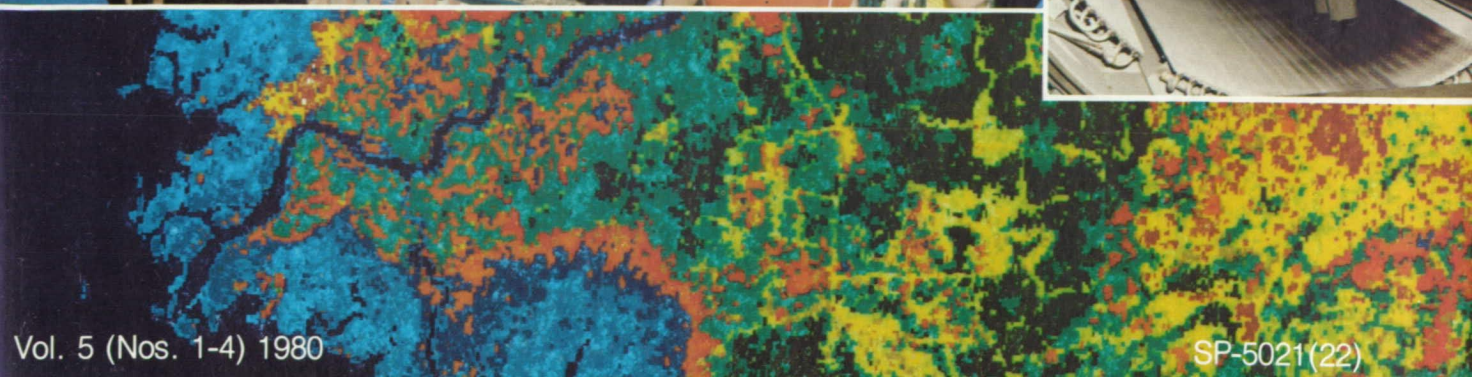
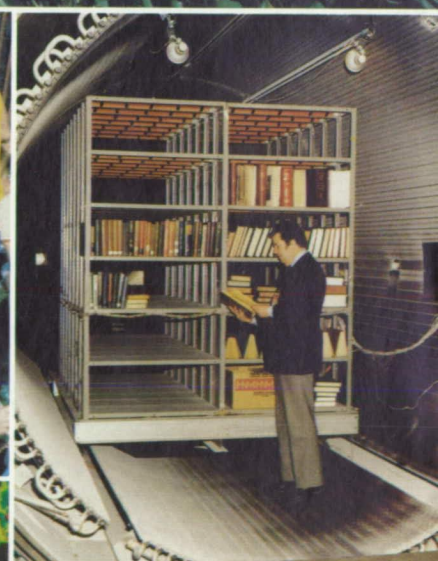


SP-5021(22)

NASA Tech Briefs Index 1980

National
Aeronautics and
Space
Administration



This document is available from the National Technical Information Service (NTIS),
Springfield, Virginia 22161, at price code A06 (\$11.00 domestic; \$22.00 Foreign).
Order NASA SP-5021(22).

INTRODUCTION

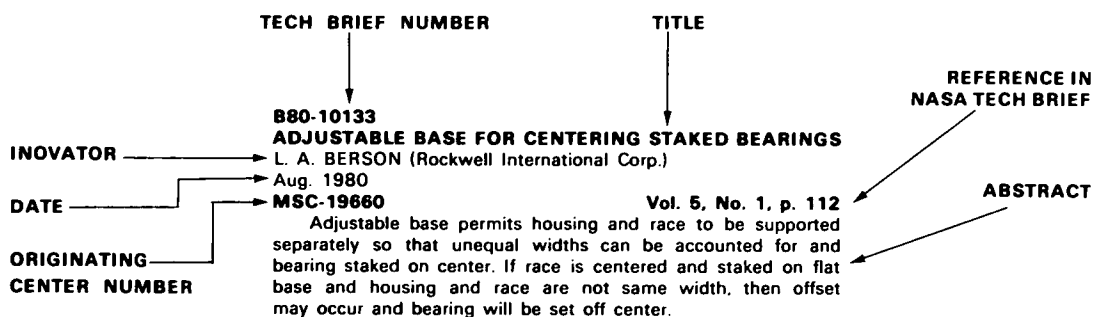
Tech Briefs are short announcements of new technology derived from the research and development activities of the National Aeronautics and Space Administration. These briefs emphasize information considered likely to be transferrable across industrial, regional, or disciplinary lines and are issued to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

This *Index to NASA Tech Briefs* contains abstracts and four indexes -- subject, personal author, originating Center, and Tech Brief number -- for 1980 Tech Briefs.

Abstract Section

The abstract section is divided into nine categories: Electronic Components and Circuits; Electronic Systems; Physical Sciences; Materials; Life Sciences; Mechanics; Machinery; Fabrication Technology; and Mathematics and Information Sciences. Within each category, abstracts are arranged sequentially by Tech Brief number.

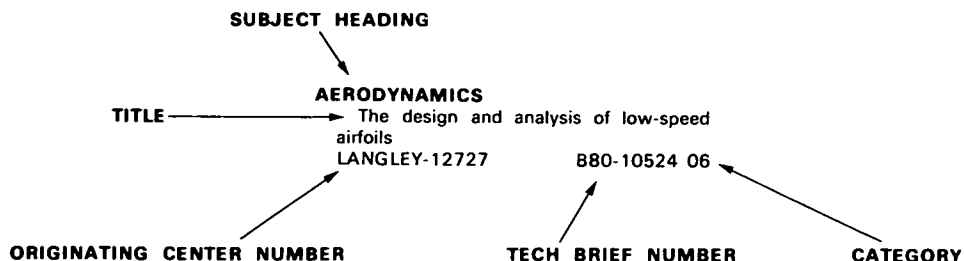
A typical abstract entry has these elements:



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.

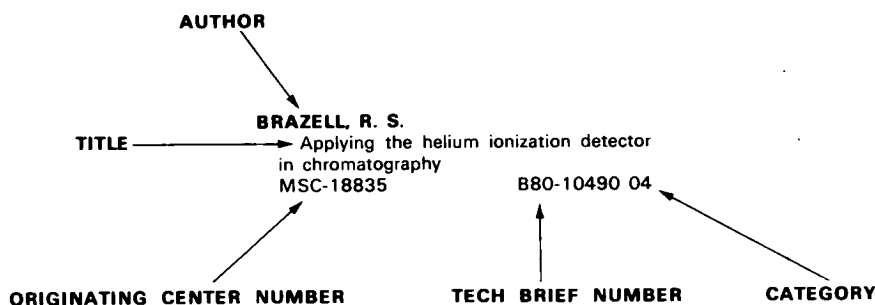
Indexes

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.

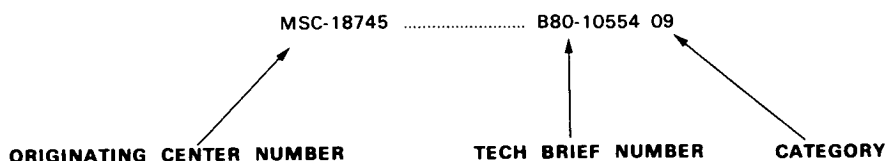


The January 1976 edition of the *NASA Thesaurus* (NASA SP-7050) is used as the authority for the indexing vocabulary that appears in the subject index. The *NASA Thesaurus* should be consulted in examining the current indexing vocabulary, including associated cross-reference structure. Only the subject 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 at \$23.50 for the two-volume set.

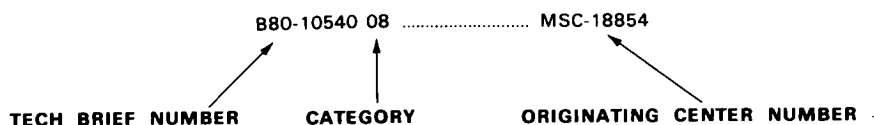
The second index is a personal author index. Entries in this index are arranged alphabetically by author's name. Tech Brief and category numbers are supplied to help the user find the appropriate entries in the abstract section.



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

Distribution of *NASA Tech Briefs*, a quarterly publication, is limited to managers and engineers in U.S. Industry and to other qualified technology transfer agents, such as; members of the media, teachers, librarians, and professionals supporting domestic commerce and industry.

Requests for individual Tech Briefs or for copies of the quarterly publication should be addressed to the Director, Technology Transfer Division Office, P.O. Box 8757, Baltimore/Washington International Airport, Maryland 21240.

TABLE OF CONTENTS

Abstract Section

Category 01	Electronic Components and Circuits ...	1
02	Electronic Systems	6
03	Physical Sciences	9
04	Materials	19
05	Life Sciences	23
06	Mechanics	25
07	Machinery	33
08	Fabrication Technology	39
09	Mathematics and Information Sciences	47

Indexes

Subject	I-1
Personal Author	I-33
Originating Center/Tech Brief Number	I-47
Tech Brief/Originating Center Number	I-51



Index to NASA Tech Briefs

June 1981

Abstract Section

01 ELECTRONIC COMPONENTS AND CIRCUITS

B80-10001

MULTIBAND MICROSTRIP ANTENNA

I. YU (Lockheed Electronics Co., Inc.)

Aug. 1980

MSC-18334

Vol. 5, No. 1, p. 3

Compact antenna transmits and receives elliptically and circularly polarized radiation. Antenna consists of layers of elliptical disks separated by dielectric substrates. Each disk operates at frequency determined by its size and dielectric constant of substrate. Individual frequency bands can be made to overlap, to yield single broadband antenna. Standard microstrip techniques are used to build it.

B80-10002

SIMPLE CIRCUIT MONITORS 'THIRD WIRE' IN AC LINES

T. T. KOJIMA (Rockwell International Corp.) and D. E. STUCK (Rockwell International Corp.)

Aug. 1980

M-FS-19457

Vol. 5, No. 1, p. 4

Device detects interruption of ground connection in three-wire electrical equipment and shuts off ac power to prevent shock hazard. Silicon-controlled rectifiers detect floating ground, and deenergize optoelectric relays thereby breaking power connections. Circuit could be incorporated into hand tools, appliances, and other electrical equipment.

B80-10003

SIMPLE BUCK/BOOST VOLTAGE REGULATOR

J. PAULKOVICH and G. E. RODRIGUEZ

Aug. 1980

GSFC-12360

Vol. 5, No. 1, p. 5

Circuit corrects low or high supply voltage, produces regulated output voltage. Circuit has fewer components because inductor/transformer combination and pulse-width modulator serve double duty. Regulator handles input voltage variation from as low as one half output voltage to as high as input transistor rating. Solar arrays, fuel cells, and thermionic generators might use this regulator.

B80-10004

INDEPENDENT SYNCHRONIZER FOR DIGITAL DECODERS

J. J. STIFFLER (Raytheon Co.)

Aug. 1980

MSC-16723

Vol. 5, No. 1, p. 6

Logic circuit synchronizes branches of any convolution code-decoder at low signal to noise ratios. Parity checks determine correct node synchronization. Device maintains synchrony as low as -3 dB. Circuit consists of 15 stage shift register, three up down counters, and some logic gates.

B80-10005

MULTICHANNEL COINCIDENCE CIRCUIT

J. I. CLEMMONS, JR.

Aug. 1980

LANGLEY-12531

Vol. 5, No. 1, p. 7

Digital circuit detects coincident pulses in two or more channels, and records time between primary pulses that are coincident with secondary pulses. Circuit has three major blocks: interval time subcircuit, measurement control subcircuit, and time sequence generator. Timer can be used in laser velocimeter or other instruments receiving data at irregular rates from two or more sources.

B80-10006

UNIVERSAL ODD-MODULUS FREQUENCY DIVIDER

A. ENGEL (Caltech)

Aug. 1980

NPO-13426

Vol. 5, No. 1, p. 8

Simple circuit divides frequency by preselected odd number. Exclusive-OR gate, divide-by-N circuit, and flip-flop are only components. Input pulses must be symmetrical.

B80-10007

DETECTING SHORT CIRCUITS DURING ASSEMBLY

G. J. DEBOO

Aug. 1980

ARC-11116

Vol. 5, No. 1, p. 9

Detector circuit identifies shorts between bus bars of electronic equipment being wired. Detector sounds alarm and indicates which planes are shorted. Power and ground bus bars are scanned continuously until short circuit occurs.

B80-10008

CONTINUOUS CONTROL OF PHASE-LOCKED-LOOP BANDWIDTH

G. W. MOTAL (Lockheed Electronics Co., Inc.) and J. C. VANELLI (Lockheed Electronics Co., Inc.)

Aug. 1980

MSC-16684

Vol. 5, No. 1, p. 10

Tracking loop filter with continuous bandwidth control smooths transition from wide to narrow band. Circuit was designed for Space Shuttle where bandwidth varied between 320 Hz for acquisition and 20 Hz for tracking. Field-effect transistor (FET) acts as voltage controlled variable resistance, changing time constant of filter between phase detector and voltage-controlled oscillator in phase-locked loop.

B80-10009

PHOTOCAPACITIVE IMAGE CONVERTER

W. E. MILLER, A. SHER (College of William and Mary), and Y. H. TSUO (College of William and Mary)

Aug. 1980

LANGLEY-12513

Vol. 5, No. 1, p. 11

Solid-state converters yield high sensitivity at high information-retrieval speed. Main advantages are high sensitivity of photocapacitive mechanism and inherent speed of information

01 ELECTRONIC COMPONENTS AND CIRCUITS

retrieval method. Fabrication of both devices is relatively simple and inexpensive.

B80-10010

CROSSED-GRID CHARGE LOCATOR

D. C. HARRISON (American Science and Engineering, Inc.)

Aug. 1980

M-FS-25170

Vol. 5, No. 1, p. 12

Circuit locates center of cloud of charge on wire grid to within 6.5 micrometers. Wires in vicinity of charge cloud develop voltages that are processed by priority encoders to develop coarse and fine position codes. Device is used with microchannel plate amplifier in X-ray photon detectors, electron microscopes, and closed-circuit television.

B80-10011

SEMICONDUCTOR STEP-STRESS TESTING

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10012 - B80-10030

M-FS-25329

Vol. 5, No. 1, p. 13

Report describes extensive program to test behavior of discrete diodes and transistors subjected to power and temperature overstress. Commercially available bipolar and field effect transistors and diodes were stressed between 0.5 and 1.75 times maximum rated power. Two groups were temperature stressed: 160 hour steps starting at 75 C to maximum of 300 C. Cumulative failures and changes in device parameters were monitored and reasons for failures presented.

B80-10012

JANTX1N2970B ZENER DIODE

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011; B80-10013 - B80-10030

M-FS-25260

Vol. 5, No. 1, p. 14

Report evaluates effects of power and temperature overstress on General Semi-conductor and Siemens devices. Excessive failure rates limited testing. Failure modes are described.

B80-10013

JANTX1N2989B ZENER DIODE

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011; B80-10012; B80-10014; B80-10030

M-FS-25261

Vol. 5, No. 1, p. 14

Report evaluates effects of power and temperature overstress on General Semiconductor and Siemens devices. Mechanical disruption is prominent failure mode. Other failures are described.

B80-10014

JANTX1N3016B ZENER DIODE

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10013; B80-10015; B80-10030

M-FS-25262

Vol. 5, No. 1, p. 14

Report evaluates effects of power and temperature overstress on Motorola and Siemens devices. Reverse bias leakage maximum limit failure and Zener-breakdown maximum limit failure were common. Other failures are described.

B80-10015

JANTX1N3031B ZENER DIODE

Innovation not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B81-10014; B80-10016; B80-10030

M-FS-25263

Vol. 5, No. 1, p. 14

Report describes effects of power and temperature overstress on Motorola and Siemens diodes. Failure was predominantly due to melted metal on die connections. Other failures are described.

B80-10016

JANTX1N5622 DIODE

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10015; B80-10017; B80-10030

M-FS-25280

Vol. 5, No. 1, p. 15

Report describes effects of power and temperature overstress on Semtech and Micro Semiconductor diodes. Semtech devices failed with excessive reverse bias leakage due to external paint. Micro Semiconductor diodes had reverse bias leakage failure due to damaged silicon.

B80-10017

JANTX1N5623 SWITCHING DIODE

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10016; B80-10018; B80-10030

M-FS-25281

Vol. 5, No. 1, p. 15

Report describes effects of power and temperature overstress on Semtech and Micro Semiconductor devices. Only two Semtech diodes failed catastrophically. Testing on Micro Semiconductor devices stopped because failure limit was reached. Micro diodes suffered lead separation.

B80-10018

JANTX2N2060 DUAL TRANSISTOR

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10017; B80-10019; B80-10030

M-FS-25251

Vol. 5, No. 1, p. 15

Report describes effects of power and temperature overstress on Motorola and Raytheon devices. Motorola devices were weak in power overstress. Raytheon devices succumbed to 160 hour temperature stress. Failure modes are detailed.

B80-10019

JANTX2N2219A DUAL TRANSISTOR

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10018; B80-10020; B80-10030

M-FS-25252

Vol. 5, No. 1, p. 15

Report describes effects of power and temperature overstress on Texas Instruments and National Semiconductor devices. Texas Instruments devices had only two failures in 2500 hours of testing. National Semiconductor devices reached 50% failure limit. No consistent failure mode was detected.

B80-10020

JANTX2N2369A TRANSISTOR

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10019; B80-10021; B80-10030

M-FS-25254

Vol. 5, No. 1, p. 16

Report describes effects of power and temperature overstress on National Semiconductor and Raytheon transistors. Good junction quality was maintained. Gain losses predominated. Other failures are reported.

B80-10021

JANTX2N2432A TRANSISTOR

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10020; B80-10022; B80-10030

M-FS-26255

Vol. 5, No. 1, p. 16

Report evaluates effects of power and temperature overstress on Crystalonics and Texas Instruments devices. Crystalonics devices survived better, as Texas Instruments lot exceeded 50 percent failure at 225 deg C. Failure modes are evaluated.

B80-10022

JANTX2N2484 TRANSISTOR

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10021; B80-10023; B80-10030

M-FS-25253

Vol. 5, No. 1, p. 16

Report evaluates effects of power and temperature overstress on Raytheon and Teledyne devices. Power overstress produced few failures. Both lots of devices exceeded 50 percent failure at 250 deg C. Failure modes are evaluated.

B80-10023**JANTX2N2605 TRANSISTOR**

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10022; B80-10024; B80-10030

M-FS-25150

Vol. 5, No. 1, p. 16

Report evaluates effects of power and temperature overstress on Raytheon and National Semiconductor devices. Breakdown voltage hysteresis, possibly due to contamination of semiconductor by gold from leads, was prominent.

B80-10024**JANTX2N2905A TRANSISTOR**

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10023; B80-10025; B80-10030

M-FS-25256

Vol. 5, No. 1, p. 17

Report evaluates effects of power and temperature overstress on Motorola and Texas Instruments devices. A variety of failure modes are described.

B80-10025**JANTX2N2920 DUAL TRANSISTOR**

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10024; B80-10026; B80-10030

M-FS-25258

Vol. 5, No. 1, p. 17

Report describes effects of power and temperature overstress on Fairchild and National Semiconductor devices. 160 hour temperature stress was only test to cause notable damage. Loss of gain is principal failure mode.

B80-10026**JANTX2N2945A TRANSISTOR**

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10025; B80-10027; B80-10030

M-FS-25259

Vol. 5, No. 1, p. 17

Report describes effects of power and temperature overstress on Raytheon and Teledyne devices. Increasing T in 16 hour steps damaged both manufacturers' lots. Raytheon lot exceeded 50 percent failure rate 160 hours before completion of test due to current gain failure. Teledyne samples completed test but had more catastrophic failures.

B80-10027**JANTX2N3637 TRANSISTOR**

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10026; B80-10028; B80-10030

M-FS-25264

Vol. 5, No. 1, p. 17

Report describes effects of power and temperature overstress on Transistor and Motorola devices. Transistor batches exceeded 50 percent failure in power overstress and 160 hour temperature stress. Design differences are evaluated.

B80-10028**JANTX2N3811 DUAL TRANSISTOR**

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10027; B80-10029; B80-10030

M-FS-25265

Vol. 5, No. 1, p. 18

Report evaluates effects of power and temperature overstress on Motorola and National Semiconductor devices. National Semiconductor devices exceeded 50 percent failure after 160 hours at 225 deg C. Motorola suffered more rejects but failures occurred at 300 deg C. Difference in lead bonding technique may explain performance.

B80-10029**JANTX2N4150 TRANSISTOR**

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10028; B80-10030

M-FS-25267

Vol. 5, No. 1, p. 18

Report evaluates effects of power and temperature overstress

on General Semiconductor and Transistor devices. General Semiconductor lot exceeded 50 percent failure 500 hours into 125 percent maximum rated power test. Catastrophic failure rates differed between manufacturers. Modes of failure are analyzed.

B80-10030**JANTX2N4856 FIELD-EFFECT TRANSISTOR**

Innovator not given (Special Products Division of DCA Reliability Laboratory) Aug. 1980 See also B80-10011 - B80-10029

M-FS-25269

Vol. 5, No. 1, p. 18

Report evaluates effects of power and temperature overstress on Teledyne and Texas Instruments devices. Temperature stress caused most failures for both manufacturers' lots. Failure modes are analyzed.

B80-10149**IMPROVED POWER FACTOR CONTROLLER**

F. J. NOLA

Sep. 1980 See also B77-10154; B79-10004

M-FS-25323

Vol. 5, No. 2, p. 133

Power dissipation in ac induction motor is reduced by circuit that lowers applied voltage when motor is idling or only lightly loaded. Timing voltages in phase with motor current are sensed a cross gate-controlled semiconductor which with motor, rather than across high-power resistor, as in earlier version.

B80-10150**ENERGY SAVING IN AC GENERATORS**

F. J. NOLA

Sep. 1980 See also B80-10149

M-FS-25302

Vol. 5, No. 2, p. 134

Circuit cuts no-load losses, without sacrificing full-load power. Phase-control circuit includes gate-controlled semiconductor switch that cuts off applied voltage for most of ac cycle if generator idling. Switch 'on' time increases when generator is in operation.

B80-10151**'PELLED-FILM' SOLAR CELLS**

R. J. STIRN (Caltech)

Sep. 1980

NPO-14734

Vol. 5, No. 2, p. 135

Cells are lighter and less expensive than conventional cells. GaAs cells are deposited on GaAs substrate coated with thin etchable layer that allows completed cell film to be peeled away from substrate. At estimated conversion of 18 percent, array of cells delivers about 1 kW of electricity per kilogram of cell material. Blanket of cells delivers energy at power-to-weight ratio about 4 times that of conventional 2-mil (0.5-mm) silicon solar cells. GaAs solar cells have better radiation resistance than silicon cells.

B80-10152**TEMPERATURE-COMPENSATING DC RESTORER**

H. M. THOMAS (Martin Marietta Corp.)

Sep. 1980

LANGLEY-12549

Vol. 5, No. 2, p. 136

Circuit provides stable references restoration in addition to temperature compensation. Possible TV monitor applications include traffic and security surveillance systems, where cameras are subject to environmental extremes, as in unheated warehouses or outdoors.

B80-10153**ALIASING FILTER FOR MULTIRATE SYSTEMS**

J. F. L. LEE (Honeywell, Inc.)

Sep. 1980

MSC-18472

Vol. 5, No. 2, p. 137

Rolloff filter is inexpensive way of reducing aliasing in digital control systems. Rolloff filter operating at faster sample rate (or rates) of system with 2:1 rate ratio gives infinite attenuation at half-sample rate of fast-rate loop. Tested successfully on Space Shuttle primary flight-control systems, filter technique could be applied to other multirate sampled-data systems.

01 ELECTRONIC COMPONENTS AND CIRCUITS

B80-10154

DUAL-FREQUENCY BIDIRECTIONAL ANTENNA

W. H. KUMMER (Hughes Aircraft Co.)

Sep. 1980

GSFC-12501

Vol. 5, No. 2, p. 138

Simultaneous two-way communication at 20 and 30 GHz is possible with versatile paraboloid-dish antenna. Developed for two-way communications between Space Shuttle and ground station, antenna includes parabolic reflector, feed horn, waveguide network, and single-axis gimbal-mounting. System resolution and accuracy are better than 1 percent.

B80-10155

COMPUTER-CONTROLLED WARMUP CIRCUIT

J. J. DAEGES (Caltech)

Sep. 1980

NPO-14815

Vol. 5, No. 2, p. 139

Filament of high-power radio transmitter is brought to operating temperature automatically. Pushbutton reduces operator's role to one-step command and is compatible with various forms of computer control. Filament shutdown is initiated by 'down' command from operator, failure of cooling systems, or power failure for more than few seconds.

B80-10156

DIRECT-CURRENT CONVERTER FOR GAS-DISCHARGE LAMPS

P. LUTUS (ILC Technology)

Sep. 1980

MSC-18407

Vol. 5, No. 2, p. 140

Metal/halide and similar gas-discharge lamps are powered from low-voltage dc source using small efficient converter. Converter is useful whenever 60-cycle ac power is not available or where space and weight allocations are limited. Possible applications are offshore platforms, mobile homes, and emergency lighting. Design innovations give supply high reliability and efficiency up to 75 percent.

B80-10157

POSITION MONITOR FOR MINING MACHINES

J. LUBICH (Benton Corp.)

Sep. 1980

M-FS-25342

Vol. 5, No. 2, p. 141

Circuit at output of incremental transducer records progress of longwall shearer. In contrast to mechanical shaft encoders, electronic circuit can be easily packaged to withstand shock and vibration of mining machine as it cuts across coal seam.

B80-10158

11-LINE TO 512-LINE DECODER

W. N. MILLER (Rockwell International Corp.)

Sep. 1980

MSC-19751

Vol. 5, No. 2, p. 141

CMOS decoder is assembled from standard 4-line to 16-line decoder/demultiplexer IC's. Matrix may also be used to generate 256 latched-on or latched-off logic signals instead of 512 discrete unlatched signals. By using conventional CMOS IC's, circuit consumes only about 30 milliwatts.

B80-10159

INPUT/OUTPUT INTERFACE MODULE

E. M. OZYAZICI (Rockwell International Corp.)

Sep. 1980

MSC-18180

Vol. 5, No. 2, p. 143

Module detects level changes in any of its 16 inputs, transfers changes to its outputs, and generates interrupts when changes are detected. Up to four changes-in-state per line are stored for later retrieval by controlling computer. Using standard TTL logic, module fits 19-inch rack-mounted console.

B80-10160

SMOOTHING THE OUTPUT FROM A DAC

C. WAGNER

Aug. 1980

FRC-11025

Vol. 5, No. 2, p. 144

Circuit smooths stepped waveform from analog-to-digital

converter without appreciable phase shift between stepped input signal and smoothed output signal and without any effect from stepping rate. Waveform produced is suitable for driving controls used in manufacturing processes, aerospace systems, and automobiles.

B80-10161

LSI LOGIC FOR PHASE-CONTROL RECTIFIERS

C. DOLLAND (Airsearch Manufacturing Co.)

Sep. 1980

M-FS-25208

Vol. 5, No. 2, p. 144

Signals for controlling phase-controlled rectifier circuit are generated by combinatorial logic than can be implemented in large-scale integration (LSI). LSI circuit saves space, weight, and assembly time compared to previous controls that employ one-shot multivibrators, latches, and capacitors. LSI logic functions by sensing three phases of ac power source and by comparing actual currents with intended currents.

B80-10162

MODEL FOR MOS FIELD-TIME-DEPENDENT BREAKDOWN

S. P. LI (Caltech), J. MASERJIAN (Caltech), and S. PRUSSIN (Caltech)

Sep. 1980

NPO-14701

Vol. 5, No. 2, p. 145

Quantitative model for MOC breakdown is derived and correlated with experiments.

B80-10163

DDL: DIGITAL SYSTEMS DESIGN LANGUAGE

S. G. SHIVAL (Alabama Univ.)

Sep. 1980

M-FS-25352

Vol. 5, No. 2, p. 146

Hardware description languages are valuable tools in such applications as hardware design, system documentation, and logic design training. DDL is convenient medium for inputting design details into hardware-design automation system. It is suitable for describing digital systems at gate, register transfer, and major combinational block level.

B80-10294

ULTRASTABLE AUTOMATIC FREQUENCY CONTROL

D. J. SABOURIN (Motorola, Inc.) and A. FURIGA (Motorola, Inc.)

Jan. 1981

MSC-18679

Vol. 5, No. 3, p. 267

Center frequency of wideband AFC circuit drifts only hundredths of percent per day. Since circuit responds only to slow frequency drifts and modulation signal has high-pass characteristics, AFC does not interfere with normal FM operation. Stable oscillator, reset circuit, and pulse generator constitute time-averaging discriminator; digital counter in pulse generator replaces usual monostable multivibrator.

B80-10295

FAST MICROWAVE SWITCHING POWER DIVIDER

R. W. JOHNSON (Ball Corp.) and R. J. STOCKTON (Ball Corp.)

Jan. 1981

GSFC-12420

Vol. 5, No. 3, p. 268

Unit divides power from single input among any 12 of 120 output terminals and redistributes it in 6 microseconds. Microwave current from coaxial line excites disk feeding many radial strip transmission lines. Built for use in electronically-steered S-band antenna, device also divides and switches energy among filters and phase shifters.

B80-10296

HIGH-POWER SOLID-STATE MICROWAVE TRANSMITTER

J. D. BOREHAM (Caltech), B. L. CONROY (Caltech), R. B. POSTAL (Caltech), and D. G. YENCHE (Caltech)

Jan. 1981

NPO-14803

Vol. 5, No. 3, p. 269

Transmitter phases outputs from individual amplifier modules then combines them in multielement array feed antenna. Size and power capability of system are variable for radar and small-angle scanning applications.

B80-10297**ANTENNA FEED FOR LINEAR AND CIRCULAR POLARIZATION**

D. A. BATHKER (Caltech) and B. L. SEIDEL (Caltech)

Jan. 1981

NPO-14810

Vol. 5, No. 3, p. 270

Antenna system transmits linearly-polarized microwave radio signal, yet circularly-polarized incoming signal is received without polarization-mismatch losses. Network uses only hybrid junctions, diplexer, and four-probe antenna; no waveguide switches are required. Other circuit arrangements are possible, using additional transmitters and receivers.

B80-10298**SIGNAL CONDITIONER FOR NICKEL TEMPERATURE SENSORS**

R. R. WALKER (Rockwell International Corp.)

Jan. 1981

MSC-18367

Vol. 5, No. 3, p. 270

Simple circuit conditions output of 50 ohm sensor for readout on strainage recorder. It consists of resistors, switch, and 'matching' network. Device saves time and reduced instrumentation costs when strain and temperature are measured in same setup.

B80-10299**EFFICIENT, LIGHTWEIGHT DC/DC SWITCHING CONVERTER**

S. CUK (Caltech) and R. D. MIDDLEBROOK (Caltech)

Jan. 1981 See also NASA-CR-135174(N78-29351)

LEWIS-12809

Vol. 5, No. 3, p. 271

Converters have input properties of boost power stage and output properties of buck power stage, yet they perform general conversion function with high efficiency. Other features include non-pulsating input/output currents, use of capacitive energy transfer, low output voltage ripple, reduced EMI, and small size.

B80-10300**28-CHANNEL ROTARY TRANSFORMER**

W. T. MCILYMAN (Caltech)

Jan. 1981

NPO-14861

Vol. 5, No. 3, p. 273

Transformer transmits power and digital data across rotating interface. Array has many parallel data channels, each with potential 1 megabaud data rate. Ferrite-cored transformers are spaced along rotor; airgap between them reduces crosstalk.

B80-10301**IMPROVING MOS MINORITY-CARRIER LIFETIME**

R. H. COCKRUM (Caltech), S. P. LI (Caltech), and S. PRUSSIN (Caltech)

Jan. 1981

NPO-14738

Vol. 5, No. 3, p. 273

Fluorine implantation increases minority-carrier lifetime in silicon by factor of 100, enhancing power efficiency in MOS applications. Implantation does not increase microdefects at silicon surface when thin oxide layers are grown, and process gathers existing impurities near surface without adversely affecting MOS electrical parameters. With these advantages, fluorine may be left on wafer surfaces after processing.

B80-10302**COOLING/GROUNDING MOUNT FOR HYBRID CIRCUITS**

B. BAGSTAD (TRW, Inc.), R. ESTRADA (TRW, Inc.), and H. MANDEL (TRW, Inc.)

Jan. 1981

MSC-18728

Vol. 5, No. 3, p. 274

Extremely short input and output connections, adequate grounding, and efficient heat removal for hybrid integrated circuits are possible with mounting. Rectangular clamp holds hybrid on printed-circuit board, in contact with heat-conductive ground plate. Clamp is attached to ground plane by bolts.

B80-10424**ALINING SLEEVE FOR OPTICAL FIBERS**

K. L. AUSTIN (Lockheed Electronics Co.)

Jan. 1981

MSC-18756

Vol. 5, No. 3, p. 389

Sleeve for aligning two optical fibers is made with precisely correct inside diameter by using section of fiber as mandrel. Because optical fiber is manufactured to very close tolerances, diameter of section serving as mandrel will be same as diameters of two fibers that are mated in butt joint inside sleeve. Result, determined by experiments, is loss of no more than 0.3 dB at joint.

B80-10440**IMPROVED BATTERY CHARGER FOR ELECTRIC VEHICLES**

W. E. RIPPEL (Caltech)

Apr. 1981

NPO-14964

Vol. 5, No. 4, p. 411

Polyphase version of single-phase 'boost chopper' significantly reduces ripple and electromagnetic interference (EMI). Drive circuit of n-phase boost chopper incorporates n-phase duty-cycle generator; inductor, transistor, and diode compose chopper which can run on single-phase or three-phase alternating current or on direct current. Device retains compactness and power factors approaching unity, while improving efficiency.

B80-10441**MULTIJUNCTION HIGH-VOLTAGE SOLAR CELL**

J. C. EVANS, JR., C. GORADIA, and A. T. CHAI

Apr. 1981 See also NASA-TM-81389(N80-16914)

LEWIS-13400

Vol. 5, No. 4, p. 412

Multijunction cell allows for fabrication of high-voltage solar cell on single semiconductor wafer. Photovoltaic energy source using cell is combined on wafer with circuit it is to power. Cell consists of many voltage-generating regions internally or externally interconnected to give desired voltage and current combination. For computer applications, module is built on silicon wafer with energy for internal information processing and readouts derived from external light source.

B80-10442**SOLAR CELL IS HOUSED IN LIGHT-BULB ENCLOSURE**

J. C. EVANS, JR.

Apr. 1981 See also B80-10441

LEWIS-13418

Vol. 5, No. 4, p. 413

Inexpensive, conventional solar-cell module uses focusing principle of electric lamp in reverse to produce electric power from sunlight. Standard outdoor light enclosure provides low-cost housing which concentrates sunlight in solar cell. Unit is capable of producing approximately 1 watt of electric power.

B80-10443**SIMPLE JFET OSCILLATOR**

L. L. KLEINBERG

Apr. 1981

GSFC-12555

Vol. 5, No. 4, p. 413

Device used in mixers, modulators, and function generators provides stable sine-wave signal compatible with both integrated circuits and discrete-component assemblies. Oscillator's frequency is tunable over narrow band about design value. Frequency range, stability, linearity, and low power drain of device are suited to communications receivers and transmitters and digital microprocessors, computers, and displays. Circuit simplicity allows for easy monolithic construction.

B80-10444**SPEED CONTROL FOR SYNCHRONOUS MOTORS**

H. PACKARD (Northrop Corp.) and J. SCHOTT (Northrop Corp.)

Apr. 1981

MSC-18680

Vol. 5, No. 4, p. 44

Feedback circuit controls fluctuations in speed of synchronous ac motor. Voltage proportional to phase angle is developed by phase detector, rectified, amplified, compared to threshold, and reapplied positively or negatively to motor excitation circuit. Speed control reduces wow and flutter of audio turntables and tape recorders, and enhances hunting in gyroscope motors.

B80-10445**LOW-RESISTANCE CONTINUITY TESTER**

02 ELECTRONIC SYSTEMS

R. B. REASONER (Caltech)

Apr. 1981

NPO-14881

Vol. 5, No. 4, p. 45

IC printed-circuit board tester measures resistance as low as 0.1 ohm but uses little power. Two 4.7 kilohm resistors and connected transistors prevent current flow through operational amplifier until probe circuit is complete, eliminating need for on/off switch. Zener diode in series with amplifier output prevents audio oscillator operation until output has sufficient amplitude. Circuit utilizes 741 operational amplifier on 11.2 volt battery or lower voltage amplifiers.

