
J D Newell (California Univ San Diego) R A Keller (California Univ, San Diego), and N A Baily (California Univ San Diego)
Jul 1975
ARC-10940
Computer is provided with information concerning boundaries in total image Gradient of each point in digitized image is calculated with aid of threshold technique then there is invoked set of algorithms designed to reduce number of gradient elements and to retain only major ones for definition of contour

B75-10155
REMOTE FILE INQUIRY (RFI) SYSTEM
Innovator not given (IBM) Aug 1975
KSC-10837
System interrogates and maintains user-definable data files from remote terminals using English-like free-form query language easily learned by persons not proficient in computer programming System operates in asynchronous mode, allowing any number of inquiries within limitation of available core to be active concurrently

B75-10172
TRIMETRIC SCALE FOR DRAFTING MACHINES
J C Ryan (Rockwell Intern Corp) and R Chu (Rockwell Intern Corp)
Aug 1975
MSC-15829, JSC-19391
Device allows three basic projections to be drawn from a single scale zero setting Ellipse proportions are included for convenience Axonometric projections can also be determined

B75-10186
RETSCP-A COMPUTER PROGRAM FOR ANALYSIS OF ROCKET ENGINE THERMAL STRAINS WITH CYCLIC PLASTICITY
R W Miller (Atkins and Merrill Inc)
Oct 1975
LEWIS-12388
Finite element program employs three-dimensional isoparametric element for analysis of rocket engine thermal strains with cyclic plasticity

B75-10187
COMPUTER PROGRAM FOR CALCULATING WATER AND STEAM PROPERTIES
R C Hendricks I C Peller and A K Baron
Nov 1975
LEWIS-12519
Computer subprogram calculates thermodynamic and transport properties of water and steam Program accepts any two of pressure temperature and density as input conditions Pressure and either entropy or enthalpy are also allowable input variables Output includes any combination of temperature density pressure entropy enthalpy specific heats sonic velocity viscosity thermal conductivity surface tension and the Laplace constant

B75-10188
COMPUTER PROGRAM FOR CALCULATING THERMODYNAMIC AND TRANSPORT PROPERTIES OF FLUIDS
R C Hendricks A K Braon and I C Peller
Oct 1975
LEWIS-12520
Computer code has been developed to provide thermodynamic and transport properties of liquid argon carbon dioxide carbon monoxide fluorine helium methane, neon nitrogen, oxygen and parahydrogen Equation of state and transport coefficients are updated and other fluids added as new material becomes available

B75-10194
EXECUTIVE COMPUTER PROGRAM FOR LINKING INDEPENDENT COMPUTER PROGRAMS ODINEX
C R Latt (Aerophysics Res Corp), D S Hague (Aerophysics Res Corp) and D A Watson (Aerophysics Res Corp)
Sep 1975
LANGLEY-11324
Program controls sequence of execution of network of program elements and maintains data base of common information which forms communication link among them Approach is applicable to any multiple-program task

B75-10242
COMPUTER PROGRAM FOR THE ATTENUATION OF HIGH BYPASS TURBOFAN ENGINE NOISE
H F Veldman (Boeing Co)
Oct 1975
LEWIS-12179
Two computer programs determine effect of boundary layer on attenuation of sound in a circular duct lined with material used in noise suppresion in fan inlet and exhaust ducts of turbofan engines

B75-10243
IMPROVED AXISYMMETRIC POTENTIAL FLOW COMPUTER PROGRAM
J L Hess (McDonnell Douglas Corp)
Oct 1975
LEWIS-12387
Basic method of calculating potential flow has been refined to increase accuracy of results and to reduce computational time Program calculates low speed flows about or within bodies of axially symmetric shape Solid body, inlet, and purely internal flow problems can be solved

B75-10252
COMPUTER INTEGRATION OF HYDRODYNAMICS EQUATIONS FOR HEAT PIPES
D K Edwards (TRW Systems Group), J E Eninger (TRW Systems Group) and B D Marcus (TRW Systems Group)
Oct 1975
GSFC-12009
Program has five operational modes that provide user flexibility in answering crucial heat-pipe design questions User specifies heat input and rejection distribution

B75-10263
IMPROVED GENERAL-PURPOSE NAMELIST PROCESSOR
E W Wojtaszek (Martin Marietta Corp)
Oct 1975
LANGLEY-11834
Processor is written in FORTRAN with minimal machine-dependent coding allowing easy conversion to various digital computers It eliminates 19 continuation-card limit of current namelist processors and permits unlimited number of variables to be read in a single namelist declaration

B75-10273
A STUDY OF ACCURACY IN SELECTED NUMERICAL-ANALYSIS INTEGRATION TECHNIQUES
W M Lear (TRW, Inc)
Oct 1975 See also NASA-CR-141784
MSC-14802
Report discusses several methods of performing numerical integration with computer When data can be expressed as state vector that is dependent variable in a differential equation self-starting integrators can be used to predict future data

B75-10278
GENERATION OF KEY IN CRYPTOGRAPHIC SYSTEM FOR SECURE COMMUNICATIONS
M Perlman
Oct 1975
NPO-13451
Report discusses key generation for transmission of confidential data A number of feedback functions are discussed for generation of long key sequences