02 ELECTRONIC SYSTEMS

B80-10031

MICROPROCESSOR-CONTROLLED DATA SYNCHRONIZER

S. W. HOUSTON (TRW, Inc.), D. R. MARTIN (TRW, Inc.), and L. R. STINE (TRW, Inc.)

Aug. 1980

MSC-18535

Vol. 5, No. 1, p. 21

Versatile receiver processes data at variety of rates and code formats. Functions performed are: bit detection, NRZ-L conversion, frame synchronization (with programmable word length), bit-sync acquisition and tracking, error-curve normalization, lock detection, half-bit-ambiguity resolution, and data-rate tracking.

B80-10032

VOLTAGE CONTROLLER/CURRENT LIMITER FOR AC

T. T. WU (Caltech)

Aug. 1980

NPO-13061

Vol. 5, No. 1, p. 22

Circuit protects ac power systems for overload failures, limits power surge and short-circuit currents to 150 percent of steady state level, regulates ac output voltage, and soft starts loads. Limiter generates dc error signal in response to line fluctuations and dumps power when overload is reached. Device is inserted between ac source and load.

B80-10033

MICROPROCESSOR CONTROL FOR PHASE-LOCK RECEIVER

L. M. CARSON (Motorola, Inc.) and J. R. SHANER (Motorola, Inc.)

Aug. 1980

NPO-14438

Vol. 5, No. 1, p. 23

Subsystem facilitates flexible data acquisition by combining hardware and software processing. Device controls complex signal acquisition sequence and assists in precise phase locking to received signal. Key features include software system and code-generator initialization routines, executive routines, utility subroutines, control sequence routines for each receiver acquisition state, control-command decoding routine, and look-up tables for code-generator configuration versus code-set number. Steps can be added to extend input signal dynamic range.

B80-10034

IMPROVED CODE-TRACKING LOOP

D. T. LAFLAME (Hughes Aircraft Co.)

Aug. 1980

MSC-18035

Vol. 5, No. 1, p. 24

Delay-locked loop tracks pseudonoise codes without introducing dc timing errors, because it is not sensitive to gain imbalance between signal processing arms. 'Early' and 'late' reference codes pass in combined form through both arms, and each arm acts on both codes. Circuit accommodates 1 dB weaker input signals with tracking ability equal to that of tau-dither loops.

B80-10035

MULTIPATH STAR SWITCH CONTROLLER

T. O. ANDERSON (Caltech)

Aug. 1980

NPO-13422

Vol. 5, No. 1, p. 25

Device concept permits parallel computers to scan several common network-connected data stations at maximum rate. Sequencers leap-frog to bypass ports already being serviced by another computer. Two-path system for 16-port star switch controller is cost effective if added bandwidth or increased reliability is desired. Triple-path system would be cost effective for 32-port controller.

B80-10036

MICROPROCESSOR-BASED DETECTOR FOR PSK COMMANDS

J. DURDEN (Motorola, Inc.) and S. W. KLARE (Motorola, Inc.)

Aug. 1980

NPO-14440

Vol. 5, No. 1, p. 26

Command detector unit operates over wide range of data rates and signal levels in space environment. It consists of signal conditioning, read-only memory, random-access memory, and digital processor. Entire unit fits on single multilayer printed-wiring board.

B80-10037

ONLINE ASSESSMENT OF A DISTRIBUTED PROCESSOR

L. F. EHRLICH (IBM Corp.)

Aug. 1980

KSC-11124

Vol. 5, No. 1, p. 27

ORT (Operational Readiness Test) software allows one engineer to test readiness of 64 minicomputers and their peripherals from single console. Software makes roll call of computers and peripherals via common data buffer to check readiness of system in morning 'wake up' or at other important times. Subsystems are tested in parallel to save time. 'Watchdog' terminates test of any system that does not respond in time, so one failed system does not halt test sequence. Entire rollcall is complete in about 15 minutes. Software is designed for Space Shuttle prelaunch checkout, but approach should interest users of similar equipment.

B80-10164

RAM-BASED FRAME SYNCHRONIZER

J. K. NISWANDER and R. J. STATTEL

Sep. 1980

GSFC-12430

Vol. 5, No. 2, p. 149

Frame synchronizer for serial telemetry is rapidly reconfigured for changing formats. Synchronizer generates signals marking data-word boundaries, beginning of each frame, and beginning of each paragraph. Also derived are search, check, and lock status signals. Existing unit is assembled from standard random-access memory elements and MOS and low-power-Schottky logic.

B80-10165

RAM-BASED PARALLEL-OUTPUT CONTROLLER

J. K. NISWANDER and R. J. STATTEL

Sep. 1980

GSFC-12447

Vol. 5, No. 2, p. 150

Selected bit strings in serial-data link are extracted for processing. Controller is programmable interface between serial-data link and peripherals that accept parallel data. It can be used to drive displays, printers, plotters, digital-to-analog converters, and parallel-output ports.

B80-10166

MICROCOMPUTER-BASED DOPPLER SYSTEMS FOR WEATHER MONITORING

P. E. SCHMID and J. J. LYNN (Old Dominion Systems, Inc.)

Sep. 1980

GSFC-12448

Vol. 5, No. 2, p. 151

Ground-based microcomputer determines geographical positions of beacons using Doppler data from weather satellites. System requires only 7 W and incorporates least-squares iteration to compute positions. Results are printed out in alphanumeric either on CRT or on teletype. 6502 CPU was used, although equivalent processor could be substituted (with appropriate modifications to hardware).

B80-10167
LINEARIZING MAGNETIC-AMPLIFIER DC TRANSDUCER OUTPUT

S. NAGANO (Caltech)
 Sep. 1980

NPO-14617 Vol. 5, No. 2, p 152

Diode corrects nonlinearity at small currents in magnetic-amplifier dc transducer circuit.

B80-10168
BETTER-QUALITY CCD-ARRAY IMAGES

S. D. GAULEMA (Caltech)
 Sep. 1980

NPO-14426 Vol. 5, No. 2, p 153

In quadruple sampling, signal from each element in array is sampled once before element is clamped on, twice during 'on' period, once again after element is turned off. Quadruple-sampling scheme increases overall signal-to-noise by about 40 percent above level for double sampling, prediction verified by measurements on star-tracking imager.

B80-10169
REAL-TIME FILM RECORDING FROM STROKE-WRITTEN CRT'S

R. HUNT and A. J. GRUNWALD (National Research Council)
 Sep. 1980

LANGLEY-12529 Vol. 5, No. 2, p. 154

Real-time simulation studies often require motion-picture recording of events directly from stroke written cathode-ray tubes (CRT's). Difficulty presented is prevention of 'flicker,' which results from lack of synchronization between display sequence on CRT and shutter motion of camera. Programmable method has been devised for phasing display sequence to shutter motion, ensuring flicker-free recordings.

B80-10170
TORQUE CONTROL FOR ELECTRIC MOTORS

C. A. BERNARD (RCA Corp.)
 Sep. 1980

MSC-18635 Vol. 5, No. 2, p. 155

Method for adjusting electric-motor torque output to accommodate various loads utilizes phase-lock loop to control relay connected to starting circuit. As load is imposed, motor slows down, and phase lock is lost. Phase-lock signal triggers relay to power starting coil and generate additional torque. Once phase lock is recovered, relay restores starting circuit to its normal operating mode.

B80-10171
FREQUENCY-CONTROLLED VOLTAGE REGULATOR

W. T. MCLYMAN (Caltech)
 Sep. 1980

NPO-13635 Vol. 5, No. 2, p. 156

Converting input ac to higher frequency reduce size and weight and makes possible unique kind of regulation. Since conversion frequency is above range of human hearing, supply generated on audible noise. It also exploits high-frequency conversion features to regulate its output voltage in novel way. Circuit is inherently short-circuit proof.

B80-10172
A REDUNDANT REGULATOR CONTROL WITH LOW STANDBY LOSSES

R. W. ANDRYCZYK (GE) and S. R. PECK (GE)
 Sep. 1980

NPO-13165 Vol. 5, No. 2, p. 157

Shunt regulator circuit for outer-planet-spacecraft radioisotope thermoelectric generator minimizes power-conditioning losses. Unit consists of bank of duplicate regulator control amplifiers and their associated shunt transistors connected across power supply line. Its high-gain circuitry arranged in redundant configuration in very reliable and is characterized by low standby loss. Circuit can be used on other power-supply applications where size, weight, and reliability are important.

B80-10173
FREQUENCY RESPONSE FO MULTIPLE-SAMPLING RATE SYSTEMS

D. K. SCHARMACK (Honeywell, Inc.)
 Sep. 1980

MSC-18473 Vol. 5, No. 2, p. 158

Analytical procedure simplifies prediction of frequency response of multirate digital control systems. Although developed for Space Shuttle flightcontrol system, procedure is applicable to any multirate system describable by linear, constant-coefficient differential equations of difference equations.

B80-10303
COMMON DATA BUFFER

F. BYRNE
 Jan. 1981

KSC-11048 Vol. 5, No. 3, p. 277

Time-shared interface speeds data processing in distributed computer network. Two-level high-speed scanning approach routes information to buffer, portion of which is reserved for series of 'first-in, first-out' memory stacks. Buffer address structure and memory are protected from noise or failed components by error correcting code. System is applicable to any computer or processing language.

B80-10304
SIMULTANEOUS DISK STORAGE AND RETRIEVAL

F. E. LEVINE (IBM)
 Jan. 1981

KSC-11167 Vol. 5, No. 3, p. 278

Data are concurrently recorded on disk by one minicomputer and accessed by another, using format of memory blocks, buffering algorithm, and time-sequence addressing. Buffering algorithm works at data rates up to 68,000 words per second; modifications up rate to 160,000 words per second.

B80-10305
FOUR-QUADRANT CCD ANALOG MULTIPLIER

C. W. BROOKS (Westinghouse Electric Corp.) and D. R. LAMPE (Westinghouse Electric Corp.)

Jan. 1981 See also NASA-CR-145334(N79-14796)

LANGLEY-12332 Vol. 5, No. 3, p. 279

Sequential processing technique improves accuracy when CCD-array signals are multiplied by weighting function to remove offsets. System uses two schemes to cancel undesired output contributions arising from prerequisite biases. First is spontaneous cancellation by multiple 'nominally identical' devices; second is sequential cancellation where same devices are used repeatedly to form multiple products. Single device then successively subtracts products, eliminating effects of MOS-array threshold nonuniformities.

B80-10306
MONOLITHIC FOUR-QUADRANT MULTIPLIER

D. R. LAMPE (Westinghouse Electric Corp.)

Jan. 1981 See also NASA-CR-145334(N79-14796)

LANGLEY-12330A Vol. 5, No. 3, p. 280

Integrated configuration for 'differential' sequential processor is less susceptible to noise than one using discrete components. Accuracy of version is unaffected by sample-and-hold (S/H) acquisition speed, S/H droop rate, and stray pickup by separate card-mounted parts.

B80-10307
MONOLITHIC CCD-ARRAY READOUT

D. L. FARNSWORTH (Westinghouse Electric Corp.), D. R. LAMPE (Westinghouse Electric Corp.), and T. J. SHUTT (Westinghouse Electric Corp.)

Jan. 1981 See also NASA-CR-145334(N79-14796)

LANGLEY-12376 Vol. 5, No. 3, p. 282

Circuit is self-biasing, with differential current-to-voltage conversion. CMOS current-differencing readout consists of dc-balanced pair of virtual ground stages and current-differencing circuit similar to circuit mirror. Triode multiplier cell replaces test sources to form monolithic configuration. Transistors belonging to selected multiplier cell need to be duplicated for each multiplier

02 ELECTRONIC SYSTEMS

within correlator chip. Remaining elements form part of readout and may be scaled as single common readout stage.

B80-10308

RECEIVER ARRAY FOR HIGH-RATE TELEMETRY

M. H. BROCKMAN (Caltech) and M. F. EASTERLING (Caltech)
Jan. 1981 See also B80-10309

NPO-14579

Vol. 5, No. 3, p. 284

RF carrier uses two receiver systems to increase signal-to-noise ratio and sensitivity. Signals separately processed are coherently combined at summing junction for improved reception of marginal high-rate signals frequently lost to system, atmosphere, and galactic noises. Two receivers improve ratio by 2.7 dB; improvement is made by arraying more receiver systems.

B80-10309

ARRAYED RECEIVERS FOR LOW-RATE TELEMETRY

M. H. BROCKMAN (Caltech) and M. F. EASTERLING (Caltech)
Jan. 1981 See also B80-10308

NPO-14590

Vol. 5, No. 3, p. 285

RF carrier array includes one master and slave receiving system to improve overall signal-to-noise ratio. Greater number of slave systems creates additional improvement. Scheme reduces detection threshold of low-rate telemetry signals transmitted from spacecraft, enhancing communications efficiency.

B80-10310

COMPRESSING TV-IMAGE DATA

E. E. HILBERT (Caltech), J. LEE (Caltech), R. F. RICE (Caltech), and A. P. SCHLUTSMAYER (Caltech)
Jan. 1981

NPO-14823

Vol. 5, No. 3, p. 286

Compressing technique calculates activity estimator for each segment of image line. Estimator is used in conjunction with allowable bits per line, N , to determine number of bits necessary to code each segment and which segments can tolerate truncation. Preprocessed line data are then passed to adaptive variable-length coder, which selects optimum transmission code. Method increases capacity of broadcast and cable television transmissions and helps reduce size of storage medium for video and digital audio recordings.

B80-10311

REAL-TIME IMAGE ENHANCEMENT

V. S. WONG (Caltech)

Jan. 1981

NPO-14281

Vol. 5, No. 3, p. 287

Pipelined system with 'vision' algorithm is implemented on LSI chip that processes input digital image data to produce image-edge map. System contains 3 input adder, difference and absolute value cells, and adder and comparator. Data store for 1 to 2 ms, and are easily transmitted or isolated; design has reduced package count and number of interconnections for increased reliability. Applications include locating objects on moving belt, deep-sea and coal mining, and control of robotic rovers.

B80-10312

TOGGLED SIGNAL FOR PREVENTION OF CONTROL ERRORS

C. E. WYLLIE (Honeywell, Inc.)

Jan. 1981

MSC-18779

Vol. 5, No. 3, p. 288

Redundant command lines use two different 'true' signals to avoid common failure modes. When function is required to operate, computer generates command and transmits it to demultiplexer, where it is split along two paths, producing outputs from separate electronic cards. Outputs combine to drive and gate high and begin function.

B80-10313

CONVERTING A DIGITAL FILTER TO ITS ANALOG EQUIVALENT

J. F. L. LEE (Honeywell, Inc.)

Jan. 1981

MSC-18587

Vol. 5, No. 3, p. 289

Two complementary methods for conversion are direct conversion method and inverse of Tustin's method. Required accuracy of filter is achieved using best-matched technique. Both require only direct computations and are simpler and more efficient than conventional iterative systems or methods requiring 'ad hoc' filter parameter adjustment.

B80-10314

AIRBORNE METEOROLOGICAL DATA-COLLECTION SYSTEM

J. W. BAGWELL and B. G. LINDOW

Jan. 1981 See also NASA-TM-78992(N78-33283)

LEWIS-13346

Vol. 5, No. 3, p. 290

Aircraft position and weather data are collected, formatted, and relayed to ground from in-flight commercial jets. Data Acquisition and Control Unit in plane receives information from standard avionics data units, and provides scaling and storage. Normally, eight sets of data are acquired in 1 hour period and transmitted to satellite at precise time. Besides meteorological applications, system can locate and reroute aircraft into favorable winds to conserve fuel or aid search for downed planes.

B80-10315

RECEIVING SIGNALS OF ANY POLARIZATION

J. E. OHLSON (Caltech), B. L. SEIDEL (Caltech), and C. H. STELZRIED (Caltech)

Jan. 1981 See also B80-10297

NPO-14836

Vol. 5, No. 3, p. 291

Two-channel detection accommodates linear, circular, and elliptical polarization in one receiving unit. Receiver employs orthomode transducer which breaks any type signal into one left and one right circular component. These are processed in separate receiver channels with equal time-delay, and then recombined for data extraction. System eliminates losses due to polarization mismatch.

B80-10316

PORTABLE ZERO-DELAY ASSEMBLY

M. M. FRANCO (Caltech), T. Y. OTOSHI (Caltech), and E. J. SERHAL, JR. (Caltech)

Jan. 1981

NPO-14671

Vol. 5, No. 3, p. 292

Instrument is calibrated using back-to-back method. In comparison standard, S-X isolators are opposite from device being tested to permit signal flow in reverse direction. After calibration portable zero-delay assembly (PZDA) is used to set time delays of deep-space network ground-station ranging systems. Approach is also used to calibrate microwave links in other communications systems.

B80-10317

PHOTOMETER USED FOR RESPONSE TIME MEASUREMENT

A. J. DA SILVA

Jan. 1981

MSC-18712

Vol. 5, No. 3, p. 293

Photometer detects motion for measuring response speed and acceleration of servocontrol system. Instrument senses selected output movement shortly after operator activates hand-controlled input. Time delay is measured on X/T recorder and response calculated. With suitable motion targets, photometer measures any open- or closed-loop servoresponse and servorate or computer lag without system disturbance.

B80-10446

SUPERCONDUCTING GYROCON WOULD BE VERY EFFICIENT

H. C. YEN (Caltech)

Apr. 1981

NPO-14975

Vol. 5, No. 4, p. 419

Cryogenic operation of gyrocon increases gain by more than 35 dB and efficiency by 90 percent. Device consists of electron gun, deflection cavity, output cavity, collector, and output coupler. Input and output cavities are made of superconducting lead or niobium. Gyrocon operates at frequencies up to 50 GHz.

B80-10447**HIGH-POWER DUAL-DIRECTIONAL COUPLER**

T. Y. OTOSHI (Caltech) and K. B. WALLACE (Caltech)

Apr. 1981

NPO-14713**Vol. 5, No. 4, p. 420**

Water-cooled coupler installed in S-band polarization diversity (SPD) cone is used to calibrate receiving-station relay. Coupler operates without arcing at 400 kw and permits accurate calibration of entire system below antenna feed horn. Device has good directivity, contributes less than 0.01 K to system noise temperature, and eliminates saturation of ground station and spacecraft receivers during high-power operation.

B80-10448**CAVITY-BACKED SPIRAL-SLOT ANTENNA**

H. ELLIS, JR. (Rockwell International Corp.)

Apr. 1981

MSC-18532**Vol. 5, No. 4, p. 421**

Compact, rugged, flush-mounted antenna operates in sum or difference modes with circular polarization. Radiating elements consist of two pairs of centerfed, interleaved spiral slots in conductive aperture plane. At center feedpoint of each slot pair is balanced feed assembly. Center points are fed from split-tube coaxial balun passing through quarter-wave length deep cavity. Circularly polarized patterns represent both received and transmitted signals.

B80-10449**TIMING SIGNAL PROPAGATES WITHOUT PHASE SHIFT**

A. V. KANTAK (LinCom Corp.) and W. C. LINDSEY (LinCom Corp.)

Apr. 1981

MSC-18777**Vol. 5, No. 4, p. 422**

Continuous monitoring of transmission delay corrects for phase shift. Nodes in Master/Slave Returnable Timing System (MSRTS) are arranged in hierarchy, with each node serving as master to several slave nodes. As signal at each slave is synchronized with original master, it serves as master to synchronize following slave nodes. System improves performance of phased microwave antenna arrays in solar-powered satellites and clock distribution systems in avionics and computers.

B80-10450**TRISLOT-CAVITY MICROSTRIP ANTENNA**

H. ELLIS, JR. (Rockwell International Corp.)

Apr. 1981

MSC-18793**Vol. 5, No. 4, p. 422**

Flush-mountable assembly composed of disk radiator sandwiched between planes of metal-clad dielectric board has greater bandwidths and beamwidths than simple disk antenna. Conducting planes connect so that disk is enclosed in cavity with Y-shaped slot in top plane. Cavity is excited by microwave energy from disk and radiates from trislot aperture.

B80-10451**DEVELOPING EXPERIMENT INSTRUMENT PACKAGES**

R. HERREID

Apr. 1981

GSFC-12536**Vol. 5, No. 4, p. 423**

Ground-Support Equipment (GSE) system supports development, calibration, and testing of experiment packages. It is also used for 'quick look' processing and in-progress data analysis. User interacts with incoming telemetry data, performs computations, and controls execution of procedures using versatile Experiment Command Interactive Language (ECIL). Program is implemented many ways with minimal modification. It is written in MARCO II and FORTRAN for DEC PDP-11/34 using the RSX-11M operating system.

A. B. ELLIS (MIT), S. W. KAISER (MIT), and M. S. WRIGHTON (MIT)

Aug. 1980

LANGLEY-12591**Vol. 5, No. 1, p. 31**

Improved electrolytic cells have efficiencies comparable to those of best silicon solar cells but are potentially less expensive to manufacture. Cells consist of light-sensitive n-type semiconductor anode and metallic cathode immersed in electrolytic solution. Reversible redox cells produce no chemical change in electrolyte and stabilize anode against dissolving. Cell can produce more than 500 mW of power per square centimeter of anode area at output voltage of 0.4 V.

B80-10039**NEW MOUNTING IMPROVES SOLAR-CELL EFFICIENCY**

N. F. SHEPARD, JR. (General Electric Co.)

Aug. 1980

NPO-14467**Vol. 5, No. 1, p. 32**

Method boosts output by about 20 percent by trapping and redirecting solar radiation without increasing module depth. Mounted solar-cell array is covered with internally reflecting plate. Plate is attached to each cell by transparent adhesive, and space between cells is covered with layer of diffusely reflecting material. Solar energy falling on space between cells is diffused and reflected internally by plate until it is reflected onto solar cell.

B80-10040**ENERGY-SAVING THERMOSTAT**

R. N. JENSEN

Aug. 1980

LANGLEY-12450**Vol. 5, No. 1, p. 33**

Thermostat for two-stage heating system adjusts turn-on time and thermostat setpoint so that reserve resistance electrical heaters are not activated in morning warm up. Thermostat monitors outside temperature and turns on heat earlier in cold weather so that room will be at desired temperature by specified time. Mechanical, electrical, electronic, pneumatic, or microprocessor versions of device are possible. Correctional factors can be included where second-stage operation is more cost-effective than prolonged first-stage operation.

B80-10041**ROTATABLE PRISM FOR PAN AND TILT**

W. B. BALL

Aug. 1980

LANGLEY-12388**Vol. 5, No. 1, p. 34**

Compact, inexpensive, motor-driven prisms change field of view of TV camera. Camera and prism rotate about lens axis to produce pan effect. Rotating prism around axis parallel to lens produces tilt. Size of drive unit and required clearance are little more than size of camera.

B80-10042**ULTRAVIOLET SPECTROMETER/POLARIMETER**

Innovator not given (Brown Engineering of Teledyne Industries, Inc.) Aug. 1980

M-FS-25298**Vol. 5, No. 1, p. 34**

Improved satellite instrument package consists of telescope, spectrometer with polarimeter, five detectors, and control electronics. Instrument is designed to study solar ultraviolet radiation. Polarimeter will determine four Stokes parameters and possible mechanisms for producing linear and circular polarization. Density measurements of Earth's upper atmosphere constituents are possible.

B80-10043**AN ADJUSTABLE SOLAR CONCENTRATOR**

E. R. COLLINS, JR. (Caltech)

Aug. 1980

NPO-14710**Vol. 5, No. 1, p. 35**

Fixed cylindrical converging lenses followed by movable parabolic mirror focus solar energy on conventional linear collector.

03 PHYSICAL SCIENCES

B80-10038**PHOTOELECTROCHEMICAL CELL WITH NONDISSOLVING ANODE**

03 PHYSICAL SCIENCES

System is low cost and accommodates daily and seasonal movements of the sun. Mirrors may be moved using simple, low-power electrical motors.

B80-10044

LARGE-VOLUME MULTIPLE-PATH NUCLEAR-PUMPED LASER

F. HOHL and R. J. DE YOUNG (Miami Univ.)

Aug. 1980

LANGLEY-12592

Vol. 5, No. 1, p. 36

Output of nuclear pumped laser is increased using mirrors, so multiple optical reflections enlarge lasing-mode volume. Design requires comparatively low thermal neutron flux, uses flux more efficiently. Flux for lasing approaches that available from steady-state reactor. Outputs over 100 watts have been reached.

B80-10045

EXTRACTING ENERGY FROM NATURAL FLOW

L. M. DELIONBACK and G. A. WILHOLD

Aug. 1980

M-FS-23989

Vol. 5, No. 1, p. 37

Three concepts for extracting energy from wind, waterflow, and tides utilize flow instability to generate usable energy. Proposed converters respond to vortex excitation motion, galloping or plunging motion, and flutter. Fluid-flow instability is more efficient in developing lift than is direct flow.

B80-10046

TWELVE SOLAR-HEATING/COOLING SYSTEMS: DESIGN AND DEVELOPMENT

Innovator not given (Energy Resources Center of Honeywell, Inc.) Aug. 1980

M-FS-25358

Vol. 5, No. 1, p. 38

Two quarterly reports describe first 6 months of development on single family, multifamily, and commercial installations in Minneapolis area. Reports discuss basic requirements, and reasons for selecting specific configurations. Systems consist of liquid cooled flat plate collectors, two fluid loops, and gas-fired forced-air auxiliary heat source.

B80-10047

SOLAR-HEATING AND COOLING SYSTEM DESIGN PACKAGE

Innovator not given (Solaron Corp.) Aug. 1980

M-FS-25393

Vol. 5, No. 1, p. 38

Package of information includes design data, performance specifications, drawings, hazard analysis, and spare parts list for commercially produced system installed in single-family dwelling in Akron, Ohio. System uses air flat-plate collectors, 12000 kg rock storage and backup heat pump. Solar portion requires 0.7 kW, and provides 35% of average total heating load including hot water. Information aids persons considering installing solar home-heating systems.

B80-10048

BENEFIT ASSESSMENT OF SOLAR-AUGMENTED NATURAL GAS SYSTEMS

E. S. DAVIS (Caltech), R. L. FRENCH (Caltech), and R. L. SOHN (Caltech)

Aug. 1980

NPO-14568

Vol. 5, No. 1, p. 38

Report details how solar-energy-augmented system can reduce natural gas consumption by 40% to 70%. Applications discussed include: domestic hot water system, solar-assisted gas heat pumps, direct heating from storage tank. Industrial uses, solar-assisted appliances, and economic factors are discussed.

B80-10049

AIR-COOLED SOLAR-COLLECTOR SPECIFICATION

Innovator not given (Owens-Illinois, Inc.) Aug. 1980

M-FS-25336

Vol. 5, No. 1, p. 39

Report summarizes performance specifications of 72-element, concentric-tube collector. Chart shows minimum collector efficiency as function of operating conditions.

B80-10050

INDOOR TESTS OF THE CONCENTRIC-TUBE SOLAR COLLECTOR

Innovator not given (Solar Energy Systems Division of Wyle Laboratories) Aug. 1980

M-FS-25390

Vol. 5, No. 1, p. 39

Report describes performance tests on 12-tube, liquid-filled collector. Thermal efficiency, change in efficiency with sun position, and time constant for temperature drop after solar flux is cut are described.

B80-10051

EVACUATED-TUBE SOLAR COLLECTOR-PERFORMANCE EVALUATION

Innovator not given (Wyle Laboratories) Aug. 1980

M-FS-25339

Vol. 5, No. 1, p. 39

Report gives thermal performance test procedures and results for commercially produced, water-filled, 8-tube collectors. Tests include efficiency, time constant for temperature drop after solar flux is cut, change in efficiency as function of sun angle, and test to see if tubes break when filled with hot water.

B80-10052

GLYCOL/WATER EVACUATED-TUBE SOLAR COLLECTOR

Innovator not given (Wyle Laboratories) Aug. 1980

M-FS-25337

Vol. 5, No. 1, p. 40

Report describes performance of 8 tube and 10 tube commercially produced solar collectors. Tests include thermal efficiency, time constant for temperature drop after solar flux is cut, change in efficiency with Sun angle, and temperature rise if circulation is stopped.

B80-10053

THERMOSYPHON HEAT EXCHANGER

J. D. HANKINS

Aug. 1980

M-FS-25389

Vol. 5, No. 1, p. 40

Report summarizes final development, testing, and certification of pumpless, liquid-to-air heat exchanger for solar heating. System requires blower but no pump in water loop. Output is 35,000 Btu/hr when water temperature is 49 C.

B80-10054

CONTROLLER FOR SOLAR-ENERGY SYSTEMS

J. D. HANKINS

Aug. 1980

M-FS-25386

Vol. 5, No. 1, p. 40

Report describes operation and testing of computerized control unit for solar-heating and cooling systems. Unit includes electronics and 'plumbing'. Components are modular. Microprocessor with ROM and RAM operates fans, pumps, and valves, and retains selected data for 32 hours.

B80-10055

CONTROLLER AND TEMPERATURE MONITOR FOR SOLAR HEATING

J. D. HANKINS

Aug. 1980

M-FS-25387

Vol. 5, No. 1, p. 41

Report describes development and certification of 77-171 differential thermostat for controlling solar-heating and cooling systems and 77-180 temperature monitor of indoor, outdoor, and storage temperatures. Units are commercially available.

B80-10056

INHIBITING CORROSION IN SOLAR-HEATING AND COOLING SYSTEMS

G. E. DERAMUS, JR. and T. S. HUMPHRIES

Aug. 1980

M-FS-25387

Vol. 5, No. 1, p. 41

Report describes evaluation of 12 water additives in contact with aluminum, copper, steel, and stainless steel at 80 C for one year. Several promising formulations were found.

B80-10057

NUMERICAL TRACING OF ELECTRON TRAJECTORIES

T. N. DELMER (Science Applications, Inc.) and T. C. STEPHENS
Aug. 1980

GSFC-12535 Vol. 5, No. 1, p. 41

Computer program integrates path of relativistic electron through region of nonuniform static electromagnetic fields with accuracy of 1 micrometer in 10 centimeters. Program can be used to evaluate and modify design of electron-imaging systems. Language is FORTRAN IV, for batch or interactive execution on PDP 10, 11, CYBER 70, 170, and CDC 6000.

880-10058

NASA CHARGING ANALYZER PROGRAM

J. J. CASSIDY, III (Systems, Science & Software), J. M. HARVEY (Systems, Science & Software), I. KATZ (Systems, Science & Software), and M. J. MANDELL (Systems, Science & Software)
Aug. 1980

LEWIS-12973 Vol. 5, No. 1, p. 42

Computer program predicts electrostatic charging of three dimensional, conducting object partially or completely covered with dielectric films. Program is useful in describing spacecraft charging and material accumulation in plasma environment of magnetosphere. Numerous graphic outputs are implemented. Language is FORTRAN V, for batch execution on 1100-series computer.

880-10174

AN EQUATION OF STATE FOR LIQUIDS

R. F. FEDORS (Caltech), R. F. LANDEL (Caltech), and J. MOACANIN (Caltech)

Sep. 1980

NPO-14821 Vol. 5, No. 2, p. 161

Closed expression for volume as function of pressure and temperature has been verified for over 250 liquids. Equation can assist chemical engineers, solid-state researchers, and others with interest in thermodynamic behavior of liquids.

880-10175

HIGH-RESOLUTION SPECTROMETRY/INTERFEROMETER

J. B. BRECKINRIDGE (Caltech), R. H. NORTON (Caltech), and R. A. SCHINDLER (Caltech)

Sep. 1980

NPO-14448 Vol. 5, No. 2, p. 162

Modified double-pass interferometer has several features that maximize its resolution. Proposed for rocket-borne probes of upper atmosphere, it includes cat's-eye retroreflectors in both arms, wedge-shaped beam splitter, and wedged optical-path compensator. Advantages are full tilt compensation, minimal spectrum 'channeling,' easy tunability, maximum fringe contrast, and even two-sided interferograms.

880-10176

INSTRUMENT REMOTELY MEASURES WIND VELOCITIES

J. S. MARGOLIS (Caltech), D. J. MCCLEESE (Caltech), C. H. SEAMAN (Caltech), and M. S. SHUMATE (Caltech)

Sep. 1980

NPO-14524 Vol. 5, No. 2, p. 163

Doppler-shift spectrometer makes remote satellite measurements of atmospheric wind velocity and temperature at specified altitudes. As in correlation spectrometer, spectrum of gas in reference cell and spectrum of same gas in atmosphere are correlated both in emission and absorption.

880-10177

FAR-FIELD RADIATION PATTERN OF TUNABLE DIODE LASERS

T. J. LASH

Sep. 1980

LANGLEY-12631 Vol. 5, No. 2, p. 164

Technique rapidly determines far-field spatial energy distribution. Method takes about 3 minutes. It is optically simple and is economical, using standard laboratory parts and equipment. It records automatically without operator control and is easily adaptable to computer control of input instructions and computer treatment of output data. Degree of data resolution is limited only by width of recorder pen, and data are repeatable.

880-10178

OPTICAL CALIBRATOR FOR TDL SPECTROMETERS

D. E. JENNINGS

Sep. 1980

GSFC-12562 Vol. 5, No. 2, p. 164

Two etalons and monochromator mode selector help calibrate spectrometer in selected laser mode. Technique accurately determines free spectral range of etalon. By establishing number of fringes between two modes, both of which have been calibrated with molecular line standards, one finds free spectral range with error inversely proportional to spectral interval between calibration points. Procedure establishes free spectral range of etalon without prior knowledge of its length or refractive index.

880-10179

UV ACTINOMETER FILM

C. D. COULBERT (Caltech), A. GUPTA (Caltech), and J. PITTS (California Univ., Riverside)

Sep. 1980

NPO-14479 Vol. 5, No. 2, p. 165

Cumulative UV radiation can be measured by low-cost polymer film that is unaffected by visible light. Useful for virtually any surface, film can help paint and plastics manufacturers determine how well their products stand up against UV radiation. Actinometer film uses photochemically sensitive compound that changes its chemical composition in response to solar radiation. Extent of chemical conversion depends on length exposure and can be measured by examining film sample with spectrophotometer. Film can be exposed from several seconds up to month.

880-10180

FLUORESCENT RADIATION CONVERTER

W. VIEHMANN

Sep. 1980

GSFC-12528 Vol. 5, No. 2, p. 166

Fluorescent radiation converter used optically transparent substrate. One side of substrate is coated with plastic film containing fluorescent organic dyes that absorb optical radiation at one wavelength and emit it at longer one. Coating is formulated to respond to specific wavelengths. Emitted radiation is reflected internally inside substrate, amplifying intensity that reaches radiation detector. Converter can be made in several shapes and size; round and square bars coated all round their lengths are useful in converting relatively intense radiation and transmitting it through substrate over lengthy distances.

880-10181

AUTOMATED HOLOGRAPHIC DROP-SIZE ANALYZER RPN

NPO-14676

S. P. FEINSTEIN (Caltech) and M. A. GIRARD (Caltech)

Sep. 1980

NPO-14676 Vol. 5, No. 2, p. 166

System analyzes drop-size distribution in liquid-droplet-spray combustion fields. Holographic camera takes 'stop-motion' hologram of combustion volume; it is then viewed by vidicon camera connected to digital data-processing system that identifies particles or droplets, determining their size and count, and displays histogram of drop-size distribution in holographic field.

880-10182

PHOTOGRAPHIC MEASUREMENT OF DROPLET DENSITY

W. C. YAGER (GE)

Sep. 1980

M-FS-25326 Vol. 5, No. 2, p. 167

Density of cloud droplets in expansion chamber or static diffusion liquid chamber is measured with error of less than 3 percent by improved photographic technique. Precision is substantial advance over 10 percent accuracy limitation in methods used in past. Method should be useful in pollutant analysis, fine-particle research, and aerosol studies.

880-10183

CAMERA ADD-ON RECORDS TIME OF EXPOSURE

E. C. COMPTON, P. C. KASSEL, JR., and C. W. KNIGHT

Sep. 1980

LANGLEY-12635 Vol. 5, No. 2, p. 168

Time photograph is taken and is permanently recorded on

03 PHYSICAL SCIENCES

edge of exposure by compact electronics module that attaches to camera case. Single-chip timing circuit drives LED display, which is imaged on film plane. Normally blanked display is unblanked when shutter switch is activated.

B80-10184

IMPROVED MULTISPECTRAL SOLAR CELL ARRAY

J. J. REDMANN (The Aerospace Corp.)

Sep. 1980

HQN-10937

Vol. 5, No. 2, p. 169

Solar-collector system projects oval-shaped color-band images onto solar cells designed to be most efficient at specific wavelength. Image size can be altered by changing width of reflecting mirror of power of lens. Image intensity is thus kept at optimum level, preventing cells from overheating.

B80-10185

LOW-COST CALIBRATION OF ACOUSTIC LOCATORS

R. F. BERRY

Sep. 1980

LANGLEY-12632

Vol. 5, No. 2, p. 169

Method uses modified commercially-available piezoelectric torch lighter. Handheld lighter has controlled spark gap that can be easily adjusted to produce repeatable short-duration high-amplitude voltage spikes. Pulser and lighter are coupled via short axial cable, eliminating long cable run variations in cable attenuation, and problem with cable entangling with anything in its path.

B80-10186

INTEGRAL STORAGE-BULB AND MICROWAVE CAVITY FOR MASERS

V. S. REINHARDT

Sep. 1980

GSFC-12542

Vol. 5, No. 2, p. 170

Mechanically-stable integral storage-bulb/microwave cavity made out of single piece of fused quartz improves frequency stability. Single-piece construction eliminates joints, making cavity dimensionally and hence frequency-stable. Fused quartz is used because of its low thermal expansion coefficient.

B80-10187

A SURVEY OF PHOTOVOLTAIC SYSTEMS

Innovator not given (Alabama Univ.) Sep. 1980

M-FS-25397

Vol. 5, No. 2, p. 171

Results of extensive telephone survey of photovoltaic manufacturers are compiled in 220 page report. Three part report includes catalog of suppliers, data sheets on specific products, and typical operating, installation, and maintenance procedures.

B80-10188

THERMAL STRATIFICATION IN LIQUID STORAGE TANKS

D. L. CHRISTENSEN (Alabama Univ.) and S. M. HAN (Alabama Univ.)

Sep. 1980

M-FS-25416

Vol. 5, No. 2, p. 171

Comprehensive literature survey indicates thermal stratification in solar-energy/liquid-storage tank improves system performance by as much as 15 percent. Collector efficiency increases when collector inlet fluid is drawn from bottom of storage tank, where fluid is coolest; warmest liquid drawn top of tank to satisfy thermal load.

B80-10189

FINAL REPORT ON DEVELOPMENT OF A PROGRAMMABLE CONTROLLER

J. D. HANKINS

Sep. 1980 See also B78-10183

M-FS-25388

Vol. 5, No. 2, p. 172

Microprocessor-based controller for solar-heating and cooling systems is described in report. Analog data from flow sensors, temperature sensors, and other devices are accepted by programmable controller. It also receives digital input from relays and switches. Report describes background of development program. It also summarizes operation, performance, and applications of controller.

B80-10190

FRESNEL LENS TRACKING SOLAR COLLECTOR

Innovator not given (Solar Energy Systems Div. of Wyle Laboratories) Sep. 1980 See also B79-10061

M-FS-25419

Vol. 5, No. 2, p. 172

Commercial tracking collector that uses acrylic Fresnel lenses to focus Sunlight on copper absorber tubes was evaluated. Tests are documented in 16 page report.

B80-10191

OUTDOOR TESTS OF THE CONCENTRIC-TUBE COLLECTOR

Innovator not given (Wyle Laboratories) Sep. 1980 See also

B80-10050

M-FS-25398

Vol. 5, No. 2, p. 172

Seventy two element, air-filled version of concentric-tube solar collector recently underwent 2 month performance evaluation at Marshall Space Flight Center solar house. Summary of results, along with other relevant data, is presented in 27 page report.

B80-10192

SELECTIVE OPTICAL COATINGS FOR SOLAR COLLECTORS

J. R. LOWERY

Sep. 1980

M-FS-23589

Vol. 5, No. 2, p. 173

For best performance, energy-absorbing surface of solar collector should be characterized by high ratio of solar absorptance to thermal emittance. Report on optical characteristics of several chemical treatments and electrodeposited coatings for metal solar-absorbing surfaces should interest designers and users of solar-energy systems. Moisture resistance of some coatings is also reported.

B80-10193

FINNED-ABSORBER SOLAR COLLECTOR

Innovator not given (Solar Energy Systems Div. of Wyle Laboratories) Sep. 1980

M-FS-25385

Vol. 5, No. 2, p. 173

Report presents results of performance evaluation. Tests are part of continuing study of solar-heating systems and components for NASA and Department of Energy. Test data are presented as graphs and tables. Report also summarizes test procedures and mathematical analysis of results.

B80-10194

A TEST PROGRAM FOR SOLAR COLLECTORS

Innovator not given (Energy Resources Center of Honeywell, Inc.) Sep. 1980 See also B79-10059

M-FS-25433

Vol. 5, No. 2, p. 173

Rigorous environmental and performance tests qualify solar collector for use in residential solar-energy systems. Testing over 7 month period examined pressurized effects, wind and snow loading, hail damage, solar and thermal degradation, effects of pollutants, efficiency, and outgassing. Test procedures and results are summarized in tables, graphs, and text.

B80-10195

OPERATIONAL TESTS OF A SOLAR-ENERGY SYSTEM IN GEORGIA

Innovator not given (Federal Systems Div. of IBM Corp.) Sep. 1980

M-FS-25420

Vol. 5, No. 2, p. 174

Seventy three page report describes one year performance of commercial solar-energy hot-water system. Silicone oil is heat-exchange fluid in tested system, designed to meet needs of family of four. Roll-bend heat exchanger is wrapped around hot-water storage tank. Oil circulates through exchanger and flat-plate solar collectors. Auxiliary energy, to maintain temperature in storage tank, is supplied by 4,500-watt resistance-heating element.

B80-10196

OPERATIONAL TESTS OF A SOLAR ENERGY SYSTEM FLORIDA SITE

Innovator not given (Federal Systems Division of IBM Corp.) Sep. 1980

M-FS-25423 Vol. 5, No. 2, p. 174
System has been evaluated for performance at test site in Loxahatchee, Florida. Results of tests are available in 76 page report. Projected annual electrical energy savings are above 10 million Btu.

B80-10197
A SOLAR-ENERGY SYSTEM IN PENNSYLVANIA
Innovator not given (Energy Resources Center of Honeywell, Inc.) Sep. 1980

M-FS-25427 Vol. 5, No. 2, p. 174
Report describes development of solar-heating system for single-family residence at site in Pennsylvania. 143 page document, containing detailed drawings, performance specifications, cost tradeoff studies, and other material, can assist those planning similar systems in areas of similar climate.

B80-10198
INSTALLATION GUIDELINES FOR THE PENNSYLVANIA SYSTEM

Innovator not given (Energy Resources Center of Honeywell, Inc.) Sep. 1980

M-FS-25424 Vol. 5, No. 2, p. 175
Installation of solar-energy system is documented in report. Included are procedures for filling and testing entire system, along with installation guidelines for each major subsystem.

B80-10199
A SOLAR-ENERGY SYSTEM IN MINNESOTA
Innovator not given (Energy Resources Center of Honeywell, Inc.) Sep. 1980

M-FS-25428 Vol. 5, No. 2, p. 175
Report discusses system for Minnesota residence. Final design was arrived at that will meet 45 percent of total average heating load and will supply 40 gallons of potable water at 140 F. Document contains detailed drawings, specifications, and cost tradeoff studies. Also included are outline of proposed installation, operation and maintenance manual, and analysis of hazards.

B80-10200
SOLAR-ENERGY SYSTEM EVALUATION-PENNSYLVANIA SITE

Innovator not given (Federal Systems Division of IBM Corp.) Sep. 1980 See also B79-10336

M-FS-25434 Vol. 5, No. 2, p. 175
Solar-heating and hot-water system installed in single-family residence test program. Results of tests are available in 82 page report.

B80-10201
A HOT-WATER SYSTEM TESTED ONSITE--TOGUS, MAINE
Innovator not given (Federal Systems Division of IBM Corp.) Sep. 1980 See also B78-10334

M-FS-25435 Vol. 5, No. 2, p. 175
Performance close to design specifications was verified over one year study in solar hot-water system. Study looked at long-term operation of system installed in residential building in Togus, Maine.

B80-10202
A RELIABLE SOLAR-HEATING SYSTEM--HUNTSVILLE, ALABAMA

Innovator not given (City of Huntsville) Sep. 1980

M-FS-25431 Vol. 5, No. 2, p. 176
Final report on solar-heating demonstration project in Huntsville, Alabama, is rich in technical data, planning considerations, test and maintenance data, and other information. It can be useful reference for those planning similar systems.

B80-10203
SOLAR-HEATING AND COOLING DEMONSTRATION PROJECT

Innovator not given (Florida Solar Energy Center of the Univ. of Florida) Sep. 1980

M-FS-25443 Vol. 5, No. 2, p. 176
Florida Solar Energy Center has retrofitted office building,

approximately 5,000 square feet of area, with solar heating and air-conditioning. Information on operation, installation, controls, and hardware for system is contained in 164 page report. Document includes manufacturer's product literature and detailed drawings.

B80-10318
MULTIPEXED LOGIC CONTROLS SOLAR-HEATING SYSTEM

J. R. CURRIE

Jan. 1981 See also B78-10182

M-FS-25287 Vol. 5, No. 3, p. 297

Four inexpensive thermocouples monitor temperatures at key points. On command from logic circuitry, dampers open and close to direct airflow, and fan and auxiliary heater shut on or off. Controlling complex arranges heating system in any one of four operating configurations.

B80-10319
FOUR-CELL SOLAR TRACKER

C. M. BERDAHL (Caltech)

Jan. 1981

NPO-14811 Vol. 5, No. 3, p. 298

Forty cm Sun tracker, consisting of optical telescope and four solar cells, stays pointed at Sun throughout day for maximum energy collection. Each solar cell generates voltage proportional to part of solar image it receives; voltages drive servomotors that keep image centered. Mirrored portion of cylinder extends acquisition angle of device by reflecting Sun image back onto solar cells.

B80-10320
OFFSET PARABOLOIDAL SOLAR CONCENTRATOR

E. Y. CHOW (Caltech)

Jan. 1981

NPO-14846 Vol. 5, No. 3, p. 299

Section of conventional paraboloid, offset from its major axis, is used as reflector in solar concentrator. Design increases solar gathering efficiency by 3 to 4 percent by eliminating shadowing and blocking of solar rays. In addition, reflector can be folded toward receiver, reducing wind-loading and making maintenance easier.

B80-10321
MINIATURE PERSONAL UV SOLAR DOSIMETER

R. R. ADAMS, I. O. MACCONOCHIE, and B. D. POOLE, JR.

Jan. 1981

LANGLEY-12469 Vol. 5, No. 3, p. 300

Small light-powered meter measures accumulated radiation in ultraviolet or other selected regions. Practical advantages are device's low cost, small size, accuracy, and adaptability to specific wave-band measurements. Medical applications include detection of skin cancer, vitamin D production, and jaundice. Dosimeter also measures sunlight for solar energy designs, agriculture and meteorology, and monitors stability of materials and environmental and occupational lighting.

B80-10322
ECONOMICAL ULTRAVIOLET RADIOMETER

C. H. SEAMAN (Caltech) and R. S. ESTEY (Kirk-Mayer, Inc.)

Jan. 1981

NPO-14843 Vol. 5, No. 3, p. 301

Inexpensive, cosine-corrected radiometer measures ultraviolet radiation. In field use, instrument tests materials for effects of ultraviolet exposure and studies solar-cell degradation. It consists of cup-shaped diaphragm and diffusing dome for corrected response, two filters that select wavelength range, and silicon solar cell. Filters control response within passband of 300 to 400 nm.

B80-10323
PREDICTING AND MONITORING DUSTSTORMS

P. M. WOICESHYN (Caltech)

Jan. 1981

NPO-14277 Vol. 5, No. 3, p. 302

Information on duststorms is processed by terminal receiving

03 PHYSICAL SCIENCES

signals from two geosynchronous satellites. Data are correlated with that of other agencies to produce color maps depicting storm area. Series of maps reveals storm direction, warning regions up to 24 hours before they are struck.

B80-10324
NOISE SUPPRESSION IN FORWARD-SCATTERING OPTICAL INSTRUMENTS

J. M. FRANKE and L. R. GARTRELL
Jan. 1981

LANGLEY-12730 Vol. 5, No. 3, p. 303

Apertures and stops located at conjugate points in receiver optics reduce noise caused by scattered light. They are placed as real, inverse images of each other, so only light from sample volume reaches detector. Noise suppression technique increases signal-to-noise ratio on order of 15 dB.

B80-10325
ENERGY-REDUCTION CONCEPT FOR INCANDESCENT LAMPS

K. H. VORHABEN (Lockheed Electronics Co.)
Jan. 1981

MSC-18757 Vol. 5, No. 3, p. 304

Reusable infrared reflector maintains filament temperature and reduces power requirements. Fixed installed over light bulb directs energy formerly lost back to lamp filament. This energy aids electric current in heating filament, allowing lower-wattage bulb to produce same amount of light as higher-wattage bulb in ordinary fixture.

B80-10326
ACOUSTICALLY-TUNED OPTICAL SPECTROMETER

E. SKLAR (American Science and Engineering, Inc.)
Jan. 1981

HQN-10924 Vol. 5, No. 3, p. 304

Lens arrangement corrects for aberrations and gives resolution of 0.7 seconds of arc. In spectrometer, light from telescope is relayed by doublet lens to acoustically tuned optical filter. Selected wavelengths are relayed by triplet lens to charge coupled device camera. Intervening cylindrical lens, tilted at 12 degree angle, corrects for astigmatism and coma introduced by two element birefringent crystal in filter.

B80-10327
COMBINED PHOTOVOLTAIC AND THERMAL-STORAGE MODULE

J. W. STULTZ (Caltech)
Jan. 1981

NPO-14591 Vol. 5, No. 3, p. 305

Module uses phase change heat absorbing wax to reduce peak temperatures, increasing electrical efficiency. Wax makes module more cost effective than conventional thermomodels by also storing thermal energy for air and water heating.

B80-10328
TRACKING FALLING OBJECTS

R. E. FRAZER (Caltech)
Jan. 1981

NPO-14813 Vol. 5, No. 3, p. 306

Moving lens follows movement of object accelerated by gravity. Lenses and mirrors maintain constant magnification regardless of distance between moving optical carriage mechanism and fixed telescope. Device tracks objects up to 2 cm in diameter over vertical distance of 2 m.

B80-10329
DIPLEXER FOR LASER-BEAM HETERODYNE RECEIVER

G. KOEPF (Phoenix Corp.)
Jan. 1981

GSFC-12589 Vol. 5, No. 3, p. 307

Four prism interferometer superposes local oscillator beam on signal beam. Position of movable prism directs incident energy in both beams out one output port. Output port is spatially separated from input ports, and there is no limitation on size of frequency difference between laser beams.

B80-10330
POWERFUL COPPER CHLORIDE LASER

T. J. PIVROTTI (Caltech)
Jan. 1981

NPO-14782 Vol. 5, No. 3, p. 308

Two design innovations give up to thirtyfold increase in power in 300 W laser amplifier. Heat is removed by flowing lasing gas through system, allowing larger lasing volumes. Fast, uniform excitation discharges are obtained with transverse, rather than longitudinal, electrodes.

B80-10331
HEAT FOR FILM PROCESSING FROM SOLAR ENERGY
Innovator not given (Interactive Resources, Inc.) Jan. 1981 See also DOE/NASA-CR-161414 (N80-22781)

M-FS-25444 Vol. 5, No. 3, p. 309

Report describes solar water heating system for laboratory in Mill Valley, California. System furnishes 59 percent of hot water requirements for photographic film processing. Text of report discusses system problems and modifications, analyzes performance and economics, and supplies drawings and operation/maintenance manual.

B80-10332
SOLAR HEATER/COOLER FOR MASS MARKET

Innovator not given (Space Div. of GE) Jan. 1981 See also DOE/NASA-CR-161422 (N80-24746)

M-FS-25452 Vol. 5, No. 3, p. 309

Report describes project to design, build, and test simple and affordable solar systems. Four combinations of heating, cooling, and domestic hot water supply systems were developed and installed. Test sites, plan for systems and components, and performance are discussed; text is complimented by detailed drawings and test data.

B80-10333
DATA-ACQUISITION AND CONTROL SYSTEM FOR SEVERE ENVIRONMENTS

Innovator not given (Wyle Labs., Inc.) Jan. 1981 See also DOE/NASA-CR-161449 (N80-25783)

M-FS-25471 Vol. 5, No. 3, p. 310

Report evaluates control system by measuring accuracy and performance of system subcomponents, including interface wiring unit, power controller, and tape recorder. Test parameters establish variety of severe operation environments. Text features test program descriptions, sample readouts, and results. Summary of custom solar system simulator is included.

B80-10334
SOLAR HEATER/COOLER FOR MASS MARKET

Innovator not given (Lutz-Sotire Partnership) Jan. 1981 See also DOE/NASA/CR-161436 (N80-27800)

M-FS-25468 Vol. 5, No. 3, p. 310

Electrical energy consumption is reduced by half for 2 1/2 story office building. 138 liquid flat plate solar collectors are mounted on building roof, which faces nearly due south. Final project report includes detailed drawings and photographs, operation and maintenance manual, acceptance test plan, and related information.

B80-10335
SOLAR-HEATED AND COOLED OFFICE BUILDING-- DALTON, GEORGIA

Innovator not given (N. GA. Area Planning and Development Commission) Jan. 1981 See also DOE/NASA-CR-161273 (N80-11555)

M-FS-25451 Vol. 5, No. 3, p. 310

Modern energy efficient building is heated and cooled by five rows of flat plate solar collectors; its domestic hot water needs are also met. Final report includes detailed drawings and photographs, manufacturer's literature, performance specifications, acceptance test data, and performance verification statements. Operation and maintenance manual is also attached.

B80-10336
SOLAR-HEATING AND HOT WATER SYSTEM--ST. LOUIS, MISSOURI

Innovator not given (William Tao and Assoc.) Jan. 1981 See also DOE/NASA-CR-161420 (N80-24744)

M-FS-25453 Vol. 5, No. 3, p. 311

Sunlight supplies about half heat energy needs of small office. System includes six tilt-adjustable commercial collectors and 1,000 gallon energy storage tank. Report contains description of system and components, drawings and photographs, manufacturer's data, and related material.

B80-10337

SOLAR HEATING FOR AN ELECTRONICS MANUFACTURING PLANT--BLUE EARTH, MINNESOTA

Innovator not given (Telex Comm., Inc.) Jan. 1981 See also DOE/NASA-CR-161437 (N80-25786)

M-FS-25469 Vol. 5, No. 3, p. 311

Partial space heating for 97,000 square foot plant is supplied by 360 flat plate solar collectors; energy is sorted as heat in indoor 20,000 gallon water tank. System includes all necessary control electronics for year round operation. During December 1978, solar energy supplied 24.4 percent of building's space heating load.

B80-10338

COSTS AND DESCRIPTION OF A SOLAR-ENERGY SYSTEM--AUSTIN, TEXAS

Innovator not given (Radian Corp.) Jan. 1981 See also DOE/NASA-CR-161442 (N80-25784)

M-FS-25472 Vol. 5, No. 3, p. 312

Heating and cooling system uses Fresnel lens concentrating collectors. Major system components are 36 collectors, 1,500 gallon thermal storage tank, absorption cooler, cooling tower, heating coil, pumps, heat exchanger, and backup heating and air conditioning. Final report includes detailed breakdown of component and installation costs for seven project subsystems.

B80-10339

SOLAR ENERGY IN A HISTORICAL CITY--ABBREVILLE, SOUTH CAROLINA

Innovator not given (Gilliland-Bell Assoc., Inc.) Jan. 1981 See also DOE/NASA-CR-161443 (N80-25788)

M-FS-25479 Vol. 5, No. 3, p. 312

Direct air solar heating does not alter building appearances, winning approval of state and local historical societies. Final report on system contains performance data, drawings, photographs, and other information. Installation manual is included as appendix.

B80-10340

MUNICIPAL RECREATION CENTER IS HEATED AND COOLED BY SOLAR ENERGY

innovator not given (Travis-Braun and Assoc., Inc.) Jan. 1981 See also DOE/NASA-CR-161444 (N80-26766)

M-FS-25478 Vol. 5, No. 3, p. 312

Major fraction of energy requirements for community building is supplied by Sun. The 238 flat plate solar collectors are roof mounted on single story structure enclosing gymnasium, locker area, and health care clinic; heat exchanger transfers collected energy to 6,000 gallon storage tank. Final report chronicles project from inception to completion, documenting performance, costs, operating modes, and data acquisition system. Appendix contains manufacturers' product literature and engineering drawings.

B80-10341

SOLAR ENERGY MEETS 50 PERCENT OF MOTEL HOT WATER NEEDS--KEY WEST, FLORIDA

Innovator not given (Quality Inn of Key West) Jan. 1981 See also DOE/NASA-CR-161434 (N80-23774)

M-FS-25454 Vol. 5, No. 3, p. 313

Final report describes domestic water preheat installed in 148 room motel. Equipment meets 50 percent of needs when motel is 100 percent occupied; equivalently, it supplies 100 percent of hot water when occupancy is 50 percent. System consists of 1,400 square feet of flat plate liquid solar collectors, storage tanks, pump, controller, and hardware.

B80-10342

SOLAR HEATED OFFICE COMPLEX--GREENWOOD, SOUTH CAROLINA

Innovator not given (W. E. Gilbert & Assoc., Inc.) Jan. 1981 See also DOE/NASA-CR-161435 (N80-23776)

M-FS-25458 Vol. 5, No. 3, p. 313

Report contains thorough documentation of project meeting 85 percent of building heat requirements. System uses roof mounted recirculating water solar panels and underground hot water energy storage. Aluminum film reflectors increase total solar flux captured by panels.

B80-10343

RESIDENTIAL SYSTEM TESTED IN AN OFFICE--HUNTSVILLE, ALABAMA

Innovator not given (IBM Federal Systems Div.) Jan. 1981 See also DOE/NASA-CR-161464 (N80-25790)

M-FS-25481 Vol. 5, No. 3, p. 314

System does not meet its design specifications if not matched with intended application. Key differences between office and residential application were (1) space heating demand at office was greater than design value because thermostat was not held at 70 degrees F as specified, and (2) much energy collected and stored went unused because office used relatively little hot water. Report discusses observations and contains design, performance, and test information.

B80-10344

SOLAR HEATED TWO LEVEL RESIDENCE--AKRON, OHIO

Innovator not given (IBM Federal Systems Div.) Jan. 1981 See also DOE/NASA-CR-161465 (N80-25791)

M-FS-25480 Vol. 5, No. 3, p. 314

Report describes 1 year evaluation of solar heating and hot water system which satisfied 24 percent of energy requirements. System uses flat plate solar collectors with air as heat transport medium. Rock storage bin stores collected energy; air to liquid heat pump supplies backup heat.

B80-10345

SOLAR ENERGY WORKSHOP--TUCSON, ARIZONA

Innovator not given (IBM Federal Systems Div.) Jan. 1981 See also DOE/NASA-CR-161450 (N80-25787)

M-FS-25473 Vol. 5, No. 3, p. 314

Showplace for solar energy utilization includes complex solar heating and cooling system which supplies 95 percent of space heat requirements. Project utilized superior construction techniques and quality materials, and full time maintenance staff was assigned to keep systems operating.

B80-10346

RESIDENTIAL SOLAR HOT WATER SYSTEM--TEMPE, ARIZONA

Innovator not given (IBM Federal Systems Div.) Jan. 1981 See also DOE/NASA-CR-161466 (N80-26778)

M-FS-25490 Vol. 5, No. 3, p. 315

Domestic hot water for single story home is heated by two 4 by 8 foot solar collectors. Solar energy saved 5.54 million Btu in six month period; savings with increased water consumption would be significantly higher.

B80-10347

RESIDENTIAL SOLAR HEATING INSTALLATION--STILLWATER, MINNESOTA

Innovator not given (Energy Resources Ctr. of Honeywell, Inc.) Jan. 1981 See also B80-10199; DOE/NASA-CR-161480 (N80-28861)

M-FS-25504 Vol. 5, No. 3, p. 315

Report presents installer guidelines for network subsystems, including filling and testing. Information on operating procedures, controls, caution requirements, and routine scheduled maintenance is included as written procedures, schematics, detailed drawings, and manufacturer's component data.

B80-10348

THREE STORY RESIDENCE WITH SOLAR HEAT--MANCHESTER, NEW HAMPSHIRE

Innovator not given (IBM Federal Systems Div.) Jan. 1981 See

03 PHYSICAL SCIENCES

also DOE/NASA-CR-161471(N80-27802)

M-FS-25499 Vol. 5, No. 3, p. 315

When heat lost through ducts is counted for accurate performance assessment, solar energy supplied 56 percent of building's space heating load. Average outdoor temperature was 53 degrees F; average indoor temperature was 69 degrees F. System operating modes included heating from solar collectors, storing heat, heating from storage, auxiliary heating with oil fired furnace, summer venting, and hot water preheating.

B80-10349

A HIGH SCHOOL IS SUPPLIED WITH SOLAR ENERGY-- DALLAS, TEXAS

Innovator not given(Dallas Independent School District) Jan. 1981 See also DOE/NASA-CR-161482(N80-29847)

M-FS-25514 Vol. 5, No. 3, p. 316

System preheats 100 percent of domestic hot water and supplies almost half of heating requirements for three story, concrete frame, brick building with basement. Final report includes details of installation, operation and maintenance, contract negotiation, and acceptance test plan.

B80-10452

MULTIBEAM COLLIMATOR USES PRISM STACK

P. O. MINOTT

Apr. 1981

GSFC-12608

Vol. 5, No. 4, p. 427

Optical instrument creates many divergent light beams for surveying and machine element alignment applications. Angles and refractive indices of stack of prisms are selected to divert incoming laser beam by small increments, different for each prism. Angles of emerging beams thus differ by small, precisely-controlled amounts. Instrument is nearly immune to vibration, changes in gravitational force, temperature variations, and mechanical distortion.

B80-10453

PULSE-SHAPING CIRCUIT FOR LASER EXCITATION

J. B. LAUDENSLAGER (Caltech) and T. J. PACALA (Caltech)

Apr. 1981

NPO-14556

Vol. 5, No. 4, p. 428

Narrower, impedance-matched pulses initiate stabler electric discharges for gas lasers. Discharges are more efficient, more compact, capable of high repetition rate, and less expensive than conventional electron-beam apparatus, but gas tends to break down and form localized arcs. Pulse-shaping circuit compresses width of high-voltage pulses from relatively-slow rise-time voltage generator and gradually grades circuit impedance from inherent high impedance of generator to low impedance of gas.

B80-10454

FIELD LIMITER FOR SOLAR RADIOMETERS

C. M. BERDAHL (Caltech)

Apr. 1981

NPO-14781

Vol. 5, No. 4, p. 429

Lenses project solar image onto aperture to exclude circumsolar radiation, more precisely measuring energy captured by receiver apertures of highly-concentrating solar thermal-energy converters. First version uses achromatic objective lens to form image of Sun at aperture ahead of radiometer cavity. Smaller second version with shorter focal length forms image magnified by another lens and thrown onto aperture. Both Versions require calibration against standard radiometer.

B80-10455

GAS-LASER POWER MONITOR

C. E. RUSS, JR.

Apr. 1981

LANGLEY-12682

Vol. 5, No. 4, p. 430

Device attaches simply to front of laser housing for continuous monitoring of power output. Monitor is calibrated to read either total output or power generated in test volume. It is fabricated from four black-anodized aluminum parts; crown glass positioned at Brewster angle reflects 0.33 percent of beam onto photodiode calibrated for electrical output proportional to laser power. Unlike conventional calorimeter, monitor does not interrupt laser

beams, and fast-response diode allows instantaneous tracking of power fluctuations.

B80-10456

FIBER OPTICS TRANSMIT CLOCK SIGNAL MORE RELIABLY

G. F. LUTES, JR. (Caltech)

Apr. 1981

NPO-14749

Vol. 5, No. 4, p. 430

Optical automatic gain control smooths maser clock amplitude fluctuations without phase shift. Uncomplicated optical system is more reliable than electrical transmission circuits which require phase-locked loops to compensate for shift. Maser feeds reference signal to linear fiber-optic analog transmitter which emits modulated laser beam directed to splitter. Splitter consists of dichroic mirrors and associated lenses for distributing beam to output ports. Cables attached there guide signals to receiving station.

B80-10457

REDUCED VISCOSITY INTERPRETED FOR FLUID/GAS MIXTURES

D. H. LEWIS (Caltech)

Apr. 1981

NPO-14976

Vol. 5, No. 4, p. 431

Analysis predicts decrease in fluid viscosity by comparing pressure profile of fluid/gas mixture with that of power-law fluid. Fluid is taken to be viscous, non-Newtonian, and incompressible; the gas to be ideal; the flow to be inertia-free, isothermal, and one dimensional. Analysis assists in design of flow systems for petroleum, coal, polymers, and other materials.

B80-10458

TUNABLE PULSED CARBON DIOXIDE LASER

G. J. MEGIE (Caltech) and R. T. MENZIES (Caltech)

Apr. 1981

NPO-14984

Vol. 5, No. 4, p. 432

Transverse electrically-excited-atmosphere (TEA) laser is continuously tunable over several hundred megahertz about centers of spectral lines of carbon dioxide. It is operated in single longitudinal mode (SLM) by injection of beam from continuous-wave, tunable-waveguide carbon dioxide laser, which serves as master frequency-control oscillator. Device measures absorption line of ozone; with adjustments, it is applicable to monitoring of atmospheric trace species.

B80-10459

SHORT-RANGE SELF-PULSED OPTICAL RADAR

C. M. BERDAHL (Caltech)

Apr. 1981

NPO-14901

Vol. 5, No. 4, p. 433

Laser for radar device is retriggered when previous laser pulse is reflected from target. Target range R is computed from number of pulses triggered per time interval. Radar accurately measures distances up to 500 meters; it is useful for determining surface shape of reflectors in large, high-gain, highly directional antennas and for other short-range surveying.

B80-10460

SOLAR-SITE TEST MODULE

R. R. KISSEL and D. R. SCOTT

Apr. 1981 See also DOE/NASA-TM-78291(N80-30899)

M-FS-25543

Vol. 5, No. 4, p. 433

Report describes small test set which interrogates solar-energy data acquisition systems. Lightweight, portable set includes microcomputer with keyboard, alphanumeric display, printer, cassette recorder/player for storing programs and data, and cable for connection to Site Data Acquisition System (SDAS). Unit is operated by BASIC program and Assembly language. Report is specific to DOE/NASA application yet contains general information to assist in designing similar units.

B80-10461

EVALUATION OF AN EVACUATED-TUBE LIQUID SOLAR COLLECTOR

Innovator not given(Solar Energy Systems Div. of Wyle

Labs) Apr. 1981 See also DOE/NASA-CR-161421(N80-24745); B80-10050

M-FS-25450 Vol. 5, No. 4, p. 434

Indoor and outdoor thermal performances of collectors are compared in report. Tests conducted on indoor solar simulator with data from both diffuse and specular reflectors are presented graphically and in tables. Comparisons with previous data for prototype show effects of improved manifold.

B80-10462

SOLAR WATER HEATER DESIGN PACKAGE

Innovator not given(Elcam, Inc.) Apr. 1981 See also DOE/NASA-CR-150605(N80-27518)

M-FS-25521 Vol. 5, No. 4, p. 434

Package describes commercial domestic-hot-water heater with roof or rack mounted solar collectors. System is adjustable to pre-existing gas or electric hot-water house units. Design package includes drawings, description of automatic control logic, evaluation measurements, possible design variations, list of materials and installation tools, and trouble-shooting guide and manual.

B80-10463

FIVE-CITY ECONOMICS OF A SOLAR HOT-WATER-SYSTEM

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161510(N80-29854)

M-FS-25532 Vol. 5, No. 4, p. 434

Report projects energy savings and system costs for five sites using analysis of actual solar energy installation performance in Togus, Maine. Maine system supplies 75 percent of hot water needed for single-family residence; economic payback period is 19 years. Benefits for all sites depend on maintenance or decrease of initial investment required and continuing increase in cost of conventional energy. Report includes analysis weighing potential changes in variables used to evaluate system profitability.

B80-10464

ECONOMIC EVALUATION OF A SOLAR HOT-WATER-SYSTEM

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161492(N80-31872)

M-FS-25529 Vol. 5, No. 4, p. 435

Analysis shows economic benefits at six representative sites using actual data from Tempe, Arizona and San Diego, California installations. Model is two-tank cascade water heater with flat-plate collector array for single-family residences. Performances are forecast for Albuquerque, New Mexico; Fort Worth, Texas; Madison, Wisconsin; and Washington, D.C. Costs are compared to net energy savings using variables for each site's environmental conditions, loads, fuel costs, and other economic factors; uncertainty analysis is included.

B80-10465

RESIDENTIAL SOLAR-HEATING SYSTEM USES PYRAMIDAL OPTICS

Innovator not given(Wormser Scientific Corp.) Apr. 1981 See also DOE/NASA-CR-161203(N80-33864)

M-FS-25567 Vol. 5, No. 4, p. 435

Report describes reflective panels which optimize annual solar energy collection in attic installation. Subunits include collection, storage, distribution, and 4-mode control systems. Pyramid optical system heats single-family and multi-family dwellings.

B80-10466

SOLAR-HEATED BANK-MARKS MISSISSIPPI

Innovator not given(First National Bank of Clarksdale) Apr. 1981 See also DOE/NASA-CR-161549(N80-33858)

M-FS-25558 Vol. 5, No. 4, p. 436

Report describes air solar-energy collectors which supply 60 percent of space heating load for full-service bank. Contemporary structure supports 468 square feet of flat-plate arrays, and features onsite temperature and power measurement readouts. Air-flow collectors minimize problems experienced with conventional liquid solar equipment and eliminate need for heat exchanger for space heating.

B80-10467

SOLAR WATER-HEATING PERFORMANCE EVALUATION-SAN DIEGO, CALIFORNIA

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161481(N80-27806)

M-FS-25502 Vol. 5, No. 4, p. 436

Report describes energy saved by replacing domestic, conventional natural gas heater with solar-energy subsystem in single-family residence near San Diego, California. Energy savings for 6 month test period averaged 1.089 million Btu. Collector array covered 65 square feet and supplied hot water to both 66-gallon solar storage tank and 40-gallon tank for domestic use. Natural gas supplied house's auxiliary energy.

B80-10468

SOLAR-HEATED AND COOLED SAVINGS AND LOAN BUILDING-1-LEAVENWORTH, KANSAS

Innovator not given(Mutual Savings & Loan Association of Leavenworth, Kansas) Apr. 1981 See also DOE/NASA-CR-161484(N80-29848)

M-FS-25520 Vol. 5, No. 4, p. 436

Report describes heating and cooling system which furnishes 90 percent of annual heating load, 70 percent of cooling load, and all hot water for two-story building. Roof-mounted flat-plate collectors allow three distinct flow rates and are oriented south for optimum energy collection. Building contains fully automated temperature controls is divided into five temperature-load zones, each with independent heat pump.

B80-10469

SOLAR-ENERGY LANDMARK BUILDING--COLUMBIA, MISSOURI

Innovator not given(Building and Grounds Department of Stephens College) Apr. 1981 See also DOE/NASA-CR-161485(N80-29849)

M-FS-25524 Vol. 5, No. 4, p. 437

Report includes design, cost, installation, maintenance, and performance details for attractive solar installation which supplies space heating for four-story Visitors Center. 176 hydronic flat-plate collectors, water-to-water heat exchanger, and 5,000-gallon storage tank comprise system which provides 71 percent of building's heat. Natural-gas-fired boiler supplies auxiliary hot water to heating system when necessary.

B80-10470

SOLAR HEATING FOR AN OBSERVATORY--LINCOLN, NEBRASKA

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161495(N80-29851)

M-FS-25525 Vol. 5, No. 4, p. 437

Report describes solar-energy system for 50 seat observatory that provides 60 percent of space heating needs. System includes 9 flat-plate collectors, rock storage bin, blowers, controls, ducting, and auxiliary natural-gas furnace; it has five operation modes. Net energy savings were 11.31 million Btu for 12 months, or equivalent of 1.9 barrels of oil. Report appendixes list performance factor definitions, performance equations, and average area weather conditions.