B75-10292
COMPUTER SYSTEM FOR LIBRARY ACCESS
A DelFrate
Dec 1975
GSFC-11952
Program performs traditional file creation maintenance, and output MARC II compatible data records can be added changed or deleted in bibliographic file

B75-10294
GENERAL OPTICS EVALUATION PROGRAM (GENOPTICS)
B J Howell
Dec 1975
GSFC-12038
Program prints and plots results of computations such as ray traces radial energy distributions, and designs of two-mirror telescopes

B75-10295
SMALL INTERACTIVE IMAGE PROCESSING SYSTEM (SMIPS)
J G Moik (Computer Sci Corp)
Dec 1975
GSFC-12079
System facilitates acquisition digital processing and recording of image data as well as pattern recognition in an iterative mode

B75-10302
THE LANGLEY RESEARCH CENTER NASA/PERT TIME III
Innovator not given (Project Schedules and Analysis Group) Dec 1975
LANGLEY-11887
Program provides practical system for total project management in areas of planning scheduling resource control, and reporting It allows use of existing management and administrative tools and processes and is applicable to many types of projects

B75-10318
POWER SPECTRUM ANALYSIS OF STAGGERED QUADRIPHASE-SHIFT-KEYED SIGNALS
F L McWhorter (Magnavox Co) and D E Cartier (Magnavox Co)
Dec 1975
MSC-14865
Mathematical analysis of power spectrum of outputs from high-reliability communication system is used to determine system bandwidth Analysis provides mathematical relationships of signal power spectrum at output of hard limiter for any type of baseband pulse input subjected only to output parameter constraints

B75-10338
MINIMIZATION SEARCH METHOD FOR DATA INVERSION
A L Fymat
Dec 1975 See also B75-10335
NPO-99999
Technique has been developed for determining values of selected subsets of independent variables in mathematical formulations Required computation time increases with first power of the number of variables This is in contrast with classical minimization methods for which computational time increases with third power of the number of variables

SUBJECT INDEX

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 B75-10225 is located under and to the right of the title and is followed by a two-digit number, e g 04 which designates the subject category in which the entire entry can be found

A

C

E

F

G

H

J

K

L

N

O

P

S

T

U

V

W

X

Y

Z

PERSONAL AUTHOR INDEX

Personal Author Index

This index is arranged alphabetically by author The Tech Brief title is listed followed by the originating Center number e g NPO-13394 The Tech Brief number e g B75-10179 is followed by a two-digit number e g 08 which designates the subject category

A

B

C

D

E

F

G

H

I

J

M

N

S

T

U

V

W

Y

Z

ORIGINATING CENTER/TECH BRIEF NUMBER INDEX

Originating Center/Tech Brief Number Index

The left hand column identifies the originating Center number to the right of each originating Center number is the Tech Brief number e g B75-10081 followed by a two-digit number e g 03 which identifies the subject category containing the entire citation

TECH BRIEF/ORIGINATING CENTER NUMBER INDEX

Tech Brief/Originating Center Number Index

The left hand column identifies the Tech Brief number e g B75-10001 followed by a two-digit number e g 03 which identifies the subject category containing the entire citation Following the subject category number is the originating Center number