B80-10471

TWO-STORY RESIDENCE WITH SOLAR HEATING--NEWMAN, GEORGIA

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161494(N80-29853)

M-FS-25526 Vol. 5, No. 4, p. 438

Report evaluates performance of warm-air collector system for 11 month period and provides operation and maintenance information. System consists of 14 warm air collectors, rock-storage bin, air handler, heat exchangers, hot-water preheat tank, associated controls, plumbing, and air ducting. Average building temperature was maintained at 72 F (22 C); solar equipment provided 47 percent of space-heating requirement.

B80-10472

SOLAR-ENERGY HEATS A TRANSPORTATION TEST CENTER--PUEBLO, COLORADO

03 PHYSICAL SCIENCES

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161493(N80-29850)

M-FS-25527 Vol. 5, No. 4, p. 438

Petroleum-base, thermal energy transport fluid circulating through 583 square feet of flat-plate solar collectors accumulates majority of energy for space heating and domestic hot-water of large Test Center. Report describes operation, maintenance, and performance of system which is suitable for warehouses and similar buildings. For test period from February 1979 to January 1980, solar-heating fraction was 31 percent, solar hot-water fraction 79 percent.

B80-10473
SINGLE-FAMILY-RESIDENCE SOLAR HEATING--CARLSBAD, NEW MEXICO

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161508(N80-29856)

M-FS-25528 Vol. 5, No. 4, p. 438

Solar-heating and hot-water system includes 408 square feet of flat-plate air collectors, rock storage bin, energy transport system, air-to-water heat exchanger, controls, and hot-water preheat tank. Hot-air oil furnace supplies auxiliary space heating, and electricity powers air-handler blower and hot water preheat pump. For 12 month period, system provided 43 percent of space-heating and 53 percent of hot-water energy; net energy savings were 23.072 million Btu.

B80-10474
MULTIMODE SOLAR-HEATING SYSTEM--COLUMBIA, SOUTH CAROLINA

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161546(N80-31880)

M-FS-25552 Vol. 5, No. 4, p. 439

Report describes failure of six-mode pyramidal-optics system to reduce winter energy savings. Over 12 month period, control problems, energy dissipation, and high operating-energy requirements undermined system efficiency. Energy savings were maximal when system in direct space-heating or hot-water preheating mode. In least efficient mode, heat pumps alternatively mingled storage or collector energy, and space heating was provided by electric heat strip.

B80-10475
SOLAR-HEATED SWIMMING SCHOOL--WILMINGTON, DELAWARE

Innovator not given(Cooperson Brack Association) Apr. 1981 See also DOE/NASA-CR-161538(N80-31878)

M-FS-25548 Vol. 5, No. 4, p. 439

Report describes operation, installation, and performance of solar-energy system which provides alternative to natural gas pool heating. System is comprised of 2,500 square feet of liquid flat-plate collectors connected to 3,600 gallon; gallon-gallon storage tank, with microcomputer-based controls. Extension of building incorporates vertical-wall, passive collection system which provides quarter of heated fresh air for office.

B80-10476
WINTER PERFORMANCE OF A DOMESTIC SOLAR-HEATING SYSTEM--DUFFIELD, VIRGINIA

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161507(N80-30892)

M-FS-25540 Vol. 5, No. 4, p. 439

Sunlight supplies 39 percent of heat load, saving 9 barrels of fuel oil in one heating season. Report describes system installation in two-story, single-family residence. Energy is collected with roof-mounted air flat-plate collectors, stored in rock bin, and transferred to water preheat tank whenever system is storing energy; heat pump supplies heat to house.

B80-10477
ONE-YEAR ASSESSMENT OF A SOLAR SPACE/WATER HEATER--CLINTON, MISSISSIPPI

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161509(N80-30893)

M-FS-25539 Vol. 5, No. 4, p. 440

Unit called 'System 4' integrated into space-heating and

hot-water systems of dormitory satisfied 32 percent of building heat load. System 4 includes flat-plate air collectors, circulation blowers, rock storage bed with heat exchanger, two hot water tanks, and auxiliary heaters. Report describes performance of system and subsystems, operating-energy requirements and savings, and performance parameters.

B80-10478
FIRE-STATION SOLAR-ENERGY SYSTEM--KANSAS CITY, MISSOURI

Innovator not given(City of Kansas City, Missouri) Apr. 1981 See also DOE/NASA-CR-161513(N80-30895)

M-FS-25538 Vol. 5, No. 4, p. 440

Screen-walled, flat-plate air collectors are part of award-winning architectural design; concrete-box storage subsystem, domestic hot-water preheat tank, blowers, pumps, heat exchangers, ducting, controls, and plumbing complete solar system. Design provides half of space heating and 75 percent of heat for domestic hot-water for fire station. Report includes historical narrative of project along with detailed drawings, charts, and product literature.

B80-10479
SOLAR-HEATED RANGER STATION--GLENDO, WYOMING

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161520(N80-30896)

M-FS-25537 Vol. 5, No. 4, p. 440

Report evaluates solar-energy system in residential ranger station. Installation provided 22 percent of space-heating and 58 percent of hot-water energy requirements. Annual net energy savings were 30 million Btu. Report describes system and its subsystems: collector array, storage, hot-water, and space-heating. Average weather conditions of test site, performance values, and energy savings are listed.

B80-10480
ECONOMIC EVALUATION OF A SOLAR HOT-WATER SYSTEM--PALM BEACH COUNTY, FLORIDA

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161512(N80-30894)

M-FS-25536 Vol. 5, No. 4, p. 441

Report projects solar-energy costs and savings for residential hot-water system over 20 year period. Evaluation uses technical and economic models with inputs based on working characteristics of installed system. Primary analysis permits calculation of economic viability for four other U.S. sites.

B80-10481
RESIDENTIAL SYSTEM--LANSING, MICHIGAN

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See also DOE/NASA-CR-161491(N80-29855)

M-FS-25530 Vol. 5, No. 4, p. 411

Air collectors are combined with water storage to supply 15 percent of space-heating and hot-water load to residence. Report discusses typical system operation, energy savings, and maintenance for 11 month period. Although unusual combination of water storage with air collecting medium creates loss of heat exchanging efficiency, net energy savings were 21 million Btu.

B80-10482
SOLAR SPACE-HEATING SYSTEM--YOSEMITE NATIONAL PARK, CALIFORNIA

Innovator not given(Federal Systems Div. of IBM Corp.) Apr. 1981 See Also DOE/NASA-CR-161539(N80-31883)

M-FS-25553 Vol. 5, No. 4, p. 442

A 12 months performance of Visitors Center installation suffered from low insolation, high energy dissipation, and equipment breakdown. System has 980 square feet of liquid flat-plate collectors, water energy storage, 4-mode control, heat exchangers, pumps, and plumbing. Design expected system to supply over 50 percent of annual heating demand, but only 109 million Btu were conserved.

B80-10483
MOTEL SOLAR-HOT-WATER SYSTEM--DALLAS, TEXAS

Innovator not given(Day's Inn of America, Inc.) Apr. 1981 See also DOE/NASA-CR-161570(N81-10521)

M-FS-25575 Vol. 5, No. 4, p. 442

Report describes system which meets 64 percent of hot water requirements of 120 room motel. Key system components include 1,000 square foot, roof-mounted collector array, 1,000 gallon storage tank, tube-in-shell heat exchanger, and three domestic hot-water tanks. Report contains calibration instructions for differential temperature controllers, shutdown procedures, and operation guidelines, performance analysis, and manufacturers' maintenance literature.

B80-10484

MOTEL SOLAR-HOT-WATER SYSTEM WITH NONPRESSURIZED STORAGE--JACKSONVILLE, FLORIDA

Innovator not given(Day's Inn of America, Inc.) Apr. 1981 See also DOE/NASA-CR-161560(N81-10523)

M-FS-25569 Vol. 5, No. 4, p. 432

Modular roof-mounted copper-plated arrays collect solar energy; heated water drains from them into 1,000 gallon nonpressurized storage tank which supplies energy to existing pressurized motel hot water lines. System provides 65 percent of hot water demand. Report described systems parts and operation, maintenance, and performance and provides warranty information.

B80-10485

CLOSED-CIRCULATION SYSTEM FOR MOTEL HOT WATER--SAVANNAH, GEORGIA

Innovator not given(Day's Inn of America, Inc.) Apr. 1981 See also DOE/NASA-CR-161561(N81-10523)

M-FS-25572 Vol. 5, No. 4, p. 433

Inexpensive guy wires support roof-mounted solar-energy collectors. Mounting system withstands 120 mph winds with no roof penetrations. Collectors circulate 50 percent ethylene glycol solution eliminating need for drain system for freeze protection. Heat exchanger transfers energy to domestic hot water which heats to 140 F.

B80-10486

SOLAR HEATING FOR A RESTAURANT--NORTH LITTLE ROCK, ARKANSAS

Innovator not given(Shoney's South, Inc.) Apr. 1981 See also DOE/NASA-CR-161557(N81-10520)

M-FS-25568 Vol. 5, No. 4, p. 443

Hot water consumption of large building affects solar-energy system design. Continual demand for hot water at restaurant makes storage less important than at other sites. Storage capacity of system installed in December 1979 equals estimated daily hot-water requirement. Report describes equipment specifications and modifications to existing building heating and hot water systems.

B80-10487

MOTEL SOLAR HOT-WATER INSTALLATION--ATLANTA, GEORGIA

Innovator not given(Day's Inn of America, Inc.) Apr. 1981 See also DOE/NASA-CR-161559(N81-10519)

M-FS-25564 Vol. 5, No. 4, p. 443

Analysis of hardness of local water, average insolation for site, and daily hot water requirements insures suitability of solar-energy system design. Report describes two units which are designed to supply 81 percent of motel's annual hot water demand based on hypothetical 85 percent occupancy. Report includes drawings, operating and maintenance instructions, and test results for 1 day of operation.

B80-10488

BUILDING WITH INTEGRAL SOLAR-HEAT STORAGE--STARKVILLE, MISSISSIPPI

Innovator not given(Security State Bank, Starkville, Mississippi) Apr. 1981 See also DOE/NASA-CR-161550(N81-10518)

M-FS-25559 Vol. 5, No. 4, p. 444

Column supporting roof also houses rock-storage bin of solar-energy system supplying more than half building space

heating load. Conventional heaters supply hot water. Since bin is deeper and narrower than normal, individual pebble size was increased to keep airflow resistance at minimum.

04 MATERIALS

B80-10059

CONTAINERLESS MATERIALS PROCESSING IN THE LABORATORY

L. L. LACY, D. B. NISEN, T. J. RATHZ, and M. B. ROBINSON Aug. 1980

M-FS-25242 Vol. 5, No. 1, p. 45

Drop tube makes possible preparation of exotic materials. The 100 foot tube is oriented precisely vertical to prevent free-falling drop from hitting tube walls. Inert-gas supply, evacuation pumps, viewing ports, and flexibility in choice of melt technique allow precise control and monitoring of solidification.

B80-10060

MEASURING COAL DEPOSITS BY RADAR

T. A. BARR

Aug. 1980

M-FS-23922 Vol. 5, No. 1, p. 46

Front-surface, local-oscillator radar directly compares frequency of signals reflected from front and back surfaces of coal deposits. Thickness is measured directly as frequency difference. Transmitter is frequency modulated, so thickness is computed directly from frequency difference. Because front and back reflections are detected in combination rather than separately, masking of comparatively weak back signal is less problem. Also system is not sensitive to extraneous reflections from targets between transmitting antenna and coal surface.

B80-10061

DETECTING A COAL/SHALE INTERFACE

P. H. BROUSSARD, J. L. BURCH, R. A. CAMPBELL, E. J. DROST, J. L. HUDGINS, P. W. MORRIS, H. REID, JR., R. J. STEIN, and J. E. ZIMMERMAN

Aug. 1980

M-FS-23720 Vol. 5, No. 1, p. 47

Detector, intended for use with longwall shearer, determines when cut has pierced through coal layer. Accelerometer measures hardness of material struck by penetrometer ram, while reflectometers measure reflectivity of surface on either side of penetrometer. Signals are combined in voting circuit that indicates 'coal' or 'shale', depending on information supplied by three sensors. It distinguishes by differences in accelerometer waveforms.

B80-10062

FAST-RESPONSE ATMOSPHERIC-POLLUTANT MONITOR

D. I. SEBACHER

Aug. 1980 See also NASA-TP-1113 (N78-13408)

LANGLEY-12317 Vol. 5, No. 1, p. 48

Fast infrared spectrometer measures atmospheric CO, CH₄, and HCl over range of 1 to 12 ppm. With modifications it could measure other pollutants and use natural light as source. Cell filled with sample to be measured filters out spectral lines of interest. Infrared beam passes through rotating cell holder that produces chopped signals at two frequencies. Difference in signal amplitudes depends on amount of test gas in sample. Signal processing circuitry amplifies and separates test-gas and reference signals.

B80-10063

FIRE TESTS FOR AIRPLANE INTERIOR MATERIALS

E. A. TUSTIN (Boeing Co.)

Aug. 1980 See also NASA-CR-145658 (N79-19112)

MSC-18478 Vol. 5, No. 1, p. 49

Large scale, simulated fire tests of aircraft interior materials

04 MATERIALS

were carried out in salvaged airliner fuselage. Two 'design' fire sources were selected: Jet A fuel ignited in fuselage midsection and trash bag fire. Comparison with six established laboratory fire tests show that some laboratory tests can rank materials according to heat and smoke production, but existing tests do not characterize toxic gas emissions accurately. Report includes test parameters and test details.

B80-10064

REDOX ELECTROCHEMICAL ENERGY STORAGE

L. H. THALLER

Aug. 1980 See also NASA-TM-X-71540 (N74-21688)

LEWIS-13398

Vol. 5, No. 1, p. 50

Reservoirs of chemical solutions can store electrical energy with high efficiency. Reactant solutions are stored outside conversion section where charging and discharging reactions take place. Conversion unit consists of stacks of cells connected together in parallel hydraulically, and in series electrically. Stacks resemble fuel cell batteries. System is 99% ampere-hour efficient, 75% watt hour efficient, and has long projected lifetime. Applications include storage buffering for remote solar or wind power systems, and industrial load leveling. Cost estimates are \$325/kW of power requirement plus \$51/kWh storage capacity. Mass production would reduce cost by about factor of two.

B80-10065

ADDITIVE IMPROVES ENGINE-OIL PERFORMANCE

A. J. BABECKI and H. C. FLETCHER

Aug. 1980

GSFC-12327

Vol. 5, No. 1, p. 51

Tests of metal erosion in operating engines show that addition of 5% tricresyl phosphate significantly reduces wear rate. Commercial 10W30 oil gives one tenth wear and degrades less with additive.

B80-10066

DRILLING SIDE HOLES FROM A BOREHOLE

E. R. COLLINS, JR. (Caltech)

Aug. 1980

NPO-14465

Vol. 5, No. 1, p. 52

Machine takes long horizontal stratum samples from confines of 21 cm bore hole. Stacked interlocking half cylindrical shells mate to form rigid thrust tube. Drive shaft and core storage device is flexible and retractable. Entire machine fits in 10 meter length of steel tube. Machine could drill drainage or ventilation holes in coal mines, or provide important information for geological, oil, and geothermal surveys.

B80-10067

CORROSION-RESISTANT CERAMIC THERMAL BARRIER COATING

P. E. HODGE, S. R. LEVINE, and R. A. MILLER

Aug. 1980

LEWIS-13088

Vol. 5, No. 1, p. 53

Two-layer thermal barrier coating, consisting of metal-CrAlY bond coating and calcium silicate ceramic outer layer, greatly improves resistance of turbine parts to hot corrosion from fuel and air impurities. Both layers can be plasma sprayed, and ceramic layer may be polished to reduce frictional losses. Ceramic provides thermal barrier, so parts operate cooler metal temperatures, coolant flow can be reduced, or gas temperatures increased. Lower grade fuels also can be used.

B80-10068

REDUCING STATIC CHARGES IN FLUIDIZED BED REACTIONS

T. WYDEVEN, E. V. BALLOU (San Jose State Univ. Foundation),

P. C. WOOD (San Jose State Univ. Foundation), and L. A. SPITZE

(San Jose State Univ.)

Aug. 1980

ARC-11245

Vol. 5, No. 1, p. 54

Radio frequency glow discharge apparatus ionizes fluidizing gas, making it conductive enough to neutralize static charge on fluidized particles. Particles agglomerate less, and in one case reactant loading capacity was increased six fold.

B80-10069

TRANSFERRING SMALL SAMPLES OF VISCOUS LIQUID

B. W. MILLER (Rockwell International Corp.), S. M. MITCHELL (Rockwell International Corp.), and J. N. OLNEY (Rockwell International Corp.)

Aug. 1980

MSC-18533

Vol. 5, No. 1, p. 55

To avoid trapped air bubbles, fluid after removing plunger. Plunger is reinserted, syringe inverted, and air bubbles expelled by depressing plunger. Technique makes it easy to control sample quantities as small as one microliter, without problems from bubbles created by plunger suction.

B80-10070

COAL CONVERSION AND SYNTHETIC-FUEL PRODUCTION

R. BRADFORD, W. T. ATKINS (BDM Corp.), R. M. BASS (BDM Corp.), R. DASCHER (BDM Corp.), J. DUNKIN (BDM Corp.), N. LUCE (BDM Corp.), W. SEWARD (BDM Corp.), and D. WARREN (BDM Corp.)

Aug. 1980

M-FS-25330

Vol. 5, No. 1, p. 56

Report evaluates potential coal gasification and synthetic-fuel production technologies for 1985 to 1990. Book includes overview of present and future technical and economic potential, ways of evaluating gasification facility designs, discussion of promising processes, characterization of potential markets, and list of available gasification systems.

B80-10071

UNDERGROUND COAL MINING

G. M. HILL (Caltech)

Aug. 1980

NPO-14704

Vol. 5, No. 1, p. 56

Computer program models coal-mining production, equipment failure and equipment repair. Underground mine is represented as collection of work stations requiring service by production and repair crews alternately. Model projects equipment availability and productivity, and indicates proper balance of labor and equipment. Program is in FORTRAN IV for batch execution; it has been implemented on UNIVAC 1108.

B80-10204

A TEMPERATURE FIXED POINT NEAR 58 C

M. E. GLICKSMAN (Rensselaer Polytech. Inst.)

Sep. 1980

M-FS-25304

Vol. 5, No. 2, p. 179

Triple-point cell constrains about 300 g of high-purity succinonitrile. Experiments show that lower 4 cm of thermometer well are virtually isothermal, making placement of thermometer not very critical. Bulb at bottom of well helps to prevent solid succinonitrile mantle from slipping.

B80-10205

REMOVAL OF HYDROGEN BUBBLES FROM NUCLEAR REACTORS

R. V. JENKINS

Sep. 1980

LANGLEY-12597

Vol. 5, No. 2, p. 180

Method proposed for removing large hydrogen bubbles from nuclear environment uses, in its simplest form, hollow spheres of palladium or platinum. Methods would result in hydrogen bubble being reduced in size without letting more radioactivity outside reactor.

B80-10206

PLASTICIZER FOR POLYIMIDE COMPOSITES

T. L. ST. CLAIR (V.P.I. & State Univ.) and J. M. BUTLER

Sep. 1980

LANGLEY-12642

Vol. 5, No. 2, p. 180

Problem of maintaining good prepreg tack and drape has been solved by modification of addition polyimide. Tack and drape are ability of prepreg to adhere to adjacent plies and to conform to desired shape during layup process. Alternate approach allows both longer life of polymer prepreg and processing of low-void laminates. It appears to be applicable to all addition polyimide systems. Modified addition polyimide takes advantage of reactive

liquid plasticizer, monoethylphthalate, which is used in place of solvent. Because of low vapor pressure of reactive liquid, it is retained and, thereby, tack and flexibility of prepreg are retained.

B80-10207**IMPROVED ADHERENCE OF TiC COATINGS TO STEEL**

W. A. BRAINARD and D. R. WHEELER

Sep. 1980 See also NASA TP-1377(N79-15184)

LEWIS-13169

Vol. 5, No. 2, p. 181

Modified process for RF sputtering of titanium carbide coatings onto 440-C steel has resulted in improved adherence. Small partial pressure of nitrogen, approximately 0.5 percent, during first minutes of deposition marked by improved adherence, friction, and wear properties when compared with coatings applied on sputter-etched surfaces, or oxidized surfaces or in presence of small oxygen partial pressure. X-ray photoelectron spectroscopy and X-ray diffraction were used to characterize resultant coatings.

B80-10208**HYBRID POLYMER MICROSPHERES**

A. REMBAUM (Caltech)

Sep. 1980

NPO-14462

Vol. 5, No. 2, p. 182

Techniques have been successfully tested for bonding polymeric spheres, typically 0.1 micron in diameter, to spheres with diameter up to 100 microns. Hybrids are being developed as improved packing material for ion-exchange columns, filters, and separators.

B80-10209**COMPOSITES FOR AEROPROPULSION**

G. M. AULT and J. C. FRECHE

Sep. 1980

LEWIS-13438

Vol. 5, No. 2, p. 183

Report summarizes status of composite materials for aeropropulsion. It describes key advances made in past several years and lists 47 references published from 1971 to 1979.

B80-10210**LUBRICATION HANDBOOK**

Innovator not given (Midwest Res. Inst.) Sep. 1980

M-FS-25158

Vol. 5, No. 2, p. 183

Handbook is divided into two major parts: solid lubricants and liquid lubricants used in aerospace industry. Listed materials cover broad application spectrum from manufacturing and ground support to missile and spacecraft hardware. Handbook can serve as ready reference in design and maintenance service of industrial equipment.

B80-10211**METHANE/AIR FLAMES IN A CONCENTRIC TUBE COMBUSTOR**

N. C. MARKATOS (Concentration, Heat and Momentum Ltd.), D. B. SPALDING (Concentration, Heat and Momentum Ltd.), and S. K. SRTVATSA (Concentration, Heat and Momentum Ltd.)

Sep. 1980

LEWIS-13388

Vol. 5, No. 2, p. 184

Computer program gives realistic prediction of hydrodynamics and chemical reaction in reverse-flow two-concentric-tube combustor. Special attention is given to formation of oxides of nitrogen in combustion process. Program is written in FORTRAN IV for batch execution.

B80-10350**HEAT RESISTANT POLYPHOSPHAZENE POLYMERS**

L. L. FEWELL, H. R. ALLCOCK (Pennsylvania State Univ.), J. P. OBRIEN (Pennsylvania State Univ.), and A. G. SCOPELIANOS (Pennsylvania State Univ.)

Jan. 1981

ARC-11176

Vol. 5, No. 3, p. 319

Polymers of carboranyl substituted polyphosphazene are stable at high temperatures and produce insulating char upon pyrolysis. Substituted compounds are prepared by heat polymerizing carboranyl halophosphazene, which is obtained by reacting lithium carborane with, for example, hexachlorocyclotriphosphazene

under anhydrous conditions. Chlorine of polymer may be replaced by aryloxy and alkoxy groups.

B80-10351**OXIDE DISPERSION STRENGTHENED SUPERALLOY**

T. K. GLASGOW, Y. G. KIM (Inco R and D Ctr.), L. R. CURWICK (Inco R and D Ctr.), and H. F. MERRICK (Inco R and D Ctr.)

Jan. 1981 See also NASA-CR-135150(N77-22213); NASA-CR-159493(N80-13218); NASA-TM-79088(N79-20180)

LEWIS-13589

Vol. 5, No. 3, p. 320

MA6000E alloy is strengthened at high temperatures by dispersion of yttrium oxide. Strength properties are about twice those of conventional nickel base alloys. Good thermal fatigue, intermediate temperature strength, and good oxidation resistance give alloy unique combination of benefits. Application in aircraft gas turbine is improved.

B80-10352**LOW COST HIGH TEMPERATURE, DUPLEX COATING FOR SUPERALLOYS**

S. G. YOUNG and D. L. DEADMORE

Jan. 1981 See also NASA-TM-79178(N79-29292)

LEWIS-13497

Vol. 5, No. 3, p. 321

Duplex silicon-slurry/aluminide coating substantially improves high temperature resistance to oxidation and corrosion of nickel base alloys. Coating used in critical sections of power systems like turbojet engines extends their operating capabilities.

B80-10353**IMPROVED METALLIC AND THERMAL BARRIER COATINGS**

S. STECURA

Jan. 1981 See also NASA-TM-79206(N7929293); NASA-TM-78976(N78-31212)

LEWIS-13324

Vol. 5, No. 3, p. 321

Low thermal conductivity two layer ceramic coatings are efficient thermal barriers between cooled metallic components and high temperature combustion gases. Potential components are combustors, blades, and vanes in aircraft engines of power-generating turbines. Presence of two layer coatings greatly reduces temperature and coolant requirements.

B80-10354**RESIN CHAR OXIDATION RETARDANT FOR COMPOSITES**

K. J. BOWLES and R. E. GLUYAS

Jan. 1981 See also NASA-TM-79314(N80-14196); NASA-TM-79288(N80-13171)

LEWIS-13275

Vol. 5, No. 3, p. 322

Boron powder stabilizes char, so burned substances are shiny, smooth, and free of loose graphite fibers. Resin weight loss of laminates during burning in air is identical for the first three minutes for unfilled and boron-filled samples, then boron samples stabilize.

B80-10355**COMPOSITES WITH NEARLY ZERO THERMAL EXPANSION**

T. J. DUNN, A. J. CWIERTNY, JR. (McDonnell Douglas Corp.), V. L. FREEMAN (McDonnell Douglas Corp.), and R. JOHNSON, JR. (McDonnell Douglas Corp.)

Jan. 1981 See also NASA-CR-160558(N80-19144)

MSC-18724

Vol. 5, No. 3, p. 323

Graphite, glass, and resin composite is very strong, stiff, and thermally stable. As mounting material for antennas, mirrors and lenses, composite minimizes structural distortion and misalignment. Rods of substance are made by pulling prepreg ribbon of glass and graphite through die. When materials are combined in proper proportion, graphite contracts, and glass and resin expand as temperature increases. Matrix for fiber may be polysulfane, epoxy, polyimide, or other resin.

B80-10356**CARBON SCRUBBER**

M. S. FRANT (Orion Res., Inc.)

Jan. 1981

MSC-16531

Vol. 5, No. 3, p. 324

Inorganic carbon is removed from samples to be analyzed

04 MATERIALS

for 'total organic carbon'. In automated water analysis systems, semipermeable membrane separates two sample streams, one treated with acid, other with base. Carbonate and bicarbonated ions are converted to dissolved CO₂ by acid; reverse process occurs in basic stream. Only CO₂ is passed by membrane, from acid treated stream to base treated stream. Acidic stream emerges free of all inorganic carbon.

B80-10357

ELECTRICALLY CONDUCTIVE PALLADIUM-CONTAINING POLYIMIDE FILMS

A. K. ST. CLAIR, T. A. FURTSCH (VPI&SU), and L. T. TAYLOR (VPI&SU)

Jan. 1981

LANGLEY-12629

Vol. 5, No. 3, p. 326

Palladium addition makes light, flexible film with low resistivity to relieve space charging. Polyimide film is prepared in four steps: preparation of polyamic acid in polar solvent; addition of soluble palladium complex salt; fabrication of film of 'palladium polyamic acid' solution; and thermal imidization of film to palladium-containing polyimide by 300 C heating. Lowered resistivities were achieved without loss in film flexibility or increase in film weight.

B80-10358

ALUMINUM IONS ENHANCE POLYIMIDE ADHESIVE

A. K. ST. CLAIR, T. L. ST. CLAIR, and L. T. TAYLOR (VPI&SU)

Jan. 1981

LANGLEY-12640

Vol. 5, No. 3, p. 326

Adding complexed aluminum ions raises useful temperature of polyimide adhesive without embrittling it or reducing long term stability. Adhesives may be applied to prepared substrate surface without supports. Possible substrates are metal, composite, or polymeric film. Adhesive is excellent where bond flexibility is required.

B80-10359

SIMULTANEOUS MEASUREMENT OF THREE ATMOSPHERIC POLLUTANTS

M. P. SINHA (Caltech)

Jan. 1981

NPO-14828

Vol. 5, No. 3, p. 327

Method enables simultaneous concentration monitoring of atmospheric SO₂, NO, and NO₂. Fluorescing pollutant gases in sample are excited by visible output of dye laser and its second-harmonic ultraviolet frequencies. Three photomultipliers, each with suitable optical filters, view fluorescence. Method tests ambient air, stack emissions, and highway automotive exhausts.

B80-10360

AEROSOL LASTS UP TO SIX MINUTES

M. A. APPEL (Caltech)

Jan. 1981

NPO-14947

Vol. 5, No. 3, p. 328

Simple aerosol generator catalytically converts hydrogen peroxide to super-heated steam and then mixes steam with dye. Highly visible mist lasts for 6 minutes and can be used to study aerodynamic turbulence. Method does not depend on formation of ice crystals at cold high altitudes and is environmentally safe.

B80-10361

HIGH CHAR YIELD EPOXY CURING AGENTS

P. DELVIGS, T. T. SERAFINI, and R. D. VANUCCI

Jan. 1981 See also NASA-TM-79226(N79-29240)

LEWIS-13226

Vol. 5, No. 3, p. 328

Class of imide-amine curing agents preserves structural integrity, prevents fiber release, and is fully compatible with conventional epoxy resins; agents do not detract from composite properties while greatly reducing char yield. Materials utilizing curing are used in aerospace, automotive, and other structural components where deterioration must be minimized and fiber release avoided in event of fire.

B80-10362

CAP PROTECTS AIRCRAFT NOSE CONE

C. F. BRYAN, JR. and D. C. BRYAN

Jan. 1981

LANGLEY-12367

Vol. 5, No. 3, p. 329

Inexpensive, easily fabricated cap protects aircraft nose cone from erosion. Made of molded polycarbonate, cap has been flight tested at both subsonic and supersonic speeds. Its strength and erosion characteristics are superior to those of fiberglass cones.

B80-10363

LASER BEAM METHANE DETECTOR

E. D. HINKLEY, JR. (Caltech)

Jan. 1981

NPO-14929

Vol. 5, No. 3, p. 330

Instrument uses infrared absorption to determine methane concentration in liquid natural gas vapor. Two sensors measure intensity of 3.39 mm laser beam after it passes through gas; absorption is proportional to concentration of methane. Instrument is used in modeling spread of LNG clouds and as leak detector on LNG carriers and installations. Unit includes wheels for mobility and is both vertically and horizontally operable.

B80-10364

REDUCED HYDROGEN PERMEABILITY AT HIGH TEMPERATURES

J. R. STEPHENS, W. D. KLOPP, and J. A. MISENICK

Jan. 1981

LEWIS-13486

Vol. 5, No. 3, p. 331

CO and CO₂ reduce hydrogen loss through iron, nickel, and cobalt based alloy tubes. Method is based on concept that oxide film on metal surface reduces hydrogen permeability through metal; adding CO or CO₂ forms oxide films continuously during operation, and hydrogen containment is improved. Innovation enhances prospects for Stirling engine system utilization.

B80-10365

CHLORINOLYSIS RECLAIMS RUBBER OF WASTE TIRES

E. R. DUFRESNE (Caltech), J. H. TERVET (Caltech), and G. G. HULL (Caltech)

Jan. 1981

NPO-14935

Vol. 5, No. 3, p. 331

Process reclaims rubber and reduces sulfur content by using chlorine gas to oxidize sulfur bonds in preference to other bonds. Rubber does not have poor hysteresis and abrasion resistance like conventionally reclaimed rubber and is suitable for premium radial tires. Chlorinated rubber is less susceptible to swelling by oils and may be used as paint ingredient.

B80-10366

REDUCED GRAVITY FAVORS COLUMNAR CRYSTAL GROWTH

T. Z. KATTAMIS (Grumman Aerospace Corp.) and J. M. PAPAZIAN (Grumman Aerospace Corp.)

Jan. 1981

M-FS-25205

Vol. 5, No. 3, p. 332

In zero gravity, aligned columnar microstructures form at expense of equiaxed growth. Preferential crystal growth occurs in solidification chamber consisting of semicylindrical copper chill block brazed to stainless steel top plate. Method is best utilized in castings where directional dependence of physical properties is beneficial, as in turbine blades.

B80-10489

IMPROVED CELL FOR WATER-VAPOR ELECTROLYSIS

J. R. AYLWARD (United Technologies Corp.)

Apr. 1981

MSC-16394

Vol. 5, No. 4, p. 447

Continuous-flow electrolytic cells decompose water vapor in steam and room air into hydrogen and oxygen. Sintered iridium oxide catalytic anode coating yields dissociation rates hundredfold greater than those obtained using platinum black. Cell consists of two mirror-image cells, with dual cathode sandwiched between two anodes. Gas traverses serpentine channels within cell and is dissociated at anode. Oxygen mingles with gas stream, while hydrogen migrates through porous matrix and is liberated as gas at cathode.

B80-10490**APPLYING THE HELIUM IONIZATION DETECTOR IN CHROMATOGRAPHY**

E. K. GIBSON, F. F. ANDRAWES (Lockheed Engineering and Management Services Co., Inc.), and R. S. BRAZELL (University of Houston)

Apr. 1981

MSC-18835

Vol. 5, No. 4, p. 448

High noise levels and oversensitivity of helium detector make flame-ionization and thermal-conductivity detectors more suitable for chromatography. Deficiencies are eliminated by modifying helium device to operate in saturation rather than multiplication mode. Result is low background current, low noise, high stability, and high sensitivity. Detector analyzes halocarbons, hydrocarbons, hydrogen cyanide, ammonia, and inorganics without requiring expensive research-grade helium.

B80-10491**PHOTOPRODUCTION OF HALOGENS USING PLATINIZED TIO₂**

B. REICHMAN (Christopher Newport College) and C. E. BYVIK

Apr. 1981

LANGLEY-12713

Vol. 5, No. 4, p. 449

Unlike electrolysis of halide salt solutions, technique using powdered titanium dioxide catalyst requires no external power other than ultraviolet radiation source. Semiconductor powders photocatalyze and photosynthesize many useful reactions; applications are production of halogen molecules, oxidation of hazardous materials in wastewater, and conversion of carbon monoxide to carbon dioxide.

B80-10492**RECYCLING PAPER-PULP WASTE LIQUORS**

M. N. SARBOLOUKI (Caltech)

Apr. 1981

NPO-14797

Vol. 5, No. 4, p. 450

Papermills in U.S. annually produce 3 million tons of sulfite waste liquor solids; other fractions of waste liquor are monomeric sugars and lignosulfonates in solution. Recovery of lignosulfonates involves precipitation and cross-linking of sulfonates to form useful solid ion-exchange resin. Contamination of sugars recovered from liquor is avoided by first converting them to ethanol, then removing ethanol by distillation.

B80-10493**USER CHOOSES COATING PROPERTIES**

C. S. GILLILAND and R. J. DUCKETT

Apr. 1981

LANGLEY-12719

Vol. 5, No. 4, p. 451

Anodizing technique allows independent selection of coating thermal emittance and solar absorption. Process has three phases: initial material processing, which prepares material and establishes initial values of emittance and absorption; anodizing with chromic acid solution, which determines final values; and material postprocessing. Stability tests show less than 15 percent coating degradation over 2,000 hour solar exposure.

B80-10494**REMOVING FREON GAS FROM HYDRAULIC FLUID**

B. B. WILLIAMS (Rockwell International Corp.), S. M. MITCHELL (Rockwell International Corp.), and T. S. STATE (Rockwell International Corp.)

Apr. 1981

MSC-18740

Vol. 5, No. 4, p. 452

Dissolved freon gas is removed from hydraulic fluid by raising temperature to 150 F and bubbling dry nitrogen gas through it, even while fluid circulates through hydraulic system. Procedure reduces parts corrosion, sludge formation, and contamination.

B80-10495**NEW PRESSURE-SENSITIVE SILICONE ADHESIVE**

J. L. LEIFFER, W. E. STOOPS, JR., T. L. ST. CLAIR, V. E. WATKINS, JR., and T. P. KELLY

Apr. 1981

LANGLEY-12737

Vol. 5, No. 4, p. 452

Adhesive for high or low temperatures does not stretch

severely under load. It is produced by combining intermediate-molecular-weight pressure sensitive adhesive which does not cure with silicone resin that cures with catalyst to rubbery tack-free state. Blend of silicone tackifier and cured rubbery silicone requires no solvents in either atmospheric or vacuum environments. Ratio of ingredients varies for different degrees of tack, creep resistance, and tensile strength.

B80-10496**DRIVING BUBBLES OUT OF GLASS**

D. M. MATTOX (Westinghouse Electric Corp.)

Apr. 1981

M-FS-25414

Vol. 5, No. 4, p. 453

Surface tension gradient in melt forces gas bubbles to surface, increasing glass strength and transparency. Conventional chemical and buoyant fining are extremely slow in viscous glasses, but tension gradient method moves 250 um bubbles as rapidly as 30 um/s. Heat required for high temperature part of melt is furnished by stationary electrical or natural-gas heater; induction and laser heating are also possible. Method has many applications in industry processes.

B80-10497**LESS-TOXIC CORROSION INHIBITORS**

T. S. HUMPHRIES

Apr. 1981 See also NASA-TP-1279(N78-28226)

M-FS-25496

Vol. 5, No. 4, p. 453

Combinations of borates, nitrates, phosphates, silicates, and sodium MBT protect aluminum from corrosion in fresh water. Most effective combinations contained sodium phosphate and were alkaline. These inhibitors replace toxic chromates which are subject to governmental restrictions, but must be used in larger quantities. Experimental exposure times varied from 1 to 14 months depending upon nature of submersion solution.

B80-10498**DIFFUSION IN SINGLE-PHASE BINARY ALLOYS**

D. R. TENNEY and J. UNNAM (VPI and State University)

Apr. 1981

LANGLEY-12665

Vol. 5, No. 4, p. 454

DBAS 1 computer program provides analyst with simple algorithms for exact rapid solutions of systems with planar, cylindrical, or spherical interfaces. Conventional solutions are complex and present convergence problems. Two algorithm types are figured for each geometry; one converges rapidly for short and the other for long diffusion times. DBAS 1 is written in FORTRAN IV for batch execution.

05 LIFE SCIENCES

B80-10072**TEMPERATURE CONTROLLER FOR HYPERTHERMIA DEVICES**

R. H. COUCH, C. P. HEARN, and J. B. WILLIAMS

Aug. 1980

LANGLEY-12528

Vol. 5, No. 1, p. 59

Temperature controller monitors and controls temperature in local region of tumor. Medical grade thermocouples are inserted in or near tumor, controller pulse modulates radio frequency diathermy power source to maintain temperature within 0.2 C. System may be extended to control diathermy of more than one tumor or patient.

B80-10073**MEASURING WATER PROPERTIES FROM A MOVING BOAT**

A. G. LAWSON

Aug. 1980

LANGLEY-12325

Vol. 5, No. 1, p. 60

Modification of commercial water analyzer permits measure-

05 LIFE SCIENCES

ment of pH, temperature, dissolved oxygen, conductivity, and turbidity for continuous water flow. Ram pressure on inlet tube mounted below power boat drives water through modified sample chamber where it is analyzed.

B80-10212

TESTING EKG ELECTRODES ON-LINE

W. G. CROSIER (Technol., Inc.) and G. S. RUTT (Technol., Inc.)
Sep. 1980

MSC-18696

Vol. 5, No. 2, p. 187

Simple test instrument allows electrocardiograph operator to check individual electrodes while they are attached to subject. Simply by rotating switch and observing meter, operator verifies that each electrode is not short-circuited or open-circuited and does not present excessive contact resistance at its interface with skin. Instrument also makes it convenient to check electrode cables that are subject to frequent bending and wear, such as cables used on patients who are exercising.

B80-10213

LASER-FLUORESCENCE MEASUREMENT OF MARINE ALGAE

E. V. BROWELL

Sep. 1980 See also NASA TND-8447(N77-26480)

LANGLEY-12282

Vol. 5, No. 2, p. 187

Progress in remote sensing of algae by laser-induced fluorescence is subject of comprehensive report. Existing single-wavelength and four-wavelength systems are reviewed, and new expression for power received by airborne sensor is derived. Result differs by as much as factor of 10 from those previously reported. Detailed error analysis evaluates factors affecting accuracy of laser-fluoresensor systems.

B80-10367

FLOW SENSOR FOR BIOMEDICAL FLUIDS

H. E. WINKLER

Jan. 1981 See also B78-10267

MSC-18761

Vol. 5, No. 3, p. 335

Electronic sensor accurately measures and controls flow of plasma, whole blood, or drugs in solution. Since sensor does not directly contact fluid, it does not have to be sterilized. It is compatible with disposable bottles, tubes, and hypodermic needles widely used in hospitals. Only modification necessary is in tube, which must contain two small metal inserts, spaced to fit in curved thermistor plates.

B80-10368

TREATING DOMESTIC WASTEWATER WITH WATER HYACINTHS

R. C. MCDONALD (Nat'l. Space Sci. Lab.) and B. C. WOLVERTON
Jan. 1981

M-FS-23964

Vol. 5, No. 3, p. 336

Greenhouse system purifies water, extracts fertilizers, and generates fuels. When fully developed, system may supplant septic tanks and central sewage for rural and underdeveloped areas.

B80-10369

COMPLIANT TRANSDUCER MEASURES ARTERY PROFILE

C. FELDSTEIN (Caltech), V. H. CULLER (Caltech), D. W. CRAWFORD (So. Calif. Univ.), and J. R. SPEARS (So. Calif. Univ.)

Jan. 1981

NPO-14899

Vol. 5, No. 3, p. 337

Instrument consisting of compliant fingers with attached semiconductor pickups measures inside contours of narrow vessels. Instrument, originally designed to monitor human arteries, is drawn through vessel to allow fingers to follow contours. Lead wires transmit electrical signals to external processing equipment.

B80-10370

IMPROVED URETERAL STONE FRAGMENTATION CATHETER

P. M. GAMMELL (Caltech)

Jan. 1981

NPO-14745

Vol. 5, No. 3, p. 337

Catheter includes fiber optic viewer, more reliable ultrasonic

probe, and better contact sensor. It is guided by four steering wires, and irrigation fluid is supplied through lumen to remove stone fragments.

B80-10371

MINIATURIZED PHYSIOLOGICAL DATA TELEMTRY SYSTEM

W. M. PORTNOY (Texas Tech. Univ.) and L. J. STOTTS (Texas Tech. Univ.)

Jan. 1981 See also NASA-CR-160660(N80-24357)

MSC-18804

Vol. 5, No. 3, p. 338

Portable digital physiological data telemetry system uses less power, is more compact, and provides better data integrity than two previous systems designed to similar specifications. It has 13 data channels and two-way voice communication.

B80-10372

MANUAL FOR PHYSICAL FITNESS

A. E. COLEMAN (Univ. of Houston)

Jan. 1981 See also NASA-CR-160758(N80-29024)

MSC-18915

Vol. 5, No. 3, p. 339

Training manual used for preflight conditioning of NASA astronauts is written for audience with diverse backgrounds and interests. It suggests programs for various levels of fitness, including sample starter programs, safe progression schedules, and stretching exercises. Related information on equipment needs, environmental considerations, and precautions can help readers design safe and effective running programs.

B80-10499

CARDIOPULMONARY DATA-ACQUISITION SYSTEM

W. G. CROSIER and R. A. REED

Apr. 1981 See also NASA-CR-160608(N80-33083); NASA-CR-160609(N80-33084); B80-10501

MSC-18783

Vol. 5, No. 4, p. 457

Computerized system controls and monitors bicycle and treadmill cardiovascular stress tests. It acquires and reduces stress data and displays heart rate, blood pressure, workload, respiratory rate, exhaled-gas composition, and other variables. Data are printed on hard-copy terminal every 30 seconds for quick operator response to patient. Ergometer workload is controlled in real time according to experimental protocol. Collected data are stored directly on tape in analog form and on floppy disks in digital form for later processing.

B80-10500

MICROPROCESSOR-CONTROLLED ULTRASONIC PLETHYSMOGRAPH

P. K. BHAGAT (University of Kentucky) and V. C. WU (University of Kentucky)

Apr. 1981

MSC-18759

Vol. 5, No. 4, p. 458

Safe, noninvasive microprocessor system times ultrasonic pulses to measure limb cross-sectional area. Simple instrument requires no calibration and does not confine leg movement, making tests relating limb volume to activity level possible. Program considers more realistic geometries of human limb than circular cross-sections and monitors changes in area with great accuracy. Errors due to body temperature changes and timing roundoff are insignificant.

B80-10501

MICROPROCESSOR-BASED CARDIOTACHOMETER

W. G. CROSIER (Technology, Inc.) and J. A. DONALDSON (Technology, Inc.)

Apr. 1981 See also NASA-CR-160607(N80-33082); B80-10499

MSC-18775

Vol. 5, No. 4, p. 459

Instrument operates reliably even with stress-test electrocardiogram (ECG) signals subject to noise, baseline wandering, and amplitude change. It records heart rate from preamplified, single-lead ECG input signal and produces digital and analog heart-rate outputs which are fed elsewhere. Analog hardware processes ECG input signal, producing 10-ms pulse for each heartbeat. Microprocessor analyzes resulting pulse train, identifying

irregular heartbeats and maintaining stable output during lead switching. Easily modified computer program provides analysis.

B80-10502

IMPROVED MICROBE DETECTION IN WATER SAMPLES
J. R. WILKINS, D. C. GRANA, and S. C. FOX (The Bionetics Corp.)

Apr. 1981

LANGLEY-12709 Vol. 5, No. 4, p. 460

Method combines membrane filtration and electrochemical microbial detection. Together, techniques give fast response and accurate detection of low concentrations. Membrane filter placed on moistened absorbent pad collects cells; platinum-wire electrodes are positioned on filter surface. Second moistened pad is placed on top of electrodes and filter. Retainer ring maintains constant pressure and close contact between system components which are held in petri dish to reduce moisture loss.

B80-10503

GAGE FOR EVALUATING RHEUMATOID HANDS

J. C. HOUGE (University of Wisconsin) and K. A. PLAUTZ (University of Wisconsin)

Apr. 1981

GSFC-12610 Vol. 5, No. 4, p. 461

Two-axis goniometer accurately measures movements of fingers about knuckle joints, diagnosing hands structurally changed by rheumatoid arthritis. Instrument measures lateral movement which is small in normal knuckles but increased in diseased joints. Goniometer is two connected protractors that simultaneously measure angles in perpendicular planes. Dials are offset to clear bony protuberances; extension and offset adjustments span any hand size.

B80-10504

FIBER-OPTICS COUPLE ARTHROSCOPE TO TV

J. M. FRANKE and D. B. RHODES

Apr. 1981

LANGLEY-12718 Vol. 5, No. 4, p. 462

Convenient, hand-held coupler images output of arthroscope onto coherent fiber bundle. Arthroscope allows surgeons to examine internal organs through any small opening in body. Coupler is also used for engine inspection, instrument repair, and around-corner visual inspection. Image from arthroscope travels along flexible bundle and appears at other cable end where it is recollimated by lens. Image is read from lens or projected on color TV camera.

B80-10505

BEEF GRADING BY ULTRASOUND

P. M. GAMMELL (Caltech)

Apr. 1981

NPO-14812 Vol. 5, No. 4, p. 463

Reflections in ultrasonic A-scan signatures of beef carcasses indicate USDA grade. Since reflections from within muscle are determined primarily by fat/muscle interface, richness of signals is direct indication of degree of marbling and quality. Method replaces subjective sight and feel tests by individual graders and is applicable to grade analysis of live cattle.

06 MECHANICS

B80-10074

CABLE-SPLICE DETECTOR

R. D. LEE, E. J. IUFR, and A. GIOVANNETTI

Aug. 1980

ARC-11291 Vol. 5, No. 1, p. 63

Detector has possible uses in aerial cable-car systems, equipment handling in mines, boreholes, and undersea operations, and other applications where moving steel cable must be

measured, monitored, or controlled. Detector consists of Hall-effect magnetic sensor located close to cable. Magnetic markings on cable are converted to electrical signals. Signals are filtered, amplified, and can actuate alarm.

B80-10075

LVDT GAGE FOR FRACTURE-TOUGHNESS TESTS IN LIQUID HYDROGEN

W. S. PIERCE and J. L. SHANNON, JR.

Aug. 1980

LEWIS-13038 Vol. 5, No. 1, p. 64

Linear-variable differential transformer replaces conventional resistance strain gages to measure crack-mouth-opening displacement. LVDT is superior in tests under liquid hydrogen, where boiling of hydrogen on resistive is suited to broad temperature range and hostile environments such as nuclear reactors.

B80-10076

TENSION-MODE LOADING FOR BEND SPECIMENS IN CRYOGENS

W. S. PIERCE and J. L. SHANNON, JR.

Aug. 1980

LEWIS-13040 Vol. 5, No. 1, p. 65

Special fixture permits use of tension-loading apparatus in fracture-toughness tests on standard bend specimens. Specimen is held in place by spacer blocks and wire clips. Central, load-application roller bends specimen between lateral, reaction-load rollers.

B80-10077

MODIFIED DISPLACEMENT GAGE FOR CRYOGENIC TESTING

W. S. PIERCE

Aug. 1980 See also NASA-TN-D-3724 (N67-10749)

LEWIS-13039 Vol. 5, No. 1, p. 66

Modification of double-cantilever-beam resistance strain gage makes boiling of hydrogen on gage arms less of problem. Modified gages are encapsulated nickel/chromium alloy, and bridge-excitation voltage is reduced from 10 to 1.5 volts. Sensitivity is 1.0 millivolt per inch with 1.5 volt excitation.

B80-10078

BROADBAND ELECTROSTATIC ACOUSTIC TRANSDUCER FOR LIQUIDS

J. H. CANTRELL, JR. (National Research Council), J. S. HEYMAN, M. A. BREAZEALE (Univ. of Tennessee), M. A. TORBETT (Univ. of Tennessee), and W. T. YOST (Univ. of Tennessee)

Aug. 1980

LANGLEY-12465 Vol. 5, No. 1, p. 67

Capacitive electrostatic transducer (ESAT) measures absolute displacement amplitudes of ultrasonic waves in liquids, and may be used as calibrator for other transducers or as probe for nondestructive study and characterization of materials. ESAT consists of thin conductive membrane stretched over metallic housing. Ultrasonic waves incident on membrane cause it to vibrate and generate signal proportional to wave amplitude. Entire assembly is sealed for immersion in liquid.

B80-10079

EDDY-CURRENT SENSOR MEASURES BOLT LOADING

M. E. BURR (Rockwell International Corp.)

Aug. 1980

M-FS-19486 Vol. 5, No. 1, p. 68

Thin wire welded to bottom of hole down center of bolt permits measurement of tension in bolt. Bolt lengthens under strain, but wire is not loaded, so gap between wire and eddy-current gap transducer mounted on bolt head indicates bolt loading. Eddy-current transducer could measure gap within 0.05 mm. Method does not require separate 'standard' for each bolt type, and is not sensitive to dirt or oil in bolt hole, unlike ultrasonic probes.

B80-10080

MULTIPLE-CREEP-TEST APPARATUS

C. L. HAEHNER

06 MECHANICS

Aug. 1980

GSFC-12561

Vol. 5, No. 1, p. 69

Simplified, compact apparatus uses fixtures that can test three samples at once for flexure, compression, or double-shear creep. Each fixture uses series of rods and plates to divide one load equally among three samples. Fixtures could be expanded to carry more samples by adding more rods and plates.

B80-10081

COMPACT, SUPER HEAT EXCHANGER

A. FORTINI and J. M. KAZAROFF

Aug. 1980

LEWIS-12441

Vol. 5, No. 1, p. 70

Heat exchanger uses porous media to enhance heat transfer through walls of cooling channels, thereby lowering wall temperature. Porous media within cooling channel increases internal surface area from which heat can be transferred to coolant. Comparison data shows wall has lower temperature and coolant has higher temperature when porous medium is used within heat exchanger. Media can be sintered powdered metal, metal fibers, woven wire layers, or any porous metal having desired permeability and porosity.

B80-10082

APPLICATIONS OF REMOTE-SENSING IMAGERY

T. H. HUGHES (Univ. of Alabama)

Aug. 1980

M-FS-25107

Vol. 5, No. 1, p. 71

Compilation of reports discusses usefulness of aircraft and satellite data in land-development projects. Landsat and Earth Resources Technology Satellites data are available to general public. Much information on biological, geological, and hydrological features as well as land use can be determined by eye without sophisticated analyzers.

B80-10083

EQUATIONS OF MOTION FOR COUPLED N-BODY SYSTEMS

H. P. FRISCH

Aug. 1980

GSFC-12407

Vol. 5, No. 1, p. 72

Computer program, developed to analyze spacecraft attitude dynamics, can be applied to large class of problems involving objects that can be simplified into component parts. Systems of coupled rigid bodies, point masses, symmetric wheels, and elastically flexible bodies can be analyzed. Program derives complete set of non-linear equations of motion in vector/dyadic format. Numerical solutions may be printed out. Program is in FORTRAN IV for batch execution and has been implemented on IBM 360.

B80-10084

VISCOUS CHARACTERISTICS ANALYSIS

R. V. JENKINS

Aug. 1980

LANGLEY-12598

Vol. 5, No. 1, p. 72

Program considers combustion and diffusive effects in analysis of supersonic, combustion-flow fields with imbedded subsonic regions. Effects of finite-rate chemistry, mixing, and wave propagation are linked together. Program handles up to 20 simultaneous shock waves. Some chemistry terms are computed for seven-species, eight-mechanism, hydrogen-and-air reaction scheme. Program is aid for supersonic-combustor development studies and is written in FORTRAN IV for batch execution on CYBER 175.

B80-10085

TRANSONIC AIRFOIL DESIGN CODE

F. BAUER (New York Univ.), P. GARABEDIAN (New York Univ.), and D. KORN (New York Univ.)

Aug. 1980

LANGLEY-12460

Vol. 5, No. 1, p. 73

Program aids in design of shockless airfoils, assists development of fuel-conserving, supercritical wings. Algorithm calculates approximate airfoil shape given prescribed pressure distribution. This allows design of families of transonic airfoils

for use in aircraft wings or turbine and compressor blades. Program is written in FORTRAN IV for batch execution on CDC-6000.

B80-10086

IMPROVED MULTIELEMENT AIRFOIL ANALYSIS

G. W. BRUNE (The Boeing Co.) and J. W. MANKE (The Boeing Co.)

Aug. 1980

LANGLEY-12489

Vol. 5, No. 1, p. 73

Program is revised of NASA/Lockheed program to numerically analyze complex viscous flow about slotted airfoils. Airfoil to be analyzed can contain as many as 10 components with negative or positive overlap. Program is written in FORTRAN IV and Assembled for batch execution on CYBER 175 only.

B80-10087

AIRCRAFT EQUILIBRIUM SPIN CHARACTERISTICS

W. M. ADAMS, JR.

Aug. 1980

LANGLEY-12502

Vol. 5, No. 1, p. 74

Program provides analytic solutions to nonlinear equations of motion describing spin conditions. Stability characteristics also are determined. Program can be used to study effects of aerodynamic and inertial parameters on spin and could be modified to compute equilibrium conditions for steady maneuvers. Program is written in FORTRAN IV for batch execution on CYBER 173.

B80-10088

FLOW FIELD IN SUPERSONIC MIXED-COMPRESSION INLETS

A. R. BISHOP, J. D. HOFFMAN (Purdue Univ.), and J. VADYAK (Purdue Univ.)

Aug. 1980

LEWIS-13279

Vol. 5, No. 1, p. 74

Program uses method of characteristics for steady three-dimensional flow to calculate flow field in supersonic portion of mixed-compression aircraft inlet at non-zero angle of attack. Results agree well with experimental data except in regions of high viscous interaction. Flow field for variety of mixed-compression inlets can be calculated. Input includes geometry and attack of inlet. Output consists of list of parameters, solution planes, and description of shock waves. Program is written in FORTRAN IV for batch execution on CDC 6000-series.

B80-10089

SHELL THEORY AUTOMATED FOR ROTATIONAL STRUCTURES

J. KEY, V. S. GONAS (Grumman Aerospace Corp.), S. LEVINE (Grumman Aerospace Corp.), and P. OGILVIE (Grumman Aerospace Corp.)

Aug. 1980

M-FS-23027

Vol. 5, No. 1, p. 74

Package of numerical integration programs static, buckling, vibration, and plastic analysis on thin shells of revolution. Shells may be subjected to distributed loads, concentrated line loads, and thermal strain. Outputs include stresses, displacement, plastic strains, and vibration and buckling results. Program aids design of aircraft bodies, spacecraft, submarines, and storage tanks. Written in FORTRAN IV for batch execution, program has been implemented on UNIVAC 1108.

B80-10090

THREE-DIMENSIONAL POTENTIAL FLOW

N. D. HALSEY (McDonnell Douglas Corp.) and J. L. HESS (McDonnell Douglas Corp.)

Aug. 1980 See also NASA-TM-80088 (N79-31142)

LANGLEY-12623

Vol. 5, No. 1, p. 75

Program calculates viscous effects on lift and pressure distribution for arbitrary-dimensional lifting configuration. Geometry package generates input data from reduced amount of user-supplied configuration data. Calculated inviscid and viscous lift and pressure distribution agree well with experimental data for variety of wings and wing/fuselages. Program is in FORTRAN IV for batch execution on CYBER 175.

B80-10091**FULL-COVERAGE FILM COOLING**P. L. MEITNER (U.S. Army Research and Technology Laboratories)
Aug. 1980**LEWIS-13249****Vol. 5, No. 1, p. 75**

Program calculates coolant flow and wall temperatures of full-coverage film-cooled vanes or blades. Thermal barrier coatings may be specified on outer surfaces of blade. Program is written in FORTRAN IV for batch execution on UNIVAC 1100.

B80-10092**DISTURBANCE AMPLIFICATION RATES**A. J. SROKOWSKI, S. A. ORSZAG (Cambridge Hydrodynamics, Inc.), T. CEBECH (McDonnell Douglas), and K. KAUPS (McDonnell Douglas Corp.)
Aug. 1980**LANGLEY-12556****Vol. 5, No. 1, p. 76**

Program computes incompressible linear stability characteristics for swept and tapered wings. Amplification rates of boundary-layer disturbances also are calculated. Program is useful in designing tapered, laminar-flow control wings incorporating suction to prevent boundary layer separation. Program is written in FORTRAN IV and Assembler for batch execution on CYBER 70-series.

B80-10214**AUTOMATIC THERMAL SWITCHES**

J. W. CUNNINGHAM and L. D. WING

Sep. 1980

GSFC-12553**Vol. 5, No. 2, p. 191**

Two automatic switches control heat flow from one thermally conductive plate to another. One switch permits heat flow to outside; other limits heat flow. In one switch, heat on conductive plate activates piston that forces saddle against plate. Heat carriers then conduct heat to second plate that radiates it away. After temperature is first plate drops, piston contracts and spring breaks thermal contact with plate. In second switch, action is reversed.

B80-10215**GROOVES REDUCE AIRCRAFT DRAG**

M. J. WALSH

Sep. 1980

LANGLEY-12599**Vol. 5, No. 2, p. 192**

Aerodynamic drag can be reduced by many small longitudinal grooves machined in aircraft skin. Experiments show that grooves parallel to airflow reduce drag by 4 to 7 percent. Reduced drag translates into reduced engine power required to overcome drag and ultimately to lower fuel consumption.

B80-10216**EFFICIENT MEASUREMENT OF SHEAR PROPERTIES OF FIBER COMPOSITES**

C. C. CHAMIS and J. H. SINCLAIR

Sep. 1980 See also NASA-TN-D-8215(N76-22314)

LEWIS-13011**Vol. 5, No. 2, p. 193**

Intralaminar (in-plane) shear characterization (shear stress/strain relationships) of unidirectional fiber composites has been hampered by difficulty of producing state of pure shear in practical laboratory test specimens. Proposed method uses 10 deg off-axis tensile specimen (fiber oriented 10 deg from load direction) in conjunction with simple transformation equations for intralaminar shear characterization of fiber composites.

B80-10217**FRESNEL LENSES FOR ULTRASONIC INSPECTION**

C. C. KAMMERER (Rockwell Intern. Corp.)

Sep. 1980

MSC-18469**Vol. 5, No. 2, p. 194**

Ultrasonic Fresnel lenses are effective focusing elements with potential applications in ultrasonic 'contact' testing for defects in materials. Ultrasonic beams focused on concave lenses are used successfully with immersion transducers, for which test object is immersed in water bath. However, for large objects, objects that are already installed, objects on production lines, and objects that can be damaged by water, contact testing is more practical than immersion.

B80-10218**CHANGES IN 'THERMAL LENS' MEASURE DIFFUSIVITY**

A. GUPTA (Caltech), S. D. HONG (Caltech), and J. MOACANIN (Caltech)

Sep. 1980

NPO-14857**Vol. 5, No. 2, p. 194**

In an extension of 'thermal lens' effect to new applications and better resolution, two laser beams combine to rapidly measure thermal diffusivity and other molecular dynamic properties. New double-beam technique handles very small samples unlike classical techniques for measuring diffusivity. It can be used for measurements on samples undergoing stress, making it applicable to data collection for structural engineering.

B80-10219**PASSIVE WING/STORE FLUTTER SUPPRESSION**

J. T. FOUGHNER, JR., W. H. REED, III, and H. L. RUNYAN, JR. (George Washington Univ.)

Sep. 1980

LANGLEY-12468**Vol. 5, No. 2, p. 195**

Passive flutter-suppression system has been developed to increase flutter speed of aircraft wings that are adversely affected by addition of large masses (stores) to the wings, such as external fuel tanks. Important features of system are its effectiveness for large variations in mass of store as well as unsensitivity of system to large change in location of store center-of-gravity.

B80-10220**SUPPRESSING BUZZ-SAW NOISE IN JET ENGINES**

L. MAESTRELLO

Sep. 1980 See also NASA-TM-78802(N79-13820)

LANGLEY-12645**Vol. 5, No. 2, p. 196**

Buzz-saw noise, most annoying noise component generated by turbofan engines, can be suppressed by installing porous surface on duct wall directly above engine fan-blade tip. Porous surface and its housing would reduce shock-wave reflection from wall and thus suppress noise.

B80-10221**DETECTION OF TANKER DEFECTS WITH INFRARED THERMOGRAPHY**

A. G. KANTSIOS

Sep. 1980

LANGLEY-12655**Vol. 5, No. 2, p. 196**

Infrared scanning technique for finding defects in secondary barrier of liquid natural gas (LNG) tank has been successfully tested on ship under construction at Newport News Shipbuilding and Dry Dock Company. Technique determines defects with minimal expenditure of time and manpower. Tests could be repeated during life of tanker and make more complicated testing unnecessary. Tests also confirmed that tank did not have any major defects, and tank was certified.

B80-10222**RECORDING FLUID CURRENTS BY HOLOGRAPHY**

L. O. HEFLINGER (TRW, Inc.) and R. F. WUERKER (TRW, Inc.)

Sep. 1980

M-FS-25373**Vol. 5, No. 2, p. 198**

Convection in fluids can be studied with aid of holographic apparatus that reveals three-dimensional motion of liquid. Apparatus eliminates images of fixed particles such as dust on windows and lenses, which might mask behavior of moving fluid particles. Holographic apparatus was developed for experiments on fluid convection cells under zero gravity. Principle is adaptable to study of variety of fluid processes—for example, electrochemical plating and combustion in automotive engines.

B80-10223**DOWNHOLE PRESSURE SENSOR**

C. M. BERDAHL (Caltech)

Sep. 1980

NPO-14729**Vol. 5, No. 2, p. 199**

Sensor remains accurate in spite of varying temperatures. Very accurate, sensitive, and stable downhole pressure measurements are needed for variety of reservoir engineering applica-

06 MECHANICS

tions, such as deep petroleum reservoirs, especially gas reservoirs, and in areas of high geothermal gradient.

B80-10224

OCEANIC-WAVE-MEASUREMENT SYSTEM

J. F. HOLMES (Computer Sci. Corp.) and R. T. MILES (Computer Sci. Corp.)

Sep. 1980

M-FS-23862

Vol. 5, No. 2, p. 200

Barometer mounted on buoy senses wave heights. As wave motion raises and lowers barometer, pressure differential is proportional to wave height. Monitoring circuit samples barometer output every half cycle of wave motion and adds magnitudes of adjacent positive and negative peaks. Resulting output signals, proportional to wave height, are transmitted to central monitoring station.

B80-10225

ELECTROFLUIDIC ACCELEROMETER

D. E. HEWES

Sep. 1980

LANGLEY-12493

Vol. 5, No. 2, p. 201

Electrofluidic accelerometer senses components of linear and angular acceleration field. Typical application of such acceleration is as active controlling element in airplane autopilot. In contrast to conventional accelerometers, electrofluidic accelerometer is lightweight, small, inexpensive, rugged, and requires little power. It consists of two temperature sensors on opposite sides of heating element. Sensors detect temperature gradient created by acceleration field on fluid; when device is accelerated, gradient changes because of buoyant force on hotter (thus lighter) portion of fluid.

B80-10226

FLASHBACK-FREE COMBUSTOR

S. G. ANDERSON and N. T. WAKELYN

Sep. 1980 See also NASA-TP-1472(N79-28259)

LANGLEY-12666

Vol. 5, No. 2, p. 202

All zirconia combustion chamber for testing fuels prevents 'flashback' accidental extension of flame into fuel supply line. Chamber consists of hemispherical injector on base surrounded by hemispherical cap. Cap has two additional ports for thermocouple and gas sampling probes.

B80-10227

MEASURING RADIATION EFFECTS ON MOS CAPACITORS

M. BAKOWSKI (Caltech), R. H. COCKRUM (Caltech), J. MASERJIAN (Caltech), and N. ZAMANI (Caltech)

Sep. 1980

NPO-14700

Vol. 5, No. 2, p. 203

Electron injection technique serves as powerful probe of trapped hole distribution after irradiation because it was determined that electrons only annihilate trapped holes. Other effects, such as other electron traps and interface state generation, are negligible in injection range used. Trap cross sections and densities indicate at least three trap species: interfacial species, dominant bulk species determined to tail off from silicon interface, and lower density and cross section species that may be distributed throughout bulk of oxide.

B80-10228

PREDICTING LIFETIME OF CAST PARTS

R. A. COOPER (Rockwell International Corp.)

Sep. 1980

M-FS-19549

Vol. 5, No. 2, p. 204

Life expectancy of cast aluminum machine parts can be predicted accurately from fatigue tests at 78 K on notched specimens of aluminum alloy. Method was developed for rocket engine turbopump parts made of high strength, heat treatable alloy with high silicon content; however, technique is applicable to other aluminum casting alloys.

B80-10229

DETECTING CONTAMINANTS BY ULTRAVIOLET PHOTOGRAPHY

D. W. NEISWANDER (Martin Marietta Corp.)

Sep. 1980

M-FS-25296

Vol. 5, No. 2, p. 205

Relatively high ultraviolet absorptivity of most organics as compared to metal is suggested as basis for detecting traces of contamination. By photographing metal surface in ultraviolet light, contaminants that might otherwise interfere with adhesion of surface coatings, or with welding or brazing, could be detected and removed. Real time monitoring of cleaning process is also possible if ultraviolet sensitive television camera is used instead of photographic film.

B80-10230

DETECTING SURFACE FAULTS ON SOLAR MIRRORS

M. J. ARGOU (Caltech), M. S. SHUMATE (Caltech), W. L. WALKER (Caltech), and R. A. ZANTESON (Caltech)

Sep. 1980

NPO-14684

Vol. 5, No. 2, p. 205

Two quality control tests determine reflectivity and curvature faults of concave solar mirrors. Curvature defects in solar mirrors are easily revealed by photographing mirror surface. Calibrated aperture placed in front of camera lens admits rays reflecting only from acceptable areas of mirror, blocking out diverging rays reflected from defective areas. Defects can pinpoint problems that may exist in production. Same photograph can be obtained using calibrated disk instead of aperture, except that, this time, only defective areas would be exposed.

B80-10231

REFRACTION CORRECTIONS FOR SURVEYING

W. M. LEAR (TRW, Inc.)

Sep. 1980 See also TM-80803(N80-10907)

MSC-18664

Vol. 5, No. 2, p. 206

Optical measurements of range and elevation angles are distorted by refraction of Earth's atmosphere. Theoretical discussion of effect, along with equations for determining exact range and elevation corrections, is presented in report. Potentially useful in optical site surveying and related applications, analysis is easily programmed on pocket calculator. Input to equation is measured range and measured elevation; output is true range and true elevation.

B80-10232

DIGITAL ENHANCEMENT OF X-RAYS FOR NDT

R. L. BUTTERFIELD

Sep. 1980

KSC-11118

Vol. 5, No. 2, p. 206

Report is 'cookbook' for digital processing of industrial X-rays. Computer techniques, previously used primarily in laboratory and developmental research, have been outlined and codified into step by step procedures for enhancing X-ray images. Those involved in nondestructive testing should find report valuable asset, particularly is visual inspection is method currently used to process X-ray images.

B80-10233

DESIGN CONSIDERATIONS FOR MECHANICAL FACE SEALS

L. P. LUDWIG and H. F. GREINER (Sealol, Inc.)

Sep. 1980 See also NASA-TM-73735(N78-13439); NASA-TM-73736(N77-33518)

LEWIS-13146

Vol. 5, No. 2, p. 207

Two companion reports deal with design considerations for improving performance of mechanical face seals, one of family of devices used in general area of fluid sealing of rotating shafts. One report deals with basic seal configuration and other with lubrication of seal.

B80-10234

REGENERATIVE SUPERHEATED STEAM TURBINE CYCLES

L. C. FULLER (Union Carbide Corp.) and T. K. STOVALL (Union Carbide Corp.)

Sep. 1980

LEWIS-13392

Vol. 5, No. 2, p. 208

PRESTO computer program was developed to analyze performance of wide range of steam turbine cycles with special attention given to regenerative superheated steam turbine cycles.

It can be used to model standard turbine cycles, including such features as process steam extraction, induction and feedwater heating by external sources, peaking, and high back pressure. Expansion line efficiencies, exhaust loss, leakages, mechanical losses, and generator losses are used to calculate cycle heat rate and generator output. Program provides power engineer with flexible aid for design and analysis of steam turbine systems.

B80-10235**STREAM TUBE CURVATURE ANALYSIS**

D. R. FERGUSON (GE) and J. S. KEITH (GE)

Sep. 1980

LANGLEY-11535

Vol. 5, No. 2, p. 208

Program accurately calculates inviscid pressure distribution and flow field, including viscous displacement effects, around arbitrary axisymmetric ducted body at transonic speeds. Computerized flow field analysis predicts transonic flow around long and short high bypass ratio fan duct nacelles with inlet and outlet flows having appropriate aerothermodynamic properties. It makes possible parametric studies for evaluating nacelle design criteria and selecting configurations for further experimental investigations.

B80-10236**A GENERALIZED VORTEX LATTICE METHOD**

W. M. BAKER (Lockheed Aircraft Corp.), R. D. ELLIOTT (Lockheed Aircraft Corp.), and L. R. MIRANDA (Lockheed Aircraft Corp.)

Sep. 1980

LANGLEY-12636

Vol. 5, No. 2, p. 209

Several variations of vortex lattice method that are currently available have proved practical and versatile theoretical tools for aerodynamic analysis and design of planar and nonplanar configurations. Success of method is due in great part to relative simplicity of numerical technique involved and to accuracy of results obtained; however, most of available procedures are for subsonic flow applications. VORLAX program was developed to incorporate direct extension of vortex lattice method into supersonic flow regime, thus providing analyst with full flow range capability.

B80-10237**VIBRATION MODES AND FREQUENCIES OF STRUCTURES**

R. J. DURLING and R. G. KVATERNIK

Sep. 1980

LANGLEY-12647

Vol. 5, No. 2, p. 209

SUDAN, Substructuring in Direct Analysis, analyzes natural modes and frequencies of vibration of structural systems. Based on direct method of analysis that employs substructures methodology, program is used with structures that may be represented as equivalent system of beam, springs, and rigid bodies.

B80-10238**PREDICTING PROPULSION SYSTEM DRAG**

L. E. PUTNAM

Sep. 1980

LANGLEY-12619

Vol. 5, No. 2, p. 210

DONBOL computer program analytically predicts axisymmetric nozzle afterbody pressure distributions and drag. Predictions are based on Neumann solution for inviscid external flow coupled with modified Reshotko-Tucker integral boundary layer technique, control volume method of Presz for calculating flow in separated region, and inviscid one dimensional solution for jet exhaust flow. Comparisons with experimental data indicate program accurately predicts pressure distributions of boattail afterbodies for which jet exhaust plume can be simulated by solid body. For other configurations, nozzle pressure drag seems to be significantly underpredicted. Method is limited to subsonic free stream mach numbers below those for which flow over body becomes sonic.