B75-10001 03	LEWIS-12083
B75-10002 09	LEWIS-12324
B75-10003 06	LEWIS-12365
B75-10004 03	LEWIS-12402
B75-10005 09	LEWIS-12247
B75-10006 08	LEWIS-11573
B75-10007 04	LEWIS-12073
B75-10008 03	LEWIS-12360
B75-10009 06	LEWIS-12376
B75-10010 06	LEWIS-12377
B75-10011 07	LEWIS-12403
B75-10012 02	LEWIS-12422
B75-10013 06	LEWIS-12434
B75-10014 01	LEWIS-12437
B75-10015 09	LEWIS-12110
B75-10016 04	LEWIS-12412
B75-10017 03	LEWIS-12433
B75-10018 09	LEWIS-12152
B75-10019 09	LEWIS-12285
B75-10020 09	LEWIS-12286
B75-10021 09	LEWIS-12325
B75-10022 06	LEWIS-12269
B75-10023 04	LEWIS-11386
B75-10024 03	LEWIS-12361
B75-10025 01	ARC-10711
B75-10026 03	ARC-10867
B75-10027 04	ARC-10869
B75-10028 03	ARC-10925
B75-10029 09	ARC-10927
B75-10030 05	ARC-10928
B75-10031 01	GSFC-11617
B75-10032 09	GSFC-11910
B75-10033 09	GSFC-11938
B75-10034 03	LANGLEY-11711
B75-10035 03	LANGLEY-11735
B75-10036 01	M-FS-23083
B75-10037 02	M-FS-23100
B75-10038 04	M-FS-23134
B75-10039 01	M-FS-23147
B75-10040 03	MSC-14407
B75-10041 05	MSC-14627
B75-10042 04	MSC-14688
B75-10043 03	MSC-14724
B75-10044 06	MSC-19301
B75-10045 05	NPO-13084
B75-10046 02	NPO-13140
B75-10047 03	NPO-13175
B75-10048 03	NPO-13215
B75-10049 01	NPO-13253
B75-10050 03	NPO-13263
B75-10051 05	NPO-13423
	NPO-13519
B75-10052 06	NPO-13425
B75-10053 09	NPO-13470
B75-10054 07	NPO-13495
B75-10055 06	ARC-10786
B75-10056 04	ARC-10823
B75-10057 05	ARC-10849
B75-10058 06	ARC-10864
B75-10059 02	ARC-10870
B75-10060 09	ARC-10880
B75-10061 05	ARC-10929
B75-10062 04	ARC-10714
B75-10063 06	LEWIS-12442
B75-10064 06	LEWIS-12448
B75-10065 06	LEWIS-12323
B75-10066 04	LEWIS-12366
B75-10067 04	LEWIS-12510
B75-10068 02	LEWIS-12109
B75-10069 01	FRC-10053
B75-10070 01	GSFC-11747
B75-10071 01	GSFC-11913
B75-10072 04	LANGLEY-11330
B75-10073 02	LANGLEY-11578
B75-10074 06	LANGLEY-11669
B75-10075 03	LANGLEY-11799
B75-10076 04	M-FS-23101
B75-10077 05	M-FS-23143
B75-10078 07	M-FS-23151
B75-10079 05	MSC-12663
B75-10080 03	MSC-14472
B75-10081 03	ARC-10463
B75-10082 03	ARC-10631
B75-10083 05	ARC-10758
B75-10084 04	ARC-10892
B75-10085 06	GSFC-11077
B75-10086 02	GSFC-11898
B75-10087 03	HQ-10844
B75-10088 01	HQ-10851
B75-10089 08	LANGLEY-11661
B75-10090 03	LANGLEY-11750
B75-10091 01	LANGLEY-11781
B75-10092 02	LANGLEY-11814
B75-10093 09	M-FS-22838
B75-10094 09	M-FS-23027
B75-10095 06	M-FS-23140
B75-10096 01	M-FS-23157
B75-10097 03	M-FS-23163
B75-10098 03	M-FS-23167
B75-10099 03	M-FS-23170
B75-10100 09	M-FS-23172
B75-10101 01	M-FS-23184
B75-10102 01	M-FS-23193
B75-10103 02	M-FS-23216
B75-10104 04	MSC-12619
B75-10105 03	MSC-12677
B75-10106 09	MSC-14386
B75-10107 02	MSC-14717
B75-10108 02	MSC-14788
B75-10109 01	MSC-19504
B75-10110 06	MSC-19523
B75-10111 06	MSC-19528
B75-10112 03	NPO-13131
B75-10113 04	NPO-13224
B75-10114 02	NPO-13276
B75-10115 03	NPO-13289
B75-10116 03	NPO-13303
B75-10117 04	NPO-13309
B75-10118 03	NPO-13346
B75-10119 03	NPO-13390
B75-10120 01	NPO-13419
B75-10121 04	NPO-13421
B75-10122 02	NPO-13439
B75-10123 03	NPO-13348
B75-10124 03	NPO-13462
B75-10125 03	NPO-13482
B75-10126 03	NPO-13504
B75-10127 03	NPO-13531
B75-10128 03	NPO-13615
B75-10129 02	ARC-10899
B75-10130 09	ARC-10955
B75-10131 06	ARC-10712
B75-10132 06	ARC-10807
B75-10133 09	ARC-10879
B75-10134 06	LEWIS-12447
B75-10135 06	LEWIS-12499
B75-10136 02	LEWIS-12518
B75-10137 04	LEWIS-12416
B75-10138 03	LEWIS-12502
B75-10139 03	LEWIS-12503
B75-10140 09	ARC-10744
B75-10141 03	ARC-10781
B75-10142 03	ARC-10952
B75-10143 09	ARC-10960
B75-10144 04	ARC-10949
B75-10145 08	ARC-10933
B75-10146 09	ARC-10940
B75-10147 03	LEWIS-12509
B75-10148 05	LEWIS-12515
B75-10149 03	LEWIS-12102
B75-10150 02	LEWIS-12523
B75-10151 06	LEWIS-12514
B75-10152 02	LEWIS-12445
B75-10153 02	GSFC-11925
B75-10154 02	KSC-10736
B75-10155 09	KSC-10837
B75-10156 02	LANGLEY-11647
B75-10157 04	LANGLEY-11774
B75-10158 03	LANGLEY-11796
B75-10159 04	LANGLEY-11800
B75-10160 03	LANGLEY-11883
B75-10161 02	M-FS-22589
	M-FS-23173
B75-10162 02	M-FS-23195
B75-10163 04	M-FS-23218
B75-10164 08	M-FS-23228
	M-FS-23229
B75-10165 06	M-FS-23260
B75-10166 05	MSC-12564
B75-10167 05	MSC-14062
B75-10168 05	MSC-14276
B75-10169 02	MSC-14330
B75-10170 05	MSC-10170
B75-10171 01	MSC-14810

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