B80-10239**HEAT CONDUCTION IN THREE DIMENSIONS**

T. M. DANZA (Rockwell Intern. Corp.), L. W. FESLER (Rockwell Intern. Corp.), and R. D. MONGAN (Rockwell Intern. Corp.)

Sep. 1980

MSC-18616

Vol. 5, No. 2, p. 210

Multidimensional heat conduction program computes transient temperature history and steady state temperatures of complex body geometries in three dimensions. Emphasis is placed on type of problems associated with Space Shuttle thermal protection system, but program could be used in thermal analysis of most three dimensional systems.

B80-10373**HOLES HELP CONTROL TEMPERATURE**

C. K. CHHATPAR (RCA Corp.)

Jan. 1981

GSFC-12618

Vol. 5, No. 3, p. 343

Study of passive thermal control for the Solar Terrestrial Subsatellite (STSS) has found that array of 'see through' holes substantially improves performance of system. Holes in payload mounting plates allow line of sight radiative heat transfer between hot and cold ends of spacecraft and between mounting plates and ends. Temperature gradients between plates are thereby reduced, as is temperature of each plate. Holes and selected exterior paints and finishes keep payload cool for all orientations and operating modes of STSS.

B80-10374**FAST RESPONSE CRYOGEN LEVEL SENSOR**

J. B. FITZPATRICK (Simmonds Precision Products, Inc.) and L. C. MAIER (Simmonds Precision Products, Inc.)

Jan. 1981

MSC-18697

Vol. 5, No. 3, p. 344

Liquid level in cryogenic tank or pipe, or amount of gas trapped in pipeline flow, is monitored electronically by cylindrical capacitive sensor. Changes in liquid level between concentric tubes of capacitor change its impedance, varying current in drive circuit. Since it is oriented parallel to direction of liquid flow, sensor presents little resistance to moving fluid.

B80-10375**FIBER OPTIC LEVEL SENSOR FOR CRYOGENS**

M. SHARMA (TRW, Inc.)

Jan. 1981

MSC-18674

Vol. 5, No. 3, p. 345

Sensor is useful in cryogenic environments where liquids of very low index of refraction are encountered. It is 'yes/no' indication of whether liquid is in contact with sensor. Sharp bends in fiber alter distribution of light among propagation modes. This amplifies change in light output observed when sensor contacts liquid, without requiring long fiber that would increase insertion loss.

B80-10376**ACOUSTIC LENS IS GAS-FILLED**

J. M. KENDALL, JR. (Caltech)

Jan. 1981

NPO-14757

Vol. 5, No. 3, p. 345

Fluorocarbon gas contained by plastic membrane is effective lens for sound waves. In tests, lens substantially improved accuracy of sound 'maps' of turbulent airflow. It could also be used to record sound intensity patterns in design of speakers, lecture halls, and auditoriums. Lens is fabricated by clamping together two membranes of thin plastic and filling enclosed space with fluorocarbon gas. Since speed of sound in gas is considerably less than in air, lens refracts and focuses sound waves, analogous to focusing light by glass lens. Focal length is adjusted simply by changing gas pressure, which changes lens curvature.

B80-10377**ULTRASONIC FREQUENCY ANALYSIS**

J. H. CANTRELL, JR. and J. S. HEYMAN

Jan. 1981

LANGLEY-12697

Vol. 5, No. 3, p. 346

Technique is used for evaluation and characterization of materials, fluids, and biological tissue. Method eliminates problem of electrical drive pulse shape by slaving tracking generator to local oscillator of spectrum analyzer. Logic/timing generator is used to control pulse transmission and receiving sequence, pulse width, and pulse repetition rate.

06 MECHANICS

B80-10378 TEMPERATURE CONTROLLER ADAPTS TO FATIGUE TESTER

L. A. IMIG and M. R. GARDNER
Jan. 1981

LANGLEY-12393 Vol. 5, No. 3, p. 347
Identical blocks of aluminum, held against front and back of specimen, each contain electrical heaters, liquid nitrogen cavity with input and exhaust tubes, and thermocouple. Thermocouples are connected to control unit, which adjusts specimen temperature during fatigue tests over range of 850 degrees F.

B80-10379 ENVIRONMENTAL TESTING UNDER LOAD

R. K. CLARK and W. B. LISAGOR
Jan. 1981

LANGLEY-12602 Vol. 5, No. 3, p. 348
Inexpensive fixture applies compression loads to specimens exposed to environment. Fixture handles relatively large specimens suitable for postexposure analysis of physical, chemical, and mechanical properties.

B80-10380 TESTING PANELS IN TENSION AND FLEXURE

G. K. JING (Martin Marietta Corp.)
Jan. 1981

M-FS-25421 Vol. 5, No. 3, p. 349
Simple jig adapts tensile test machine for simultaneous application of tension and flexure, for evaluating panel composition, processing, and design. Environmental test chamber can be added so that panel properties can be measured at extreme temperatures.

B80-10381 A CONSTRUCTION TECHNIQUE FOR WIND TUNNEL MODELS

P. L. LAWING, P. G. SANDEFUR, JR., and W. H. WOOD
Jan. 1981

LANGLEY-12710 Vol. 5, No. 3, p. 350
High strength, good surface finish, and corrosion resistance are imparted to miniature wind tunnel models by machining pressure channels as integral part of model. Pattern for pressure channels is scribed, machined, or photoetched before channels are drilled. Mating surfaces for channels are flashed and then diffusion brazed together.

B80-10382 MEASURING THE THERMAL CONDUCTIVITY OF INSULATION

C. A. WILKINS (Caltech), R. ASH (Caltech), and W. L. DOWLER (Caltech)
Jan. 1981

NPO-14871 Vol. 5, No. 3, p. 351
Two symmetrical heat sources help determine thermal transmission properties of insulating material.

B80-10383 RAIN, FOG, AND CLOUDS FOR AIRCRAFT SIMULATORS

W. D. CHASE
Jan. 1981

ARC-11158 Vol. 5, No. 3, p. 352
Environmental chamber creates realistic fog and rain effects in aircraft simulator. It reproduces clouds, homogeneous fog, patches of fog, rain and fog, and rain only. It is used with real time digital computer, color computer generated image display that simulates airport lights, or color television camera that produces moving display of airport runway as depicted on model terrain board.

B80-10384 IMPROVED MAGNETIC MATERIAL ANALYZER

J. E. TRINER
Jan. 1981 See also NASA-TM-79234 (N79-31499)

LEWIS-13493 Vol. 5, No. 3, p. 353
Flux-controlled magnetic-core-loss tester has been developed that produces high-frequency core-loss data (within 2 percent)

for any desired waveform excitation and allows magnetic characteristics of material to be measured under symmetrical and asymmetrical excitation conditions. It allows direct control of additional loss variable rather than just driving frequency as is case for all previous sinusoidal core-loss measurements.

B80-10385 ELECTRONIC DEPTH MICROMETER

R. K. MAJOR (United Space Boosters, Inc.)
Jan. 1981

KSC-11181 Vol. 5, No. 2, p. 354

Device for measuring depth or thickness reads distance of penetration by small-diameter probe. It was developed specifically to measure thickness of wet (uncured) insulation applied to Space Shuttle structures; thin probes penetrate wet insulation to substrate, and reference surface on gage is then positioned against outer surface of insulation to measure its thickness. Gage is easy to use, even by workers wearing gloves or other protective clothing, and allows remote reading and recording of production data.

B80-10386 INTERCHANGEABLE SPRING MODULES FOR INERTIA MEASUREMENTS

J. W. MCNAMARA and J. W. OAKLEY
Jan. 1981

LANGLEY-12402 Vol. 5, No. 3, p. 355

Operation of inertia balance is simplified by packaging set of balance springs in interchangeable modules. They are held in place in balance pedestal by just two fasteners, making removal and replacement fast and simple. With them, balance can be readied in less than 15 minutes, in contrast to more than 2 hours by previous method.

B80-10387 WAKEFLOW ANALYSIS BY COST

V. J. ANSELMO (Caltech)
Jan. 1981

NPO-14705 Vol. 5, No. 3, p. 355

COST (Computerized Optical Scanning Tomography) is proposed for visualizing wakeflows of aircraft and wind-tunnel models. Operating very close to real time, COST hardware could be installed at airports to monitor turbulent flow trailing large aircraft, so that smaller aircraft could be directed to avoid turbulence. Real-time analysis of jet-engine exhaust plumes, to reduce pollution and optimize performance, is also possible.

B80-10388 INTEGRATED MATERIAL-SURFACE ANALYZER

F. J. GRUNTHANER (Caltech) and B. F. LEWIS (Caltech)
Jan. 1981

NPO-14702 Vol. 5, No. 3, p. 356

These 10 surface-analysis tests can be run without breaking vacuum: secondary-ion mass spectroscopy, ion-scattering spectroscopy, electron-stimulated desorption, residual-gas analysis, auger electron spectroscopy, x-ray photoelectron spectroscopy, ultraviolet photoelectron spectroscopy, characteristic-electron energy-loss spectroscopy, scanning electron microscope, scanning low-energy electron probe. Quadruple mass spectrometer, used in first 4 tests, serves as electron transfer lens in last 6 tests.

B80-10389 FIBER OPTIC ACCELEROMETER

R. R. AUGUST (Rockwell Intern. Corp.)
Jan. 1981

LEWIS-13219 Vol. 5, No. 3, p. 357

Low-cost, rugged lightweight accelerometer has been developed that converts mechanical motion into digitized optical outputs and is immune to electromagnetic and electrostatic interferences. Instrument can be placed in hostile environment, such as engine under test, and output led out through miscellany of electrical fields, high temperatures, etc., by optic fiber cables to benign environment of test panel. There, digitized optical signals can be converted to electrical signals for use in standard

electrical equipment or used directly in optical devices, such as optical digital computer.

B80-10390

HEAT/PRESSURE SEAL FOR MOVING PARTS

M. L. STEVENS (Fairchild Republic Co.)

Jan. 1981

MSC-18422

Vol. 5, No. 3, p. 358

Prototype seal keeps hot gases from leaking between large, adjacent parts in relative motion. Seal withstands temperatures greater than 1,000 degrees C (1800 degrees F) and accommodates heat and pressure caused distortion of parts. It is nonabrasive, creates little resistance to movement of parts, and causes minimal wear and damage to surface coatings.

B80-10391

HEAT SWITCH HAS NO MOVING PARTS

S. H. CASTLES

Jan. 1981

GSFC-12625

Vol. 5, No. 3, p. 359

No moving parts are needed for thermally actuated switch. It could also operate as variable thermal conductance, allowing temperature of equipment to be regulated with minimal expenditure of energy.

B80-10392

DYNAMICS OF CAVITATING CASCADES AND INDUCER PUMPS

C. E. BRENNEN (California Inst. of Tech.) and A. J. ACOSTA (California Inst. of Tech.)

Jan. 1981

M-FS-25399

Vol. 5, No. 3, p. 359

Report chronicles advances in understanding and predicting unsteady dynamic characteristics of cavitating cascades and inducer pumps. It includes bibliography of 19 papers authored between 1972 and 1980.

B80-10393

SIMPLIFIED THERMAL ANALYZER

M. J. COYLE

Jan. 1981

GSFC-12638

Vol. 5, No. 3, p. 360

Simplified Shuttle Payload Thermal Analyzer (SSPTA) aids in evaluating thermal design of instruments to be flown in Space Shuttle cargo bay. It is collection of programs that are currently used in thermal analysis of spacecraft, modified for quick, preliminary analysis of payloads. Although designed primarily to analyze Shuttle payloads, it can be easily used for thermal analysis in other situations.

B80-10394

RESIZING STRUCTURES FOR MINIMUM WEIGHT

C. FLEURY and L. A. SCHMIT (California Univ.)

Jan. 1981

LANGLEY-12699

Vol. 5, No. 3, p. 361

Approximation concepts and dual-method algorithms are combined in method of minimum-weight design for structures. Approximation Concepts Code for Efficient Structural Synthesis (ACCESS3) program is powerful research tool in which mathematical programming and optimality criteria are coalesced in efficient structural weight-minimization method.

B80-10395

NASTRAN MODIFICATIONS FOR RECOVERING STRAINS AND CURVATURES

C. C. CHAMIS and C. H. HENNRICH (MacNeal-Schwendler Corp.)

Jan. 1981

LEWIS-12592

Vol. 5, No. 3, p. 361

NASTRAN, NASA's general-purpose finite-element structural analysis program, has been modified to allow recovery of surface strains, reference plane strains, and local curvatures at nodes of general plane elements. NASTRAN routines that operate on element stress/strain/temperature relationships and strain/temperature relationships have been modified to incorporate generation and return of strains and curvatures in lieu of stresses. Strains and curvatures are then transformed to material axes

and interpolated to generate corresponding strains and curvatures at nodes of element. This interpolation is accomplished using special surface-mapping function.

B80-10396

COST-MINIMIZED AIRCRAFT TRAJECTORIES

H. LEE and H. ERZBERGER

Jan. 1981

ARC-11282

Vol. 5, No. 3, p. 361

For aircraft operating over fixed range, operating costs are basically sum of fuel cost and time cost; but determining minimum cost trajectory can be complex. Program optimizes trajectories with respect to cost function that is based on weighed sum of fuel cost and time cost. Minimum fuel, minimum time, and various delay trajectories are obtained by specifying particular values for fuel and time cost factors.

B80-10397

AERODYNAMIC PRELIMINARY ANALYSIS

E. BONNER (Rockwell International Corp.), W. CLEVER (Rockwell International Corp.), P. DIVAN (Rockwell International Corp.), K. DUNN (Rockwell International Corp.), and J. KOJIMA (Rockwell International Corp.)

Jan. 1981

LANGLEY-12404

Vol. 5, No. 3, p. 362

Computerization of aerodynamic theory has progressed to state where analysis of complete aircraft configurations can be performed in single program. Aerodynamic Preliminary Analysis System, APAS, is comprehensive aerodynamic analysis system, based on linearized potential theory. Three-dimensional configurations (with or without jet flaps) having multiple nonplanar surfaces of arbitrary planform and open or closed slender bodies of noncircular contour may be analyzed with APAS. As preliminary design aid, APAS allows designer to survey systematically large number of alternative configurations and component geometries economically.

B80-10398

INVISCID TRANSONIC FLOW OVER AXISYMMETRIC BODIES

J. C. SOUTH, JR. and J. D. KELLER

Jan. 1981

LANGLEY-12499

Vol. 5, No. 3, p. 363

Axisymmetric transonic flow is of interest not only because of its practical application to missile and launch vehicle aerodynamics but also because of its relation, in terms of area rule, to fully three dimensional flow. RAXBOD computer program analyzes steady, inviscid, irrotational, transonic flow over axisymmetric bodies in free air. RAXBOD uses finite-difference relaxation method to solve numerically exact formulation of disturbance velocity potential with exact surface boundary conditions. Agreement with available experimental results has been good in cases where viscous effects and wind-tunnel wall interference are not important.

B80-10399

PLASTIC DEFORMATION OF ENGINES AND OTHER NONLINEAR STRUCTURES

R. G. VOS (Boeing Co.) and J. L. ARNQUIST (Boeing Co.)

Jan. 1981

M-FS-23814

Vol. 5, No. 3, p. 363

Plastic Analysis Capability for Engines (BOPACE3D) in nonlinear stress-analysis program based on very general family of isoparametric finite elements. Although development of BOPACE3D has been heavily influenced by requirements for engine analysis (in particular Space Shuttle main engine), it is general program applicable to many nonlinear structures.

B80-10400

ANALYSIS OF A COOLED, TURBINE BLADE OR VANE WITH AN INSERT

R. E. SAUGLER

Jan. 1981

LEWIS-13293

Vol. 5, No. 3, p. 364

Computer program, TACTI, has been developed to calculate transient and steady-state temperatures, pressures, and flow in cooled turbine blade or vane with impingement insert. Coolant-side

06 MECHANICS

heat-transfer coefficients are calculated internally in program, with user specifying 1 of 3 modes of heat transfer at each station: impingement (including effect of crossflow); or forced convection over pin fins.

B80-10506 **AN OVEN FOR MANY THERMOCOUPLE REFERENCE JUNCTIONS**

L. P. LEBLANC
Apr. 1981

FRC-10112 Vol. 5, No. 4, p. 467

Compact, lightweight oven designed with geometric and heating symmetry holds many junctions at stable temperature. Oven has cylindrical wall with all points equidistant from heating coil. Thermocouple junctions are inserted in holes bored radially in wall. Sensor controls power supplied to heating coil, maintaining cylinder wall and junctions at constant temperature.

B80-10507 **ISOLATION AND MEASUREMENT OF ROTOR VIBRATION FORCES**

I. KENIGSBERG (United Technologies Corp.) and J. F. MADDEN (United Technologies Corp.)

Apr. 1981 See also A79-18654

LANGLEY-12476 Vol. 5, No. 4, p. 468

Mounting for helicopter gearbox measures forces generated by rotor and isolates transmission from airframe. Mountings have frequency-dependent load/displacement relationship that gives statically rigid but dynamically soft support, lowering vibratory transfer. Previous isolation by springs or force-opposing devices required strain gages to measure rotor vibration and were operative at only one vibration frequency. Active system eliminates these limitations.

B80-10508 **IMPROVED LEEM RANGES OVER FOUR DECADES**

J. J. SINGH, G. M. WOOD, JR., G. H. RAYBORN (University of Southern Mississippi), and F. A. WHITE (Rensselaer Polytechnic Institute)

Apr. 1981 See also NASA-TM-80172(N80-13429)

LANGLEY-12706 Vol. 5, No. 4, p. 469

Low-energy electron magnetometer is suitable for terrestrial and aerial applications. Electron beam strikes tantalum collector plates in device, amplifying current and converting it to frequency. Current difference increases with beam deflection, providing measure of local field strength. LEEM operation requires no liquid helium unlike superconducting quantum interference device. LEEM sensitivity compares favorably with that of optical absorption magnetometers, and microsecond response range makes analyzing fast magnetic transients and signatures possible.

B80-10509 **IMAGER DISPLAYS FREE FALL IN STOP ACTION**

R. E. FRAZER (Caltech)

Apr. 1981

NPO-14779 Vol. 5, No. 4, p. 470

Microprocessor-controlled imaging system displays sequence of 'frozen' images of free-falling object, using video cameras positioned along fall. Strobe lights flash as object passes each camera's viewfield. Sequence stored on video disk and displayed on television monitor is stop-action record of fall dynamics. With modification, system monitors other high speed phenomena.

B80-10510 **TRANSDUCER FOR EXTREME TEMPERATURES AND PRESSURES**

H. NADLER (Rockwell International Corp.)

Apr. 1981

MSC-18778 Vol. 5, No. 4, p. 471

Transducer with limits of 500 C and 10 kilobars responds to mechanical vibrations up to 20 kHz. Vibration pickup performs well in nuclear reactors, turbines, and other extreme environments. Low pressure problems of outgassing and 'virtual' leakage experienced with conventional transducers potted in epoxy are eliminated with use of glass and metal supports. Interior opens

to atmosphere, preventing buildup of pressure-induced stresses. Spring holds transducer against housing, reducing strain distortion.

B80-10511 **BULK LIFETIME INDICATES SURFACE CONTAMINATION**

P. D. BLAIS (Westinghouse Electric Corp.)

Apr. 1981

NPO-14966 Vol. 5, No. 4, p. 471

Indirect measurement of wafer surface impurities has sensitivity of 300 monolayers. Photoconductivity-decay apparatus determines bulk recombination lifetime in semiconductor materials. Bulk impurity levels before and after annealing relate to level of surface contamination. Method evaluates wafer cleaning techniques, qualifying purity of chemical and deionized water used, or monitors production process.

B80-10512 **BIAxIAL METHOD FOR IN-PLANE SHEAR TESTING**

H. G. BUSH and T. WELLER (National Academy of Sciences)
Apr. 1981 See also NASA-TM-74070(N78-21489)

LANGLEY-12680 Vol. 5, No. 4, p. 472

Method for obtaining uniform shear deformation yields more accurate values for material mechanical properties than uniaxial picture frame techniques. Forces applied are one-half usual magnitude, reducing transmitted force and related pin deformations. Biaxial method installs square sandwich specimen in stiff frame with pinned corners. Frictional effects are negligible, and stiffening of honeycomb core is corrected for in results.

B80-10513 **GAS ABSORPTION/DESORPTION TEMPERATURE-DIFFERENTIAL ENGINE**

C. G. MILLER (Caltech)

Apr. 1981

NPO-14528 Vol. 5, No. 4, p. 474

Continuously operating compressor system converts 90 percent of gas-turbine plant energy to electricity. Conventional plants work in batch mode, operating at 40 percent efficiency. Compressor uses metal hydride matrix on outside of rotating drum to generate working gas, hydrogen. Rolling valve seals allow continuous work. During operation, gas is absorbed, releasing heat, and desorbed with heat gain. System conserves nuclear and fossil fuels, reducing powerplant capital and operating costs.

B80-10514 **INSTRUMENT MEASURES CLOUD COVER**

E. G. LAUE (Caltech)

Apr. 1981

NPO-14936 Vol. 5, No. 4, p. 474

Eight solar sensing cells comprise inexpensive monitoring instrument. Four cells always track Sun while other four face sky and clouds. On overcast day, cloud-irradiance sensors generate as much short-circuit current as Sun sensor cells. As clouds disappear, output of cloud sensors decreases. Ratio of two sensor type outputs determines fractional cloud cover.

B80-10515 **COMPACT INFRARED DETECTOR**

A. GUPTA (Caltech), S. HONG (Caltech), and J. MOACANIN (Caltech)

Apr. 1981

NPO-14864 Vol. 5, No. 4, p. 475

Broadband IR detector integrated into compact package for pollution monitoring and weather prediction is small, highly responsive, and immune to high noise. Sensing material is transparent sheet metalized with reflecting coating and overcoated with black material on same side. Pulse produced by chopping of infrared source beam creates transient 'thermal lens' that temporarily defocuses laser beam probe. Detector monitoring beam measures defocusing which parallels infrared intensity.

B80-10516 **FAST CALIBRATION OF GAS FLOWMETERS**

R. V. LISLE and T. L. WILSON

Apr. 1981

KSC-11076 Vol. 5, No. 4, p. 476

Digital unit automates calibration sequence using calculator IC and programmable read-only memory to solve calibration equations. Infrared sensors start and stop calibration sequence. Instrument calibrates mass flowmeters or rotameters where flow measurement is based on mass or volume. This automatic control reduces operator time by 80 percent. Solid-state components are very reliable, and digital character allows system accuracy to be determined primarily by accuracy of transducers.

B80-10517**WIND-SIMULATION TESTER FOR SOLAR MODULES**

J. S. GRIFFITH (Caltech)

Apr. 1981

NPO-14837

Vol. 5, No. 4, p. 477

Tester induces cyclic pressure loads across module surface, guaranteeing its mechanical integrity. Module to be tested is sandwiched between stiffened aluminum layers covered with rubber sheets. Automatic front and back pressure loading is cycled by pneumatic system on separate stand. Relief valves prevent overpressuring. Fixture operates at high speed, completing cycle in 5 seconds, and typically applies 2,400 pascals.

B80-10518**HEAT PIPES COOL PROBE AND SANDWICH PANEL**

C. J. CAMARDA, L. M. COUCH, and H. N. KELLY

Apr. 1981

LANGLEY-12637

Vol. 5, No. 4, p. 478

Two concepts integrate heat-pipe technology. Probe with heat-pipe cooled jacket is self-contained, passive, and has no moving parts, unlike conventional air and water cooled probes. It is used in hostile, high temperature environments like wind tunnels and powerplants or on high-speed research and hypersonic cruise vehicles. Heat-pipe sandwich panel combines structural efficiency of sandwich with thermal efficiency of heat-pipe. It is used to eliminate thermal gradients and stresses, minimize thermal distortions, and transfer heat from one face of panel to other.

B80-10519**THERMODYNAMIC AND TRANSPORT PROPERTIES OF AIR/WATER MIXTURES**

T. E. FESSLER

Apr. 1981

LEWIS-13432

Vol. 5, No. 4, p. 479

Subroutine WETAIR calculates properties at nearly 1,500 K and 4,500 atmospheres. Necessary inputs are assigned values of combinations of density, pressure, temperature, and entropy. Interpolation of property tables obtains dry air and water (steam) properties, and simple mixing laws calculate properties of air/water mixture. WETAIR is used to test gas turbine engines and components operating in relatively humid air. Program is written in SFTRAN and FORTRAN.

B80-10520**CALCULATING LINEAR A, B, C, AND D MATRICES FROM A NONLINEAR DYNAMIC ENGINE SIMULATION**

L. C. GEYSER

Apr. 1981

LEWIS-13250

Vol. 5, No. 4, p. 479

Digital program DYGABCD generates linear state-space models for simulating turbofan and turbojet engines over complete range of power settings and flight conditions. Program is written in FORTRAN IV for batch execution and is implemented on IBM 360-series computer.

B80-10521**STRUCTURAL DESIGN WITH STRESS AND DISPLACEMENT CONSTRAINTS**

J. KIUSALAAS (Pennsylvania State University) and G. B. REDDY (Pennsylvania State University)

Apr. 1981

M-FS-25235

Vol. 5, No. 4, p. 480

DESAPI program synthesizes linear elastic structures under static loads. Its design objective is finding element sizes that minimize total weight without changing layout structure. Primary constraints are upper limits on stresses and displacements

prescribed as yield and local instability criteria. Program is written in FORTRAN IV for batch execution and is implemented on IBM 360 computer.

B80-10522**AN ALL-FORTRAN VERSION OF NASTRAN FOR THE VAX**

L. PURVES

Apr. 1981

GSFC-12600

Vol. 5, No. 4, p. 481

All FORTRAN version of NASA structural analysis program NASATNAN is implemented on DEC VAX-series computer. Applications of NASATNAN extend to almost every type of linear structure and construction. Two special features are available in VAX version; program is executed from terminal in manner permitting use of VAX interactive debugger, and links are interactively restarted when desired by first making copy of all NASATNAN work files.

B80-10523**POTENTIAL FLOW IN TWO-DIMENSIONAL DEFLECTED NOZZLES**

J. D. HAWK and N. O. STOCKMAN

Apr. 1981

LEWIS-13461

Vol. 5, No. 4, p. 481

Three programs analyze flow: SCIRCL, geometry definition program; 24Y, incompressible two-dimensional potential-flow program; and NOZZLEC, program combining incompressible potential-flow solutions into solutions of interest after compressibility correction. Program group is written in FORTRAN IV for implementation on UNIVAC 1100/42.

B80-10524**THE DESIGN AND ANALYSIS OF LOW-SPEED AIRFOILS**

R. EPPLER (University of Stuttgart) and D. M. SOMERS

Apr. 1981

LANGLEY-12727

Vol. 5, No. 4, p. 481

PROFILE program solves diverse and inverse airfoil-flow problems. It combines conformational mapping method for design of airfoils with prescribed velocity-distribution characteristics, panel method for potential-flow analysis, and boundary-layer method. PROFILE is written in FORTRAN IV for implementation on CDC 6000-series computer.

B80-10525**TRANSONIC FLOW OVER WING/FUSELAGE CONFIGURATIONS**

C. W. BOPPE (Grumman Aerospace Corp.)

Apr. 1981

LANGLEY-12702

Vol. 5, No. 4, p. 482

Wing Body Code (WIBCO) program simulates flow-field configurations for reduction of design cost and improvement of aircraft performance. Inputs to WIBCO consist of ambient flow conditions and geometric configuration data; grid control and relaxation parameters are internally set. Outputs include input data echo, grid system verification, relaxation-solution convergence history, and computed velocities, pressures, forces, moments, reference lengths, and areas. Program is written in FORTRAN IV for batch execution.

07 MACHINERY

B80-10093**PRECISION FILAMENT CUTTER**

A. D. MCHATTON, A. L. NEWCOMB, JR., and G. SCHLUFE (Bionetics Corp.)

Aug. 1980

LANGLEY-12564

Vol. 5, No. 1, p. 79

Automated cutter precisely chops filaments of glass, graphite, plastic, and other materials into fibers for use in composites and other applications. Cutter uses movable blade that is pushed

07 MACHINERY

and pulled across fixed blade. Because mass of movable blade is small and stroke is short, operation is fast, and wear and energy consumption are low. Blade cuts on both forward and return movements. Operator selects fiber length and chopping rate. After each cut, blast of air blows filament away so it can be collected.

B80-10094

AUTOMATIC CONNECTOR FOR STRUCTURAL BEAMS

G. F. VON TIESSEHAUSEN

Aug. 1980

M-FS-25134

Vol. 5, No. 1, p. 80

Lightweight connector automatically aligns beams to be joined, and withstands torsion, tension, and compression loads. One beam has connector, other has receptor. Bracket aligns connector and receptor. When actuated, spring in connector pushes shaft into receptor. Hooks on shaft snap to lock into receptor slots. Union can be separated easily without damage. Connectors are designed for in-space assembly, but may be suited to ground assemblies as well.

B80-10095

MECHANICAL END JOINT FOR STRUCTURAL COLUMNS

H. G. BUSH and R. E. WALLSOM (Vought Corp.)

Aug. 1980

LANGLEY-12482

Vol. 5, No. 1, p. 81

Connector for tubular struts permits construction of lightweight frames without tools or assembly equipment. Two main components are node fitting and strut element. Components are aligned approximately and pushed together. Design accommodates reasonable axial and rotational misalignment of nodes and struts. Also, individual columns can be inserted into receptacle and given slight push by operator, trigger pins release ratchet, allowing energy stored in springs to rotate screw into nut in receptacle.

B80-10096

SELF-ENERGIZED SCREW COUPLING

A. E. LEFEVER (Rockwell International Corp.) and R. S. TOTAH (Rockwell International Corp.)

Aug. 1980

M-FS-25340

Vol. 5, No. 1, p. 82

Threaded coupling carries its own store of rotational energy. Originally developed to ease task of astronauts assembling structures in space, coupling offers same advantages in other hazardous operations, such as underwater and in and around nuclear reactors. Coupling consists of two parts: crew portion and receptacle. When screw portion is inserted into receptacle and given slight push by operator, trigger pins release ratchet, allowing energy stored in springs to rotate screw into nut in receptacle.

B80-10097

AUTOMATIC SHUTOFF VALVE

S. F. HAWKINS (Rockwell International Corp.) and C. W. OVERBEY (Rockwell International Corp.)

Aug. 1980

MSC-19385

Vol. 5, No. 1, p. 8

Cellulose-sponge disk absorbs incoming water and expands with enough force to shut valve. When water recedes, valve opens by squeezing sponge dry to its original size. This direct mechanical action is considered more reliable than solenoid valve.

B80-10098

WISE HOLDS SPECIMENS FOR MICROSCOPE

W. N. GREULE (Rockwell International Corp.)

Aug. 1980

MSC-18690

Vol. 5, No. 1, p. 83

Convenient, miniature, spring-loaded clamp holds specimens for scanning electron microscope. Clamp is made out of nesting sections of studded angle-aluminum. Specimens are easier to mount and dismount with vise than with conductive adhesive or paint.

B80-10099

TUBING CUTTER FOR TIGHT SPACES

A. S. GIRALA

Aug. 1980

MSC-18538

Vol. 5, No. 1, p. 84

Cutter requires few short swings of handle to rotate its cutting edge full 360 around tube. It will cut tubing installed in confined space that prevents free movement of conventional cutter. Cutter is snapped onto tube and held in place by spring-loaded clamp. Screw ratchet advances cutting wheel.

B80-10100

ALUMINUM-ENCASED LEAD Mallet

F. CHIN (Rockwell, International Corp.) and I. F. PARDUE (Rockwell International Corp.)

Aug. 1980

MSC-18529

Vol. 5, No. 1, p. 85

Soft hammer will not mar or distort work piece. Aluminum casing, made from aluminum tube, reduces flaring and flaking of lead. Lead can be melted out and recast to refurbish hammer when necessary. Hammer would replace plastic, lead, and aluminum soft hammers currently used widely in industry.

B80-10101

CLAMSHELL DOOR SYSTEM

D. R. HELBLE (Rockwell International Corp.)

Aug. 1980

MSC-18488

Vol. 5, No. 1, p. 85

Space shuttle system opens, closes, and latches bay doors. System includes remotely controlled 'zipper latch' that accommodates misalignment. Opening, closing, and latching follow specific sequences, and are monitored from cockpit. Entire system could be modified for commercial jetliners and marine vessels with underwater access doors.

B80-10102

MEASURING BALL-BEARING LOADS

M. F. BUTNER (Rockwell International Corp.)

Aug. 1980

M-FS-19505

Vol. 5, No. 1, p. 86

Contour of wear-path boundary in bearing race gives precise information about magnitude, direction and imbalance of load. Simple tool measures height of path perimeter as bearing race is rotated manually on flat surface.

B80-10103

RETAINING A SLEEVE ON A SHAFT

R. PESSIN (Rockwell International Corp.)

Aug. 1980

M-FS-19518

Vol. 5, No. 1, p. 87

Snap ring with slotted tabs fits groove in shaft. Sleeve to be held on shaft fits over snap ring keeping it from expanding. Tabs are bent out to keep sleeve from slipping off shaft.

B80-10104

COMPACT POSITIONING FLANGE

S. L. HOOPER (Kentron Hawaii, Ltd.)

Aug. 1980

MSC-14876

Vol. 5, No. 1, p. 88

Flange adjusts center of rotation of gimble-mounted objects such as telescopes. Three aluminum plates are machined to have interlocking orthogonal keys and ways. Outer plate is mounted to shaft. Inner plate is attached to object. Middle and inner plate slide along on axis. Screws slide in slots parallel to ways for adjustment, then tighten to lock position along each axis. Device is similar to crossed ways found on industrial machine tools, but simpler, lighter, and much smaller.

B80-10105

BOLT-TENSION INDICATOR

K. L. WILSON (Rockwell International Corp.)

Aug. 1980

M-FS-19324

Vol. 5, No. 1, p. 88

Pin attached to bottom of hole through long axis of machine bolt can be used to indicate correct bolt tension without torque meters or extensometers. Bolt elongates when tightened, but pin does not, and so appears to recede within bolt head. Steps cut in exposed end of pin would indicate acceptable range of

tightness. Design would be particularly convenient in field locations without specialized instrumentation.

B80-10106

DUAL MODE ACTUATOR

S. C. RICK

Aug. 1980

LANGLEY-12412

Vol. 5, No. 1, p. 89

Compact mechanism functions under automatic control, manual control, or both. Output shaft rotation is controlled automatically by two hydraulic cylinders or manually by movement of input lever. Automatic control movement is isolated from manual-control movement by adjustment of force on piston spring. Actuator can be modified to control straight line position rather than rotation, or to open valves that regulate fluid flow in actuator, thus creating special movements other than simple rotation.

B80-10107

ZERO-TORQUE SPANNER WRENCH

M. V. FRIEDEL (Martin Marietta Corp.)

Aug. 1980

MSC-14843

Vol. 5, No. 1, p. 90

Wrench converts gripping action of hand to rotary motion without imparting reactive moments or forces on part being turned or on operator. Wrench should be useful in undersea operations and other delicate work where reactive forces and torques have to be controlled. In design for valve tightening, tool resembles cross between conventional spanner wrench and pilers. One handle engages valve body; second handle has ratchet pawl that engages toothed coupling ring on perimeter of valve handle. When operator squeezes wrench handles, valve handle rotates with respect to valve body.

B80-10108

DRILL-MOTOR HOLDING FIXTURE

E. N. CHARTIER (Rockwell International Corp.) and L. N. CULP (Rockwell International Corp.)

Aug. 1980

MSC-18582

Vol. 5, No. 1, p. 91

Guide improves accuracy and reduces likelihood of bit breakage in drilling large work pieces. Drill motor is mounted on pipe that slides on furniture clamp. Drill is driven into work piece by turning furniture-clamp handle.

B80-10109

SELF-ACTING SHAFT SEALS

L. P. LUDWIG

Aug. 1980

LEWIS-13229

Vol. 5, No. 1, p. 92

Report reviews operating principles and design of self-acting seals. Influences of adverse operating conditions are considered also. Elements of analysis used in seal performance predictions are described and evaluated. Mathematical models for obtaining seal force balance and equilibrium film thickness are outlined. Self-acting seals are nonrubbing, have lower leakage rates than labyrinth seals, and are well suited for advanced aircraft engines.

B80-10240

FLARED TUBE ATTACHMENT FITTING

I. D. ALKIRE (Rockwell Intern. Corp.) and J. P. KING, JR. (Rockwell Intern. Corp.)

Sep. 1980

MSC-18416

Vol. 5, No. 2, p. 213

Tubes can be flared first, then attached to valves and other flow line components, with new fitting that can be disassembled and reused. Installed fitting can be disassembled so parts can be inspected. It can be salvaged and reused without damaging flared tube; tube can be coated, tempered, or otherwise treated after it has been flared, rather than before, as was previously required. Fitting consists of threaded male portion with conical seating surface, hexagonal nut with hole larger than other diameter of flared end of tube, and split ferrule.

B80-10241

TUBE FLARE INSPECTION TOOL

G. E. MEUNIER (Rockwell Intern. Corp.)

Sep. 1980

MSC-19636

Vol. 5, No. 2, p. 213

Flare angle and symmetry of tube ends can be checked by simple tool that consists of two stainless steel pins bonded to rubber plug. Primary function of tool is to inspect tubes before they are installed, thereby eliminating expense and inconvenience of repairing leaks caused by imperfect flares. Measuring hole tapers, countersink angles, and bearing race angles are other possible uses. Tool is used with optical comparator. Axis of tool is aligned with centerline of tube. Shadow of seated pins on comparator screen allows operator to verify flare angle is within tolerance.

B80-10242

A VERSATILE TUNNEL ACTS AS A FLEXIBLE DUCT

N. D. BROWN (Goodyear Aerospace Corp.), N. C. COSTAKOS (Goodyear Aerospace Corp.), and G. L. JEPPESEN (Goodyear Aerospace Corp.)

Sep. 1980

M-FS-22836

Vol. 5, No. 2, p. 214

Tunnel activated by cable assembly can be expanded, contracted, and bent similar to flexible duct without uncoupling at either end. Tunnel was developed to join reusable space vehicle with cargo module and could be modified to be used as hydraulic or pneumatic hose or duct connecting complex moveable joints in remote manipulators and earth moving machinery.

B80-10243

MECHANICAL HAND FOR GRIPPING OBJECTS

K. H. CLARK and J. D. JOHNSTON

Sep. 1980

M-FS-23692

Vol. 5, No. 2, p. 215

End effector serves as 'hand' for remote manipulator spacecraft system to grasp objects of various sizes. Device has built in flexible wrist joint 'cartilage' for increased gripping force without significant strain on mechanical connections.

B80-10244

HIGH-PERFORMANCE, MULTIROLLER TRACTION DRIVE

S. LOWENTHAL, D. A. ROHN, E. ZARETSKY, N. E. ANDERSON (U.S. Army Research & Technology Lab.), and A. NASVYTIS (Transmission Research, Inc.)

Sep. 1980 See also NASA-TP-1378(N79-13369)

LEWIS-13347

Vol. 5, No. 2, p. 216

Fixed-speed-ratio traction drive (NASVYTRAC) has been developed that can transmit high power across large speed ratio using compact cluster of rollers. Traction drive transmits power without gear teeth, through shear forces on thin lubricant film that separates drive rollers. Automatic loading mechanism regulates normal load between rollers so sufficient normal load is present to transmit required torque without slip or overloading.

B80-10245

LOCKNUT PRELOAD TOOL

J. E. GREENWOOD (Rockwell Intern. Corp.) and J. F. KAUPPI (Rockwell Intern. Corp.)

Sep. 1980

MSC-16153

Vol. 5, No. 2, p. 217

Small tool replaces large torque wrench for turning locknuts. Preload tool 'stretches' threaded rod on which locknut turns, reducing force on nut which can then be turned by common hand wrench. Advantages are reduced cost and weight, ease of manipulation in cramped space near actuators, and portability.

B80-10246

SELF-ADJUSTING MECHANICAL SNUBBING LINK

E. V. HOLMAN (Rockwell Intern. Corp.)

Sep. 1980

MSC-16134

Vol. 5, No. 2, p. 218

All-mechanical shock-absorber concept has several advantages over hydraulic devices. Snubbing link automatically adjusts length under light loads, locks at any position when onslaught exceeds design limits for which it is set, and will not leak oil or require periodic servicing. Concept can be incorporated as safety device on material handling systems or as energy absorption device or governor for machines or equipment.

07 MACHINERY

B80-10247

BAYONET PLUG WITH RAMP-ACTIVATED LOCK

K. E. WOOD (Rockwell Intern. Corp.)

Sep. 1980

MSC-18526

Vol. 5, No. 2, p. 218

Matched pair of washers with broad surface ramps is locking mechanism in bayonet plug. It can be used where threaded springs and fasteners are impractical because of extreme temperatures or other environmental incompatibility. Matched pair of ramped washers is placed on plug and bayonet inserted. Inner slot of one washer matches contour of plug; this washer is stationary. Inner slot of second washer is circular. When second washer is rotated, washers push against bayonet plug, locking it in place. Retaining wire secures plug.

B80-10248

HEAT-PIPE SENSOR FOR REMOTE LEVELING

J. P. MARSHBURN

Sep. 1980

GSFC-12095

Vol. 5, No. 2, p. 219

System gives level readings in inaccessible areas. Level sensor is equipped with three thermocouples used to measure temperature differences that arise when pipe is tilted. When platform on which pipe is resting is level, three thermocouple recordings are identical. When readings are unequal, platform is leveled by remote control. System can replace expensive optical equipment and can function in cold, vacuum, and hot humid environments that produce nonlinear expansion and contraction in conventional equipment. Other advantages include low cost, no moving parts, and operation in toxic environments.

B80-10249

AUTOMATIC 35 MM SLIDE DUPLICATOR

H. F. SEIDEL and R. E. TEXLER

Sep. 1980

LEWIS-13399

Vol. 5, No. 2, p. 220

Automatic duplicator is readily assembled from conventional, inexpensive equipment and parts. Series of slides can be exposed without operator attention, eliminating considerable manual handling and processing ordinarily required. At end of programmed exposure sequence, unit shuts off and audible alarm signals completion of process.

B80-10250

THE 3-D GUIDANCE SYSTEM WITH PROXIMITY SENSORS

A. K. BEJCZY (Caltech)

Sep. 1980

NPO-14521

Vol. 5, No. 2, p. 221

Four proximity sensors help to guide mechanical claw into alignment with target fixture. Digital signals are used to sense distance and to align roll, pitch, and yaw with respect to target before it is grasped. Sixteen sensor-to-operator messages are possible with binary signal system. Similar, more precise alternative presents 75 workable logic states; most precise alternative uses continuous calibrated data from sensors.

B80-10251

AUTOMATIC CONNECTOR JOINS STRUCTURAL COLUMNS

G. G. JACQUEMIN (Lockheed Missiles & Space Co., Inc.)

Sep. 1980

LANGLEY-12578

Vol. 5, No. 2, p. 222

Connector snap-locks over toothed bolthead mounted on column end, forming rigid joint that will not bend or twist. Connector is used in conventional construction to install temporary structures or as mechanical coupler. Up to nine receptacles can be clustered in one node to join up to nine converging columns.

B80-10252

TEST FITTINGS FOR DIMENSIONALLY CRITICAL TUBES

R. HAGLER (Caltech)

Sep. 1980

NPO-14399

Vol. 5, No. 2, p. 222

Method using lightweight fitting protects tubes and tube stubs during testing and through to final welding. Fitting does

not interfere with final welding or brazing like temporary test fittings, and is not heavy like machined-on integral fittings with face-seal O-rings. Fitting approach is adaptable to many types of components, including valves, transducers, and filters.

B80-10253

ELECTROMECHANICAL SLIP SENSOR

A. K. BEJCZY (Caltech) and S. PARK (Caltech)

Sep. 1980

NPO-14654

Vol. 5, No. 2, p. 223

Sensor indicates direction of slip and slip rate of objects handled by remote manipulators. Freely movable spheroid with staggered pattern of surface indentations rotates in direction of slipping body, tilting shaft with conductive disk plate. Plate assembly is bent toward contact corresponding to direction of slip and is flicked by indentations at rate corresponding to slip rate. Slip direction and rate are determined using LED's arranged circularly or microcomputer with CRT display.

B80-10254

X-RAY BEAM POINTER

C. W. NELSON (Beech Aircraft Co.)

Sep. 1980

MSC-18590

Vol. 5, No. 2, p. 224

Inexpensive, readily assembled pointer aims X-ray machine for welded assembly radiographs. Plumb bob used for vertical alignment and yardstick used to visualize X-ray paths were inconvenient and inaccurate. Pointer cuts alignment time by one-half and eliminates necessity of retakes. For 3,000 weld radiographs, pointer will save 300 worker-hours and significant materials costs.

B80-10255

HANDTOOL ASSISTS IN BUNDLING CABLES

E. J. STRINGER (Rockwell Intern. Corp.)

Sep. 1980

MSC-18567

Vol. 5, No. 2, p. 225

Simple tool makes it possible to bundle electrical cables in channel or 'tray' without requiring cables be lifted out. Procedure for bundling is faster and less awkward than lifting method. Used with commercially-available plastic ribbons that tie cables together, tool guides ribbon along tray wall, through bracket at bottom of tray, and up opposite wall. One end of ribbon locks in other end, securing cable bundle.

B80-10256

SLEEVE PULLER SALVAGES WELDED TUBES

J. F. WEAVER (Rockwell Intern. Corp.)

Sep. 1980

MSC-18686

Vol. 5, No. 2, p. 225

Tool removes sleeve remnants without distorting or damaging tubes, unlike pliers and other conventional handtools. Tubes can be reused, saving time, labor, and material in many applications. Sleeve-removal fixture consists of pressure screw, swing arm, locking screws, and base. It removes sleeve remnant from tubing after welded joint has been sawed through.

B80-10257

A LINEAR MAGNETIC MOTOR AND GENERATOR

P. A. STUDER

Sep. 1980

GSFC-12518

Vol. 5, No. 2, p. 226

In linear magnetic motor and generator suitable for remote and hostile environments, magnetic forces drive reciprocating shaft along its axis. Actuator shaft is located in center of cylindrical body and may be supported by either contacting or noncontacting bearings. When device operates as bidirectional motor, drive coil selectively adds and subtracts magnetic flux to and from flux paths, producing forces that drive actuator along axis. When actuator is driven by external reciprocating engine, device becomes ac generator.

B80-10258

CRYOGENIC-STORAGE-TANK SUPPORT

G. H. WISDOM (McDonnell Douglas Corp.)

Sep. 1980

MSC-14848

Vol. 5, No. 2, p. 227

Support isolates tank from thermal and mechanical loading by environment. Design uses combination of well-known common mechanisms to isolate tank and allow for tank expansion and contraction due to temperature and pressure changes. Similar support method is used on nitrogen tanks.

B80-10259**ROTOR TRANSIENT ANALYSIS**

P. E. ALLAIRE (Virginia Univ.), K. C. CHOY (Virginia Univ.), and E. J. GUNTER (Virginia Univ.)

Sep. 1980

LEWIS-13230

Vol. 5, No. 2, p. 228

Undamped modes approximate dynamic behavior of rotors and bearings. Application of modal analysis to uncouple equations of motion simplifies stability, steady-state unbalance response, and transient response analysis of system; nonlinear stability is predicted from calculated frequency spectra. Analysis provides designers with complete information without involving large-scale computational costs. Programs are written in FORTRAN IV for use on CDC 6600 computer.

B80-10401**CLEAVING MACHINE FOR HARD CRYSTALS**

J. S. J. BENEDICTO and F. HALLBERG

Jan. 1981

GSFC-12584

Vol. 5, No. 3, p. 367

Hard crystalline materials such as lithium fluoride (LiF) are cleaved in thin sections by semiautomatic machine. Yield of undistorted LiF crystals is almost 100 percent, even when cleaved section is only 1/32 inch thick. Machine contains spring-activated hammer that limits penetration of blade and controls shock that cleaves crystal. Fixture with spring-loaded clamps precisely locates and holds crystal, restraining it in ideal position for cleaving. Crystal then splays apart.

B80-10402**ABRASIVE DRILL FOR RESILIENT MATERIALS**

A. J. KOCH

Jan. 1981

LEWIS-13411

Vol. 5, No. 3, p. 368

Resilient materials normally present problem in obtaining accurate and uniform hole size and position. Tool is fabricated from stiff metal rod such as tungsten or carbon steel that has diameter slightly smaller than required hole. Piercing/centering point is ground on one end of rod. Rod is then plasma-sprayed (flame-sprayed) with suitable hard abrasive coating. High-speed, slow-feed operation of tool is necessary for accurate holes, and this can be done with drill press, hard drill, or similar machines.

B80-10403**DRILLING AT RIGHT ANGLES IN BLIND HOLES**

R. PESSIN (Rockwell International Corp.)

Jan. 1981

M-FS-19535

Vol. 5, No. 3, p. 369

Tool drills small hole perpendicular to and at bottom of blind hole. It consists of carbide cutter brazed to flexible shaft, inside thin metal tube with 90 degree bend. Wood dowel holds tube while motor turns shaft and drives cutter. It was developed for clearing plugged fuel orifices. Concept is adaptable to other hard-to-reach drilling situations.

B80-10404**SOLAR-POWERED AIRCRAFT**

W. H. PHILLIPS

Jan. 1981

LANGLEY-12615

Vol. 5, No. 3, p. 369

Solar-powered aircraft, driven by electric motor, has vertical and horizontal wings. Design allows aircraft to fly straight path while banked, permitting optimal exposure of its wing-mounted solar cells to Sun. Such aircraft would fly at altitude high enough to be above clouds and to avoid winds with velocities much greater than its own airspeed. Its most likely application would be as pilotless aircraft to take advantage of its ability to remain aloft for long periods (for very long flights).

B80-10405**BALL-JOINT GROUNDING RING**

P. J. A. APERLO (Rockwell International Corp.), P. A. BUCK (Rockwell International Corp.), and V. A. WELDON (Rockwell International Corp.)

Jan. 1981

MSC-18824

Vol. 5, No. 3, p. 371

In ball and socket joint where electrical insulator such as polytetrafluoroethylene is used as line to minimize friction, good electrical contact across joint may be needed for lightning protection or to prevent static-charge build-up. Electrical contact is maintained by ring of spring-loaded fingers mounted in socket. It may be useful in industry for cranes, trailers, and other applications requiring ball and socket joint.

B80-10406**VERSATILE MODULAR SCAFFOLDS**

J. KERLEY

Jan. 1981

GSFC-12606

Vol. 5, No. 3, p. 372

Movable and fixed modular scaffolds can be tailored to most scaffolding needs by interconnecting only 4 basic structural elements: platforms, rails, vertical-support angles, and stiffener. Standard nuts and bolts are used to join elements, simplifying construction, and reducing costs. Scaffolds are rigid and can be made any length. They are stable on unlevel ground and can extend to well over 50 feet in height. Scaffolds allow for internal elevators and for wheels and air mounts so that same elements can be used for standing or movable scaffold.

B80-10407**RESHAPING TUBE ENDS FOR WELDING**

W. H. EMANUEL (McDonnell Douglas Corp.) and C. A. HEADLEY (McDonnell Douglas Corp.)

Jan. 1981

MSC-18462

Vol. 5, No. 3, p. 373

Tube ends are rounded in preparation for welding by new semiautomatic tool. Tubes that have been trimmed close to bend may be deformed by process. To restore roundness, out-of-round tube is opened, plug inserted, and crimper compresses tube into proper shape around plug.

B80-10408**REMOTE MANIPULATOR WITH FORCE FEED-BACK**

J. W. HILL (SRI International) and J. K. SALISBURY, JR. (SRI International)

Jan. 1981

ARC-11272

Vol. 5, No. 3, p. 373

Controller for remote manipulators gives user 'feel' for forces required to lift, slide, turn, and otherwise handle objects. Because operator experiences sensations similar to those he would perceive if he handled objects directly, he needs much less skill and training for manipulator than for one with force feedback. It was developed to handle hazardous materials, such as radioactive substances, explosives, or corrosive chemicals. Other possible uses include tracking moving objects, vehicle control, and human interaction with computers (for example, via three dimensional display of computer model).

B80-10409**SPRAYING SUSPENSIONS UNIFORMLY**

W. P. PRASTHOFER

Jan. 1981

M-FS-25139

Vol. 5, No. 3, p. 374

With head on each of its ends, bolt can be disengaged from its blind side. Bolt has conventional hexagonal head on one end and smaller hexagonal head on its threaded end. Since reduced head is smaller than bolt diameter, it does not interfere with insertion of bolt shank in bolthole. However, it can be turned by wrench to release bolt from its blind (threaded) end. Bolt should be tethered on its large-head end so that it does not drop away from assembly.

B80-10410**TWO-HEADED BOLT**

G. W. JEFFERS (Rockwell Intern. Corp.)

07 MACHINERY

Jan. 1981

M-FS-19619 Vol. 5, No. 3, p. 375

Coarse, multi-ingredient suspensions are sprayed on surface smoothly and uniformly with aid of nozzle attachment for commercial spray gun. Nozzle attachment is contoured internally to suppress overspray and to prevent spray from segregating. From its conical inlet, nozzle converges smoothly to throat, then diverges in bell-shaped chamber that allows suspension to flow uninterruptedly without building up turbulently in nozzle. End of nozzle is adjustable and can be extended or retracted to avoid dripping when inlet pressure, pump pressure, or density of mixture changes.

B80-10411

COMPACT TABLE-TILTING MECHANISM

F. R. MITCHELL (Frank R. Mitchell and Assoc.)

Jan. 1981

NPO-14800 Vol. 5, No. 3, p. 376

Optical components are oriented precisely by motorized device for manipulating objects attached to plane tilt table. Mechanism is compact, simple, and has low backlash. It consists of drive motor, rotatable disk, rigid link, and table. Motor rotates about vertical axis, and motion is converted through disk and rigid link to rotation of table about perpendicular axis.

B80-10412

TIME-SHARING SWITCH FOR VACUUM BRAZING

J. A. STEIN

Jan. 1981

MSC-18699 Vol. 5, No. 3, p. 376

Switching unit changes power and cooling-water connections between two vacuum-brazing machines. It allows both units to be powered by single radio-frequency (RF) generator. One machine can be used for brazing while bell jar of other is being evacuated (20 minute process) in preparation for brazing or is being cooled after brazing (10 minute process).

B80-10413

LIMITING CURRENT IN ELECTRON-BEAM WELDERS

K. W. SPIEGEL

Jan. 1981

M-FS-19503 Vol. 5, No. 3, p. 377

Damage to workpiece by excessive current in electron-beam welder is prevented by mechanism that accurately adjusts anode-to-cathode spacing. Mechanism is installed on standard Sciaky (or equivalent) electron-beam gun with only minimal modification. By turning knurled knob and observing digital readout of anode/cathode separation, machine operator adjusts welder for safe maximum current before welding begins.

B80-10414

TORQUE-WRENCH EXTENSION

D. H. PETERSON (Rockwell International Corp.)

Jan. 1981

MSC-18769 Vol. 5, No. 3, p. 378

Torque-wrench extension makes it easy to install and remove fasteners that are beyond reach of typical wrenches or are located in narrow spaces that prevent full travel of wrench handle. At same time, tool reads applied torque accurately. Wrench drive system, for torques up to 125 inch-pounds, uses 2 standard drive-socket extensions in aluminum frame. Extensions are connected to bevel gear that turns another bevel gear. Gears produce 1:1 turn ratio through 90 degree translation of axis of rotation. Output bevel has short extension that is used to attach 1/4-inch drive socket.

B80-10415

QUICK MIXING OF EPOXY COMPONENTS

D. E. DUNLAP, JR. (McDonnell Douglas Corp.)

Jan. 1981

MSC-18731 Vol. 5, No. 3, p. 379

Two materials are mixed quickly, thoroughly, and in precise proportion by disposable cartridge. Cartridge mixes components of fast-curing epoxy resins, with no mess, just before they are used. It could also be used in industry and home for caulking, sealing, and patching. Materials to be mixed are initially isolated

by cylinder wall within cartridge. Cylinder has vanes, with holes in them, at one end and handle at opposite end. When handle is pulled, grooves on shaft rotate cylinder so that vanes rotate to extrude material A uniformly into material B.

B80-10416

WRENCH FOR SMOOTH OR DAMAGED FASTENERS

R. CARRILLO (Rockwell International Corp.)

Jan. 1981

MSC-18772 Vol. 5, No. 3, p. 380

Smooth-surfaced or damaged fasteners that cannot be gripped by conventional wrench can be unscrewed by special wrench. It can be used in tight spaces and will not damage adjacent structures. Wrench consists of central handle and 2 independent jaws with serrated teeth. Teeth are placed on fastener to be removed, and handle is rotated until fastener is gripped with positive locking action. Rotation of wrench handle removes fastener.

B80-10526

INTERLOCKING WEDGE JOINT IS EASILY ASSEMBLED

M. J. LONG

Apr. 1981

LANGLEY-12729 Vol. 5, No. 4, p. 485

Wedge joint links structural members in manual, remote, or automated assemblies. Joint is simple enough to be assembled by undersea divers, workers in nuclear reactors, and other wearing gloves or bulky clothing. Combination of wedging angles on parts overcomes structural misalignments and forces assembly into true position as locking sleeve moves into place. Joint transmits tension, compression, bending moments and torsion and is inherently insensitive to thermal excursions, vibration, and machining tolerance buildup.

B80-10527

PNEUMATIC-POWER SUPPLY

R. C. KRAMER (Rockwell International Corp.)

Apr. 1981

MSC-18855 Vol. 5, No. 4, p. 486

Portable compressed air supply has two or more outputs at pressures from 20 to 100 psi. Applications include operating production equipment, spraying paint and lubricants, and pressurizing refrigeration systems. Supply filters air from standard high-pressure line, reduces it to working pressure, and adds lubricant when required. Regulator supplies low-pressure air to output channels. On channel lines, vernier-control valves select output pressures.

B80-10528

SIDEWALL PENETRATOR FOR OIL WELLS

E. R. COLLINS, JR. (Caltech)

Apr. 1981

NPO-14306 Vol. 5, No. 4, p. 487

Penetrator bores horizontal holes in well casing to increase trapped oil drainage. Several penetrators operated by common drive are inserted into well at once. Shaft, made from spiraling cable, rotates and thrusts simultaneously through rigid curvilinear guide tube forcing bit through casing into strata. Device pierces more deeply than armor-piercing bullets and shaped explosive charges.

B80-10529

FOUR-WHEEL DUAL BRAKING FOR AUTOMOBILES

H. B. EDWARDS

Apr. 1981

LANGLEY-12687 Vol. 5, No. 4, p. 488

Each master cylinder applies braking power to all four wheels unlike conventional systems where cylinder operates only two wheels. If one master system fails because of fluid loss, other stops car by braking all four wheels although at half force.

B80-10530

LOCK FOR HYDRAULIC ACTUATORS

R. H. WOOD (Rockwell International Corp.)

Apr. 1981

MSC-18853 Vol. 5, No. 4, p. 489

Two clamps hold rod in fixed extension from cylinder even when power is off, converting actuator into stiff structural member. Locked actuator is useful as mechanical support or linkage or as fail-safe device in case of loss of hydraulic pressure. Potential applications include manufacturing processes and specialized handling and holding devices.

B80-10531
GENTLE ARRESTER FOR MOVING BODIES

R. A. HULL
Apr. 1981

LANGLEY-12372 Vol. 5, No. 4, p. 490

Wire cable absorbs energy at constant rate with reduced shock and rebounding. Cable typically elongates to 90 percent of its potential, but is surrounded by braided sheath to absorb remaining energy should it break prematurely. Applications of arrester include passenger restraint in air and land vehicles, parachute risers, and ground snatch by aircraft. Possible cable material is type 302 stainless steel.

B80-10532
SOFT CONTAINER FOR EXPLOSIVE NUTS

D. C. GLENN, W. E. DRUMMOND, and G. MILLER
Apr. 1981

MSC-18871 Vol. 5, No. 4, p. 491

Flexible fabric fits over variety of assembly shapes to contain debris produced by detonations or safety tests. Bag material is woven multifilament polyamide or aramid. Belt loops hold bag to clamp. Ring supports explosive nut structure and detonator wires, and after nut is mounted, bag and clamp are slipped over ring and fastened.

B80-10533
CYLINDRICAL BEARING ANALYSIS

R. J. KLECKNER (SKF Industries) and J. PIRVICS (SKF Industries)
Apr. 1981

LEWIS-13393 Vol. 5, No. 4, p. 491

Program CYBEAN computes behavior of rolling-element bearings including effects of bearing geometry, shaft misalignment, and temperature. Accurate assessment is possible for various outer-ring and housing configurations. CYBEAN is structured for coordinated execution of modules that perform specific analytical tasks. It is written in FORTRAN IV for use on the UNIVAC 1100/40 computer.

08 FABRICATION TECHNOLOGY

B80-10110
VERIFYING ROOT FUSION IN ELECTRON-BEAM WELDS

F. L. BECKER (Rockwell International Corp.), S. DOCTOR (Rockwell International Corp.), and R. E. KLEINT (Rockwell International Corp.)
Aug. 1980

M-FS-19499 Vol. 5, No. 1, p. 95

Ultrasonic equipment and x-y recorder indicate where back side of joint is properly welded. Wire waveguide placed in groove at root of joint to be welded is fused when joint is adequately penetrated. Ultrasonic signal moving down waveguide is reflected where guide is melted. Change in reflected-signal arrival time with change in weld-head position is nearly constant unless joint is incompletely penetrated. Method permits determination of penetration depth in preweld samples without opening vacuum chamber and sectioning weld. Technique is particularly valuable when back side of joint is inaccessible.

B80-10111
X-RAY TECHNIQUE VERIFIES WELD-ROOT FUSION

R. E. KLEINT (Rockwell International Corp.)
Aug. 1980

M-FS-19468 Vol. 5, No. 1, p. 96

Small holes drilled along back edge of surface to be joined are filled when weld root is adequately fused. Holes 2% of thickness of material can be detected with X-rays. Absence of detectable holes indicates good weld. Procedure has been proven in production and is more reliable than conventional X-ray methods.

B80-10112
ETCHANT FOR INCOLOY-903 WELDS

J. A. GERSTMEYER (Rockwell International Corp.)
Aug. 1980

M-FS-19378 Vol. 5, No. 1, p. 96

Special reagent consists of 1 part 90% lactic acid, 1 part 70% nitric acid, and 4 part, 37% hydrochloric acid. Solution etches parent and weld metals at same rate, without overetching. Underlying grain structure of both metals is revealed.

B80-10113
CHEMICAL-MILLING SOLUTION FOR INVARI ALLOY

W. BATIUK (Perkin-Elmer Corp.)
Aug. 1980

M-FS-25365 Vol. 5, No. 1, p. 97

Excellent surface finishes and tolerances are achieved using two formulations. Solution A gives finish of 3.17 micrometers after milling at 57 to 63 deg C. Constituents of A are: Hydrofluoric acid (70%), 5.8 oz/gal; nitric acid (40-42) degrees Baume, 40 oz/gal. Alternative solution gives 2.16 micrometer finish, and differs from A by addition of 7% phosphoric acid. Formulations eliminate channeling at root fillets, dishing, island formation, and overhangs.

B80-10114
ELIMINATING UNDERBEAD FISSURING IN SUPERALLOYS

R. D. BETTS (Rockwell International Corp.)
Aug. 1980

M-FS-19460 Vol. 5, No. 1, p. 97

Parameters that produce high-integrity overlay welds in Incoloy-903, Incoloy-88, and Inconel-718 differ from those in conventional metal-in groove welds. Reduced weld velocity eliminates underbead crack-inducing level.

B80-10115
ION-BEAM CLEANING FOR COLD WELDS

B. L. SLATER
Aug. 1980

LEWIS-12982 Vol. 5, No. 1, p. 98

1000 eV beam bombarding metal surfaces to be joined removes oxides and contaminants at rate of several atomic layers per second for current density of 1 mA/sq. cm. Clean surfaces can then be joined by squeezing them together. With ion-beam cleaning, mating force for strong bond is low enough to cause only 1% deformation. Conventional cold-welding requires about 70% deformation for bonding. Technique was tested successfully on aluminum to aluminum welds, copper to copper, copper to aluminum, copper to nickel, and silver to iron. Base metals failed before welds in tear test.

B80-10116
COATINGS FOR HYBRID MICROCIRCUITS

D. L. KINSER (Vanderbilt Univ.)
Aug. 1980

M-FS-25292 Vol. 5, No. 1 p. 99

Silicone or parylene coatings protect circuits from damage by battery of military standard tests. PIND (Partial Impact Noise Detection) test proved unreliable in predicting failure for either coated or uncoated circuits.

B80-10117
PLACEMENT TECHNIQUE FOR SEMICUSTOM DIGITAL LSI CIRCUITS

B. CARROLL (Auburn Univ.) and G. W. COX (Auburn Univ.)
Aug. 1980

M-FS-25324 Vol. 5, No. 1, p. 100

Small lots of special-purpose integrated circuits are fabricated from standard transistor arrays. Folded linear order of cells minimizes interconnection length and puts cell in juxtaposition. Cell-placement technique is carried out via computer program.

08 FABRICATION TECHNOLOGY

B80-10118

A GENERAL LOGIC STRUCTURE FOR CUSTOM LSI'S

M. W. SIEVERS (Caltech)

Aug. 1980

NPO-14410

Vol. 5, No. 1, p. 101

Structure composed of standardized-circuit arrays reduces cost and complexity of fabricating special integrated circuits. Desired circuits are formed from basic mask, custom cuts, and contact points. Interactive computer program speeds design.

B80-10119

JIG FOR ASSEMBLING LARGE COMPOSITE PANELS

J. T. WATTS (McDonnell Douglas Corp.)

Aug. 1980

LANGLEY-12394

Vol. 5, No. 1, p. 102

Layup of composite panels as large as 15 by 60 ft is greatly facilitated by simple mechanism. Jig consists of flat, detachable table, and curved laminating-plate joined by rack and pinion to insure accurate registration. Vacuum holds thin plastic film to laminating-plate. Preimpregnated composite sheet is applied to plate, which is then lowered face down onto table. Release of vacuum leaves layer and film and table. Film is peeled off, and steps are repeated for next layer of laminate.

B80-10120

SHAPING GRAPHITE/EPOXY STIFFENERS

J. L. CUPP (Rockwell International Corp.)

Aug. 1980

MSC-18494

Vol. 5, No. 1, p. 103

Layers of graphite/epoxy, tape stacked on ridges and in grooves of channel like ribs stiffen curved laminates. Twenty-five to 38 layers of tape on each cap and flange are vacuum-bagged into shape and then interleaved with plies of fabric to form light-weight structural members free of wrinkles and voids. Structure could be parts for cars, trucks, and other vehicles.

B80-10121

FLUSH-MOUNTING TECHNIQUE FOR COMPOSITE BEAMS

T. C. HARMAN (United Technologies Corp.) and B. F. KAY (United Technologies Corp.)

Aug. 1980

LANGLEY-12389

Vol. 5, No. 1, p. 104

Procedure permits mounting of heavy parts to surface of composite beams without appreciably weakening beam web. Web is split and held apart in region where attachment is to be made by lightweight precast foam filler. Bolt hole penetrates foam rather than web, and is secured by barrelnut in transverse bushing through web.

B80-10122

EXAMINING GRAPHITE REINFORCEMENT IN COMPOSITES

R. E. SANDERS (Rockwell International Corp.) and C. I. YATES (Rockwell International Corp.)

Aug. 1980

MSC-19594

Vol. 5, No. 1, p. 104

Structure of graphite layers in composite parts can be checked by pyrolyzing epoxy portion of composite samples. After 2-3 hours in nitrogen atmosphere at 540 C, only graphite fibers remain. These can be separated and checked for proper number, thickness, and orientation.

B80-10123

CRYOGENIC MACHINING OF POLYURETHANE FOAM

E. A. MOSHEY (RCA) and P. PRYCHKA (RCA)

Aug. 1980

MSC-18572

Vol. 5, No. 1, p. 105

Low-density foam can be machined precisely while frozen. Liquid nitrogen cools foam and aluminum heat sink prior to machining. Heat sink keeps part frozen during entire machining operation.

B80-10124

'GRINDING' CAVITIES IN POLYURETHANE FOAM

J. R. BROWER (Rockwell International Corp.), R. E. DAVEY (Rockwell International Corp.), W. F. DIXON (Rockwell Interna-

tional Corp.), P. H. ROBB (Rockwell International Corp.), and P. P. ZEBUS (Rockwell International Corp.)

Aug. 1980

MSC-18564

Vol. 5, No. 1, p. 105

Grinding tool installed on conventional milling machine cuts precise cavities in foam blocks. Method is well suited for prototype or midsize production runs and can be adapted to computer control for mass production. Method saves time and materials compared to bonding or hot wire techniques.

B80-10125

ALUMINA BARRIER FOR VACUUM BRAZING

C. S. BEUYUKIAN (Rockwell International Corp.)

Aug. 1980

MSC-18528

Vol. 5, No. 1, p. 106

Heating platens of vacuum-brazing press will not stick to workpiece if aluminum oxide 'paper' is interposed. Paper does not disintegrate in press, will not contaminate braze alloy, and helps form smoothly contoured, regular fillet at brazed edges.

B80-10126

CONNECTOR HEAT SHIELD

S. CLARKE (Wright Components, Inc.)

Aug. 1980

MSC-16282

Vol. 5, No. 1, p. 106

Polytetrafluoroethylene tape wrapped around electrical connectors protects them from heat damage during soldering. Tape is easily removed after contacts are joined.

B80-10127

FOAM-FILLED CUSHIONS FOR SLIDING TRAYS

S. B. NAHIN (Rockwell International Corp.) and P. H. ROBB (Rockwell International Corp.)

Aug. 1980

MSC-18565

Vol. 5, No. 1, p. 107

Polytetrafluoroethylene tube filled with polyurethane foam forms low friction sliding surface that cushions vibrations and absorbs manufacturing tolerances and misalignment. Possible uses include packaging of components for shipping and seals for doors in lockers, cars, and refrigerators.

B80-10128

ION-BEAM ETCHING ENHANCES ADHESIVE BONDING

B. A. BANKS, M. J. MIRTICH, and J. S. SOVEY

Aug. 1980 See also NASA-TM-79004 (N79-12909); NASA-TM-78888 (N78-24358)

LEWIS-13028

Vol. 5, No. 1, p. 108

Metals and fluoropolymers exposed to 0.5 to 1.0 keV argon ions at current densities of 0.2 to 1.5 mA/sq cm develop surface texturing that increases tensile and shear strength of epoxy bonds. Bonds are 46 to 100 percent stronger than those of chemically etched surfaces. Metals require 3 to 4 hours of bombardment to become properly textured. Fluoropolymers require 5 seconds to 30 minutes. Ion beam will not texture nickel. Unlike chemical treatments, bonding of fluoropolymers can be done days or months after ion treatment.

B80-10129

ROOM-TEMPERATURE ADHESIVE FOR HIGH-TEMPERATURE USE

J. L. BROOKS (Rockwell International Corp.), W. L. HILL (Rockwell International Corp.), and C. R. ROUSSEAU (Rockwell International Corp.)

Aug. 1980

MSC-16930

Vol. 5, No. 1, p. 109

PPQ (polyphenylquinoxaline) cures at room temperature, but withstands temperatures between -186 and +402 deg C. Adhesive is applied in chloroform solution. Bond forms as solvent evaporates.

B80-10130

EASILY-ASSEMBLED HELICAL HEATER

D. E. PIZZECK

Aug. 1980

LANGLEY-11712

Vol. 5, No. 1, p. 110

Rugged, compact heater is made from 0.1 mm diameter

Inconel wire (125 ohms per meter). Heating element is enclosed in PTFE heat-shrink sleeve. Ends of coil pass through small ceramic spools and are silver-brazed to lead wires. Junctions are potted in epoxy or silicon and covered with crimp sleeves and heat-shrink tubing.

B80-10131
MICROPROCESSOR SYSTEMS FOR INDUSTRIAL PROCESS CONTROL

F. H. LESH (Caltech)

Aug. 1980

NPO-14661

Vol. 5, No. 1, p. 110

Six computers operate synchronously and are interconnected by three independent data buses. Processors control one subsystem. Some can control buses to transfer data at 1 megabit per second. Every 2.5 msec each processor examines list of things to do during next interval. This spacecraft control system could be adapted for controlling complex industrial processes.

B80-10132
WIRE HARNESS TWISTING AID

E. J. CASEY (Rockwell International Corp.), C. C. COMMADORE (Rockwell International Corp.), and M. E. INGLES (Rockwell International Corp.)

Aug. 1980

MSC-18581

Vol. 5, No. 1, p. 111

Long wire bundles twist into uniform spiral harnesses with help of simple apparatus. Wires pass through spacers and through hand-held tool with hole for each wire. Ends are attached to low speed bench motor. As motor turns, operator moves hand tool away forming smooth twists in wires between motor and tool. Technique produces harnesses that generate less radio-frequency interference than do irregularly twisted cables.

B80-10133
ADJUSTABLE BASE FOR CENTERING STAKED BEARINGS

L. A. BERSON (Rockwell International Corp.)

Aug. 1980

MSC-19660

Vol. 5, No. 1, p. 112

Adjustable base permits housing and race to be supported separately so that unequal widths can be accounted for and bearing staked on center. If race is centered and staked on flat base and housing and race are not same width, then offset may occur and bearing will be set off center.

B80-10134
SAFELY SPLICING GLASS OPTICAL FIBERS

K. KORBELAK (General Cable Corp.)

Aug. 1980

KSC-11107

Vol. 5, No. 1, p. 112

Field-repair technique fuses glass fibers in flammable environment. Apparatus consists of v-groove vacuum chucks on manipulators, high-voltage dc power supply and tungsten electrodes, microscope to observe joint alignment and fusion, means of test transmission through joint. Apparatus is enclosed in gas tight box filled with inert gas during fusion. About 2 feet of fiber end are necessary for splicing.

B80-10135
KNIFE-EDGE SEAL FOR VACUUM BAGGING

J. A. RAUSCHL (Rockwell International Corp.)

Aug. 1980

M-FS-24049

Vol. 5, No. 1, p. 113

Cam actuated clamps pinch bagging material between long knife edge (mounted to clamps) and high temperature rubber cushion bonded to baseplate. No adhesive, tape, or sealing groove is needed to seal edge of bagging sheet against base plate.

B80-10136
A PRECOAT PREVENTS CERAMIC STOPOFFS FROM SPALLING

A. BRENNAN (Rockwell International Corp.)

Aug. 1980

M-FS-19495

Vol. 5, No. 1, p. 114

Nickel-alloy precoat applied with plasmagun improves

adhesion of ceramic materials applied to protect areas from unintentional brazing. Metal surface should be grit-blasted before precoating. Coating does not interfere with brazing or contaminate vacuum pumping systems.

B80-10137
SHOULD WE INDUSTRIALIZE SPACE?

G. W. DRIGGERS (Science Applications, Inc.) and C. L. GOULD (Rockwell International Corp.)

Aug. 1980

M-FS-23963

Vol. 5, No. 1, p. 114

Two reports project world needs over next 30 to 50 years and correlate them with space opportunities. Effects of diminishing resources, market, population, and technological changes are considered. Possible benefits are outlined.

B80-10138
COST MODELS AND ECONOMICAL PACKAGING OF LSI'S

R. P. HIMMEL (Hughes Aircraft Co.), R. G. RAVETTI, C. W. ROTHROCK, S. M. STUHLBARG, and P. J. ZULUETA

Aug. 1980

M-FS-25359

Vol. 5, No. 1, p. 115

Report discusses mathematical models used to estimate costs of developing and fabricating microcircuits. Second part discusses LSI packaging using tape chip carrier technology.

B80-10139
AUTOMATED ION IMPLANTATION FOR IC'S

B. W. KENNEDY

Aug. 1980

M-FS-25193

Vol. 5, No. 1, p. 115

Report discusses automated ion-implantation facility under development at Marshall Space Flight Center. Facility will produce ultra-reliable IC's with minimal human intervention.

B80-10140
AN AUTOMATED PHOTOLITHOGRAPHY FACILITY FOR IC'S

B. W. KENNEDY

Aug. 1980

M-FS-25073

Vol. 5, No. 1, p. 116

Report discusses subsystems that will constitute fully-automated photolithography facility for IC's. Facility being developed at Marshall Space Flight Center will produce ultrareliable IC's with minimal human intervention.

B80-10141
MODELS OF MOS AND SOS DEVICES

J. D. GASSAWAY (Mississippi State Univ.), Q. MAHMOOD (Mississippi State Univ.), and J. D. TROTTER (Mississippi State Univ.)

Aug. 1980

M-FS-25153

Vol. 5, No. 1, p. 116

Quarterly report describes progress in three programs: dc sputtering machine for aluminum and aluminum alloys; two dimensional computer modeling of MOS transistors; and development of computer techniques for calculating redistribution diffusion of dopants in silicon on sapphire films.

B80-10260
PHOTONITRIDE PASSIVATING COATING FOR IC'S

T. C. HALL and J. W. PETERS

Sep. 1980

M-FS-25401

Vol. 5, No. 2, p. 231

Increased reliability and simplified fabrication result from postassembly preencapsulation passivation process. Photonitride reaction chamber receives silane, ammonia, and mercury from mixing manifold to form passivating coating on IC's. Photonitride layer is barrier to moisture and penetration by mobile ions, and helps to protect IC devices subjected to severe mechanical handling or circuit repair procedures. Process is compatible with variety of wire-bonded lead frame assemblies. Advantages over plasma and sputtering deposition processes are low deposition temperature and zero stray radiation and ion levels.

08 FABRICATION TECHNOLOGY

B80-10261

DOUBLE METALIZATION FOR VLSI

J. D. TROTTER (Mississippi State Univ.) and T. E. WADE (Mississippi State Univ.)
Sep. 1980

M-FS-25149

Vol. 5, No. 2, p. 232

Postsintering process increases yield of double-layer metal conductors to almost 100 percent. When wafers containing double-metalized chips are sintered, metal layers react with oxide film remaining in insulation layer holes, breaking it up so that it no longer impedes electric current. Cooling also mechanically disrupts oxide film.

B80-10262

MORE-RELIABLE SOS ION IMPLANTATIONS

D. S. WOO (RCA Corp.)

Sep. 1980

M-FS-25322

Vol. 5, No. 2, p. 232

Conducting layer prevents static charges from accumulating during implantation of silicon-on-sapphire MOS structures. Either thick conducting film or thinner film transparent to ions is deposited prior to implantation, and gaps are etched in regions to be doped. Grounding path eliminates charge flow that damages film or cracks sapphire wafer. Prevention of charge buildup by simultaneously exposing structure to opposite charges requires equipment modifications less practical and more expensive than deposition of conducting layer.

B80-10263

OHMIC CONTACT TO GAAS SEMICONDUCTOR

H. J. HOVEL (IBM Corp.) and J. M. WOODALL (IBM Corp.)

Sep. 1980

LANGLEY-12466

Vol. 5, No. 2, p. 233

Multimetallic layers produce stable, low-resistance contacts for p-type GaAs and p-type GaAlAs devices. Contacts present no leakage problems, and their series resistance is too small to measure at 1 Sun intensity. Ohmic contacts are stable and should meet 20-year-life requirement at 150 C for GaAs combined photothermal/photovoltaic concentrators.

B80-10264

RESISTANCE WELDING GRAPHITE-FIBER COMPOSITES

R. T. LAMOUREUX (McDonnell Douglas Corp.)

Sep. 1980

MSC-18534

Vol. 5, No. 2, p. 234

High-strength joints are welded in seconds in carbon-reinforced thermoplastic beams. Resistance-welding electrode applies heat and pressure to joint and is spring-loaded to follow softening material to maintain contact; it also holds parts together for cooling and hardening. Both transverse and longitudinal configurations can be welded. Adhesive bonding and encapsulation are more time consuming methods and introduce additional material into joint, while ultrasonic heating can damage graphite fibers in composite.

B80-10265

ALL-INORGANIC SPARK-CHAMBER FRAME

T. M. HESLIN

Sep. 1980

GSFC-12354

Vol. 5, No. 2, p. 235

Outgassing is reduced by using ceramic and glass materials exclusively. Frames are assembled from four beams with rabbeted ends. Only ceramic or glass adhesives are used, and printed circuit is applied by screen printing directly on beams. Inorganic frames provide stable spark-chamber operation without gas refill, useful in terrestrial gamma-ray studies, in high-energy physics research, and other applications.

B80-10266

CONTROLLING THE SHAPE OF GLASS MICROBALLOONS

S. A. DUNN (Bjorksten Res. Labs., Inc.) and S. GUNTER (Bjorksten Res. Labs., Inc.)

Sep. 1980

M-FS-25230

Vol. 5, No. 2, p. 236

Percent yield of 'perfect' glass microballoons is increased by using microlevitating furnaces. Furnace components operate

at higher temperatures and with levitation gases that will not affect glass materials. Furnace speeds up remelting and reshaping, reducing number of rejects for laser fusion studies. Electronic sensing maintains constant pressure differential across CHS despite changing furnace pressure and temperature; control retains microballoon in stable levitating state.

B80-10267

FORMING COMPLEX CAVITIES IN CLEAR PLASTIC

T. RILEY, G. MATUSIK, and C. CASTERLINE

Sep. 1980

LEWIS-13412

Vol. 5, No. 2, p. 237

Metal casting 'lost wax' process is used to mold plastic parts. Highly economical technique produces optically-clear components of complex shapes, which can be used in complex combustion and manifold systems.

B80-10268

SHRINKING PLASTIC TUBING AND NONSTANDARD DIAMETERS

W. V. RUIZ (Rockwell Intern. Corp.) and C. S. THATCHER (Rockwell Intern. Corp.)

Sep. 1980

MSC-18430

Vol. 5, No. 2, p. 237

Process allows larger-than-normal postshrink diameters without splitting. Tetrafluoroethylene tubing on mandrel is supported within hot steel pipe by several small diameter coil sections. Rising temperature of mandrel is measured via thermocouple so assembly can be removed without overshrinking (and splitting) of tubing.

B80-10269

THERMAL BARRIER AND GAS SEAL

J. O. KANE (Rockwell Intern. Corp.) and M. SURBAT (Rockwell Intern. Corp.)

Sep. 1980

MSC-18390

Vol. 5, No. 2, p. 238

Resilient baglike seal tolerates thousand-degree temperatures and accommodates small changes in gap size without losing gas-barrier properties; at same time, it maintains smooth aerodynamic surface across gap. Seal includes alumina filler backed by metal plate. Alumina-filled envelope is easily handled and installed, and can be used in high-temperature industrial processes like coal gasification and liquefaction.

B80-10270

HEAT-SHRINKABLE SLEEVE AIDS IN INSULATING UNIVERSAL JOINTS

W. S. GREEN (Rockwell Intern. Corp.) and F. W. THOMPSON (Rockwell Intern. Corp.)

Sep. 1980

MSC-18685

Vol. 5, No. 2, p. 239

Tubing stiffens joint so that it can be aligned with spline fitting; unsleeved joint would normally droop, making it difficult to attach to splines. Sleeve technique saves time and effort when assembling nonrigid parts by making special holding tools or fixtures unnecessary. Tubing also protects joint from dust and other contamination.

B80-10271

IMPROVED PARTICULATE-SAMPLING FILTER

A. R. HOFFMAN (Caltech) and H. W. SCHNEIDER (Caltech)

Sep. 1980

NPO-14801

Vol. 5, No. 2, p. 240

Small surface indentations entrain larger and more representative sampling than conventional petri-dish smeared with smooth layer adhesive. Filter is assembled from perforated disk and flat backing plate with sticky surface. Due to design-created currents, particulates come in contact with surface for longer time and have greater probability of being trapped. Filter is useful in air-quality monitoring at industrial sites, in mines, and in and around nuclear power plants.

B80-10272

TIME-SHAPED RF BRAZING

J. A. STEIN (Rockwell Intern. Corp.) and M. A. VANNASSE

(Rockwell Intern. Corp.)

Sep. 1980

MSC-18617

Vol. 5, No. 2, p. 240

One RF generator is controlled from two independent work stations with aid of RF switch and simple control boxes. Brazing may be stopped manually or automatically by external brazing-temperature controller or timer in RF switch housing. Switch is air-operated with water-cooled contacts. If switch loses air pressure, generator stops transmitting power. Time-shared outlet increases utilization and productivity of costly RF generator.

B80-10273

PRODUCING GAPPED-FERRITE TRANSFORMER CORES

W. T. MCILYMAN (Caltech)

Sep. 1980

NPO-14715

Vol. 5, No. 2, p. 241

Improved manufacturing techniques make reproducible gaps and minimize cracking. Molded, unfired transformer cores are cut with thin saw and then fired. Hardened semicircular core sections are bonded together, placed in aluminum core box, and fluidized-coated. After winding is run over box, core is potted. Economical method significantly reduces number of rejects.

B80-10274

PLASTIC WELDER

J. D. BUCKLEY, R. L. FOX, and R. J. SWAIN

Sep. 1980

LANGLEY-12540

Vol. 5, No. 2, p. 242

Low-cost, self-contained, portable welder joins plastic parts by induction heating. Welder is useable in any atmosphere or in vacuum and with most types of thermoplastic; plastic components can be joined in situ. Device is applicable to aerospace industry and in automobile, furniture, and construction industries. Power requirements are easily met by battery or solar energy. In welder, toroidal inductor transfers magnetic flux through thermoplastic to screen. Heated screen causes plastic surface on either side to melt and flow into it to form joint.

B80-10275

ELECTRON-BEAM WELDER CIRCLE GENERATOR

R. K. BURLEY (Rockwell Intern. Corp.)

Sep. 1980

M-FS-19441

Vol. 5, No. 2, p. 243

Generator rotates electron beam and performs other convenient functions during welding process. Device eliminates time-consuming techniques relying heavily on operator's skill. Welding speed is varied with frequency selector, and amplitudes of x- and y-axes are varied by adjusting phase shift. Both high and low-range adjustments are available, and each axis can be separately controlled. Crosshair is provided for set-up and beam alignments.

B80-10276

'FOREIGN MATERIAL' TO VERIFY ROOT FUSION IN WELDED JOINTS

R. E. KLEINT (Rockwell Intern. Corp.)

Sep. 1980

M-FS-19496

Vol. 5, No. 2, p. 243

Foil or thin wire at weld root is used to verify weld penetration. When weld is adequate, material mixes with weld and traces of it diffuse to weld crown. Spectroscopic analysis of samples identifies foreign material and verifies root has fused. Weld roots are usually inaccessible to visual inspection, and X-ray and ultrasonic inspection techniques are not always reliable. Good results are obtained with use of gold/nickel alloy.

B80-10277

TUBE-WELDER AIDS

J. F. WEAVER (Rockwell Intern. Corp.)

Sep. 1980

MSC-18687

Vol. 5, No. 2, p. 244

Simple tools assist in setting up and welding tubes. Welder aids can be easily made to fit given tube diameter. Finished set can be used repeatedly to fix electrode-to-weld gap and mark sleeve and joint positions. Tools are readily made in tube-manufacturing plants and pay for themselves in short time in

reduced labor costs and quality control: Conventional measurements are too slow for mass production and are prone to errors.

B80-10278

HONING FIXTURE FOR WELDED ELECTRODES

R. F. NICHOLAS (Rockwell Intern. Corp.) and W. H. SCHUBERT (Rockwell Intern. Corp.)

Sep. 1980

M-FS-19537

Vol. 5, No. 2, p. 244

Fixture for refacing electrodes mounts directly on welding machine. Up-and-down movement of stone against electrode is done manually or with designed motor drive. Fixture is used in lieu of manually refinishing electrodes with emory paper or other abrasive. It produces uniformly flat, parallel electrodes in less time, saving cost on production time.

B80-10279

SILICON NITRIDE PASSIVATION OF IC'S

J. J. ERICKSON (Hughes Aircraft Co.), F. L. GEBHART (Hughes Aircraft Co.), T. C. HALL (Hughes Aircraft Co.), and J. W. PETERS (Hughes Aircraft Co.)

Sep. 1980

M-FS-25309

Vol. 5, No. 2, p. 245

Feasibility study looks at effectiveness of silicon nitride passivation coating against moisture and mobile ions. Coating was tested on CMOS microcircuits. Tests included temperature cycling, high-temperature electrical stress, and temperature and humidity exposure. Report concludes plastic-encapsulated circuits with protective coating exhibit high survival rates; it includes tables summarizing test results and figures that show effects of flexing.

B80-10280

PROGRESS IN MOSFET DOUBLE-LAYER METALIZATION

J. D. GASSAWAY (Mississippi State Univ.), J. D. TROTTER (Mississippi State Univ.), and T. E. WADE (Mississippi State Univ.)

Sep. 1980

M-FS-25239

Vol. 5, No. 2, p. 246

Report describes one-year research effort in VLSI fabrication. Four activities are described: theoretical study of two-dimensional diffusion in SOS (silicon-on-sapphire); setup of sputtering system, furnaces, and photolithography equipment; experiments on double layer metal; and investigation of two-dimensional modeling of MOSFET's (metal-oxide-semiconductor field-effect transistors).

B80-10281

OPTIMIZING COSTS OF VLSI CIRCUITS

K. B. COOK, JR. (Auburn Univ.) and D. V. KERNS, JR. (Auburn Univ.)

Sep. 1980

M-FS-25348

Vol. 5, No. 2, p. 246

Report analyzes costs of developing and producing low-production-volume, customized VLSI (very large-scale, integrated) circuits. Relationship is developed between IC cost and electronic system cost using IC cost models based on design/fabrication approach. Emphasis is on development of understanding between cost and volume for custom circuits to be used by NASA. Reliability is major cost component in models. Report is divided into five sections and includes four appendices with useful reference literature.

B80-10282

AN AUTOMATED OXIDE AND DIFFUSION FACILITY FOR IC'S

B. W. KENNEDY

Sep. 1980

M-FS-25357

Vol. 5, No. 2, p. 246

Report discusses totally-automated oxidation and diffusion facility for fabricating IC's. Several innovations are demonstrated: process controller specifically designed for semiconductor processing; automatic loading system to accept wafers from air track, insert them in quartz carrier, and place carrier on paddle for insertion into furnace; automatic unloading of wafers back onto air track; and boron diffusion using diborane.

08 FABRICATION TECHNOLOGY

B80-10283

PREDICTING CRACK PROPAGATION

T. HU (Rockwell Intern. Corp.)

Sep. 1980

MSC-18718

Vol. 5, No. 2, p. 247

Flaw growth under load is predicted in two dimensions with Advanced Crack Propagation Predictive Analysis Program (FLAGR04). FLAGR04 accommodates variety of cracks, crack transitions, stress gradients, changes in material properties, and Willenberg retardation. Program is written in FORTRAN IV for batch execution and is available for CDC and IBM machines.

B80-10417

CONTOUR-MEASURING TOOL FOR COMPOSITE LAYUPS

M. J. FONTES

Jan. 1981

ARC-11246

Vol. 5, No. 3, p. 383

Simple handtool helps form contours and complex shapes from laminae of resin-impregnated fabric. Tool, which consists of yoke having ballpoint pen and spindle and gage, is placed so that it straddles model. As toll is moved, pen draws constant thickness focus that is used as template.

B80-10418

A NEW FAMILY OF FIRE-RESISTANT FOAMS

J. GAGLIANI (International Harvester Co.)

Jan. 1981 See also NASA-CR-160576 (N80-22492); B78-10053

MSC-16921

Vol. 5, No. 3, p. 384

Need for lightweight flame-resistant, nonsmoking materials in interiors of spacecraft has spawned family of foams that could find applications in aircraft and other vehicles. Polyimide-based foams are being developed as resilient fillers for seat cushions, as rigid, low-density wall panels, as high-strength sheets for floors, and as thermal and acoustical insulation.

B80-10419

MODIFIED FIRE-RESISTANT FOAMS FOR SEAT CUSHIONS

J. GAGLIANI (International Harvester Co.), R. LEE (International Harvester Co.), U. A. K. SORATHIA (Intern Harvester Co.), and A. L. WILCOXSON (Intern. Harvester Co.)

Jan. 1981

MSC-18704

Vol. 5, No. 3, p. 385

Modified polyimide-polymer resins are precursors for new family of resilient fire-resistant foams. Terpolyimide foams containing long-chain aliphatic diamines withstand 50,000 cycles of compression over a 200 pound load - an equivalent of 3 years of continuous use as seat cushion filler.

B80-10420

ONE-STEP MICROWAVE FOAMING AND CURING

J. GAGLIANI (International Harvester Co.), R. LEE (International Harvester Co.), U. A. K. SORATHIA (International Harvester Co.), and A. L. WILCOXSON (International Harvester Co.)

Jan. 1981 See Also NASA-CR-160576(N80-22492); NASA-CR-151472 (N77-28301)

MSC-18707

Vol. 5, No. 3, p. 386

Process that combines microwave foaming and curing of polyimide precursors in single step produces fire-resistant foam slabs of much larger volume than has previously been possible. By adding selected conductive fillers to powder precursors and by using high-power microwave oven, foam slabs with dimensions in excess of 61 by 61 by 7.6 cm are made. Typical foaming and curing and curing time is 35 minutes in microwave oven with additional 1 to 2 hour postcure in conventional oven.

B80-10421

RIGID FIRE-RESISTANT FOAMS FOR WALLS AND FLOORS

J. GAGLIANI (International Harvester Co.), R. LEE (International Harvester Co.), U. A. K. SORATHIA (International Harvester Co.), and A. L. WILCOXSON (International Harvester Co.)

Jan. 1981 See also NASA-CR-160576 (N80-22492); NASA-CR-151472 (N77-28301)

MSC-18708

Vol. 5, No. 3, p. 386

Previous techniques for fabricating rigid fire-resistant polyi-

mide foams by compressing already-foamed precursor have been supplanted by one-step constrained-rise process. Precursor mixed with reinforcing fillers is placed between rigid substrates that constrain expansion of foam as it is heated by microwave energy. Process works for both liquid and powder precursors and can also be adapted to attach woven fiberglass skins at same time precursor is being foamed.

B80-10422

HOT FORMING GRAPHITE/POLYIMIDE STRUCTURES

R. M. BAUCOM and P. W. KIDDER (LTV)

Jan. 1981

LANGLEY-12547

Vol. 5, No. 3, p. 387

Hot forming process has been developed in which structural shapes and panels are fabricated directly from stabilized graphite/polyimide preforms. Process can be used with thermosetting polymers that have high-temperature melt phase just before final cure. This phase allows fibers to move without destroying matrix-to-fiber adhesion. One of key advantages of this process is that prestages preforms are very stable and do not require refrigerated storage.

B80-10423

METHOD FOR SHAPING POLYETHYLENE TUBING

R. C. KRAMER (Rockwell International Corp.)

Jan. 1981

MSC-18771

Vol. 5, No. 3, p. 388

Method forms polyethylene plastic tubing into configurations previously only possible with metal tubing. By using polyethylene in place of copper or stain less steel tubing in low pressure systems, fabrication costs are significantly reduced. Polyethylene tubing can be used whenever low pressure tubing is needed in oil operations, aircraft and space applications, powerplants, and testing laboratories.

B80-10425

FILM COATINGS FOR CONTOURED SURFACES

H. E. FLANERY (Rockwell International Corp.), R. K. FROST (Rockwell International Corp.), and A. J. OLSON (Rockwell International Corp.)

Jan. 1981

MSC-18784

Vol. 5, No. 3, p. 389

Thickness of fluorocarbon elastomer films applied in contoured shapes by vacuum forming is difficult to control at sharply curved areas. Process for spraying contoured fluorocarbon elastomer films of uniform strength and thickness has been used instead of vacuum forming to fabricate curtain covering external tank of Space Shuttle. Conventional spray equipment may be used.

B80-10426

KILOVOLT VACUUM FEED THROUGH IS LESS NOISY

L. D. HOWELL (ITT)

Jan. 1981

NPO-14802

Vol. 5, No. 3, p. 390

Electrical feedthrough connects both low-voltage and high-voltage signals between cryogenic environment and 'outside world.' Developed for cooled germanium gamma-ray detector, feedthrough has especially low capacitance and low sensitivity to microphonic noise. Its high-voltage lead is free of corona discharge and electrical breakdown to at least 5 kV.

B80-10427

CUTTING HOLES IN FABRIC-FACED PANELS

S. A. PETERSON (Rockwell International Corp.)

Jan. 1981

MSC-18786

Vol. 5, No. 3, p. 391

Tool has 2 carbide inserts that bore clean holes through fibrous material with knifelike slicing action. Cutting edge of insert is curved, with plane inner surface at 30 degree angle to tool axis. Drill press or hand-held drill can be used to hold cutting tool.

B80-10428

SEALING MICROPORES IN THIN CASTINGS

G. A. MERSERAU (Honeywell, Inc.), G. O. NITZSCHKE (Honeywell, Inc.), H. L. OCHS (Honeywell, Inc.), and F. S. SUTCH

(Honeywell, Inc.)

Jan. 1981

MSC-18623

Vol. 5, No. 3, p. 391

Microscopic pores in thin-walled aluminum castings are sealed by impregnation pretreatment. Technique was developed for investment castings used in hermetically sealed chassis for electronic circuitry. Excessively high leakage rates were previously measured in some chassis.

B80-10429

LIGHTWEIGHT TERMINAL BOARD

J. D. DRECHSLER (Rockwell International Corp.) and H. EATON (Rockwell International Corp.)

Oct. 1981

MSC-18787

Vol. 5, No. 3, p. 393

Sandwich construction for terminal boards reduces fabrication time and produces thinner boards with better insulation consistency, better appearance, and less weight. New method also permits closer spacing of terminal posts. Method starts with thin (0.031 inch) sheet of polyimide and consists of drilling, inserting terminal posts, upsetting ends, and then bonding second sheet to upset side as continuous insulation member. Resulting sandwich is lighter and much cheaper than single board.

B80-10430

TRANSISTOR PACKAGE FOR HIGH PRESSURE APPLICATIONS

P. J. ZANTOS (Rockwell International Corp.)

Jan. 1981

MSC-18743

Vol. 5, No. 3, p. 393

TO63 transistor package can operate in hydraulic oil at pressures of 200 psi or greater without leakage failure if it is reinforced by alumina disk brazed to cap and terminals. This inexpensive modification has been used successfully on power transistors in hydraulic circulating-pump assemblies for Space Shuttle orbiter and should be effective in other pressurized environments, such as in oil exploration equipment.

B80-10431

AUTOMATIC CHEMICAL VAPOR DEPOSITION

B. W. KENNEDY

Jan. 1981

M-FS-25249

Vol. 5, No. 3, p. 393

Report reviews chemical vapor deposition (CVD) for processing integrated circuits and describes fully automatic machine for CVD. CVD proceeds at relatively low temperature, allows wide choice of film compositions (including graded or abruptly changing compositions), and deposits uniform films of controllable thickness at fairly high growth rate. Report gives overview of hardware, reactants, and temperature ranges used with CVD machine.

B80-10432

CADAT LOGIC SIMULATION PROGRAM

C. L. MITCHELL (M & S Computing, Inc.) and J. F. TAYLOR (M & S Computing, Inc.)

Jan. 1981 See also B80-10437

M-FS-25183

Vol. 5, No. 3, p. 394

CADAT Logic Simulation Program (LOGSIM) checks functional correctness of electronic logic circuit by simulating circuit at logic gate level. LOGSIM also checks propagation delay through logic nets and indicates any timing or 'race' problems.

B80-10433

CADAT TEST PATTERN GENERATOR

Innovator not given (M & S Computing Co.) Jan. 1981

M-FS-25066

Vol. 5, No. 3, p. 394

CADAT test pattern generator (TPG) aids in checkout, fault detection, and fault isolation of complex digital circuits. Time and effort of manually generating digital test patterns can be major limiting factor in effectively utilizing automatic testing. This time and effort are reduced from several months to several days by TPG.

B80-10434

CADAT FIELD-EFFECT-TRANSISTOR SIMULATOR

Innovator not given (RCA Corp.) Jan. 1981

M-FS-25067

Vol. 5, No. 3, p. 395

CADAT field-effect transistor simulator (FETSIM) analyzes dc and transient behavior of metal-oxide-semiconductor (MOS) circuits. Both N-MOS and P-MOS transistor configurations in either bulk of silicon-on-sapphire (SOS) technology and almost any combination of R/C elements are analyzed.

B80-10435

CADAT PLACE-AND-ROUTINE IN TWO DIMENSIONS

Innovator not given (RCA Corp.) Jan. 1981

M-FS-25058

Vol. 5, No. 3, p. 395

CADAT place-and-route-in-two dimensions program (PR2D) is standard-cell automatic-layout program for generating large-scale-integrated/metal-oxide-semiconductor (LSI/MOS) arrays. PR2D translates logic designer's cell interconnection requirements into physically-defined MOS chip. PR2D reads input data, searches pin data file for data on each pattern type, generates placement of patterns, and interconnects patterns. As output, it generates artwork for layouts.

B80-10436

CADAT MULTIPOINT PLACEMENT AND ROUTING

Innovator not given (RCA Corp.) Jan. 1981

M-FS-25065

Vol. 5, No. 3, p. 396

CADAT multipoint-in-two dimensions program (MP2D) is powerful placement and routing aid for processing double-ended cell equivalents of high-speed silicon-on-sapphire (SOS) standard-cell family. Basic purpose of MP2D is to design high-density large-integrated (LSI) arrays.

B80-10437

CADAT INTEGRATED CIRCUIT MASK ANALYSIS

Innovator not given (M & S Computing Co.) Jan. 1981 See also B80-10432

M-FS-25054

Vol. 5, No. 3, p. 396

CADAT System Mask Analysis Program (MAPS2) is automated software tool for analyzing integrated-circuit mask design. Included in MAPS2 functions are artwork verification, device identification, nodal analysis, capacitance calculation, and logic equation generation.

B80-10534

'DENSIFIED' TILES FORM STRONGER BONDS

R. L. DOTTS and J. W. HOLT (Rockwell International Corp.)

Apr. 1981 See also B80-10535

MSC-18741

Vol. 5, No. 4, p. 495

Application of colloidal silica more than doubles bond strength of ceramic tile/substrate attachments. 'Densification' process strengthens surface where tile attaches to felt strain-isolator pad, redistributing stresses and preventing failures at that point. First, isopropyl alcohol is applied to bottom tile surface. Second, aqueous mixture of cementing colloidal silica and reinforcing ball-milled silica particles is painted on tile. Finally, after drying, tile is rewaterproofed by exposure to vapors or methyltrimethoxysilane and acetic acid.

B80-10535

TILE DENSIFICATION WITH TEOS

G. M. ECORD and C. SCHOMBURG

Apr. 1981

MSC-18737

Vol. 5, No. 4, p. 495

Densification process uses brushed or sprayed coating of tetraethyl orthosilicate. Liquid is applied and cured in three steps: tile weight increase averages 0.15 g per square centimeter. TEOS liquid is prepared by mixing TEOS with hydrochloric acid and adding marking dye. TEOS application provides variable stiffness, strength, and penetration. Surface of tile shows no buildup and is more durable for additional coatings.

B80-10536

REPAIRING HIGH-TEMPERATURE GLAZED TILES

G. M. ECORD and C. SCHOMBURG

Apr. 1981

MSC-18736

Vol. 5, No. 4, p. 496

Tetraethyl orthosilicate (TEOS) mixture fills chips and cracks in glazed tile surface. Filler is made by mixing hydrolyzed TEOS.

08 FABRICATION TECHNOLOGY

silicon tetraboride powder, and pulverized tile material. Repaired tiles survived testing by intense acoustic emissions, arc jets, and intense heat radiation. Repair is reliable and rapid, performed in 1-1 1/2 hours with tile in any or orientation.

B80-10537

PRODUCING SILICON CONTINUOUSLY

W. M. INGLE (Motorola, Inc.), R. S. ROSLER (Motorola, Inc.), and S. THOMPSON (Motorola, Inc.)
Apr. 1981

NPO-14796

Vol. 5, No. 4, p. 497

Fluid-bed vaporization followed by chemical vapor deposition generates large, semiconductor-grade silicon particles. Method is economical, high-volume alternative to conventional batch-processing methods. Harvested chunks, extracted in cyclone separator, are about 0.5 to 1.3 centimeters in diameter. Process is not limited to polymer feedstock; it utilizes any halosilane intermediate used in silicon production.

B80-10538

MOBILE GLAZING UNIT

J. W. HOLT (Rockwell International Corp.)
Apr. 1981 See also NASA-N81-70850

KSC-11171

Vol. 5, No. 4, p. 498

Unit programs thermal cycle from 100 to 2,300 F for firing ceramic glaze coatings on refractory surfaces in any attitude and position. Device includes control console, heater assembly, protective cover, and manipulator boom; boom places heater next to surface to be fired. Unit is industrially useful for in situ repair of ceramics and curing individual refractory blocks during furnace maintenance.

B80-10539

LEARNING HIGH-QUALITY SOLDERING

W. S. READ (Caltech)
Apr. 1981

NPO-14869

Vol. 5, No. 4, p. 499

Soldering techniques for high-reliability electronic equipment are taught in 5 day course at NASA's Jet Propulsion Laboratory. Topic covered include new circuit assembly, printed-wiring board reworking, circuit changes, wire routing, and component installation.

B80-10540

ELIMINATING GAPS IN SPLIT RINGS

R. W. GOULD (Rockwell International Corp.)
Apr. 1981

MSC-18854

Vol. 5, No. 4, p. 500

Simple installation method allows thinner, lighter tether rings than conventional procedures, saving expensive materials. Installer inverts ring with pliers before it is slid over cable, then returns it to its original position after installation. Ring is in correct orientation, and coils are tightly compressed for high reliability fastening.

B80-10541

PASSIVATION LAYER FOR STEEL SUBSTRATE OF SOLAR CELL

R. J. STIRN (Caltech) and Y. M. YEH (Caltech)
Apr. 1981

NPO-14961

Vol. 5, No. 4, p. 501

Solar cell is fabricated on commercial sheet-steel substrate passivated with tungsten layer. Layer prevents constituents of steel from interacting with semiconductor materials in MOS thin-film solar cell. Thin plating of nickel on steel improves bonding of tungsten. Use of steel as substrate reduces materials cost of solar cell construction.

B80-10542

LOW-COST CONCENTRATING MIRRORS

T. R. CARROLL (Caltech)
Apr. 1981

NPO-14962

Vol. 5, No. 4, p. 502

Parabolic concentrators used in solar-energy systems are constructed from many flat rectangular mirrors. Each mirror is elastically deformed in one dimension. Several such mirrors placed

adjacent to each other along parabolic curve form inexpensive mirror suitable for solar application.

B80-10543

SPIRAL-WOUND GASKET FORMS LOW-TEMPERATURE SEAL

S. C. IRICK
Apr. 1981

LANGLEY-12315

Vol. 5, No. 4, p. 502

Spiral-wound cryogenic gasket with one component requires no encapsulant and is easily produced with self-locking features. Seal either opens and closes or is fixed. It is made by skiving strip from circumference of disk of glass-filled material. Successive turns of strip are spirally wrapped in groove machined into one flange surface. Closing joint compresses gasket.

B80-10544

ARC SPRAYING SOLDERABLE TABS TO GLASS

J. LINDMAYER (Solarex Corp.)
Apr. 1981

NPO-14853

Vol. 5, No. 4, p. 503

Tabs suitable for electrical or mechanical connections in solar cells and integrated circuits are made by spraying technique. Solder wets copper, copper bonds to aluminum, and aluminum adheres to glass. Arc spraying is automated and integrated with encapsulation, eliminating hand tabbing, improving reliability, and reducing cost.

B80-10545

BACK CONTACTS FOR SILICON-ON-CERAMIC SOLAR CELLS

T. L. SCHULLER (Honeywell, Inc.) and S. MARQUARDT (Honeywell, Inc.)
Apr. 1981

NPO-14809

Vol. 5, No. 4, p. 504

Grooved substrate exposes back surface of photovoltaic cells, allowing dopant diffusion into surface and electrical contact. When substrate is coated successively with carbon and molten silicon, polycrystalline-silicon bridges form over grooves, but leave channels open. Best adhesion results when substrate grooves run perpendicular to direction of liquid-silicon layer and are closely spaced.

B80-10546

SELF-LUBRICATING GEARSET

D. S. BINGE (RCA Corp.)
Apr. 1981

MSC-18801

Vol. 5, No. 4, p. 504

Gearset fabricated from molybdenum sulfide filled polyimide allows attention-free operation in vacuum and at extreme temperatures. Ring gear drives pinion gear on shaft in skewed-axis arrangement. Because loads are shared among multiple meshing teeth, self-lubricating material is strong enough to accommodate high gear ratio.

B80-10547

REFLECTING LAYERS REDUCE WEIGHT OF INSULATION

J. D. COLE (Rockwell International Corp.), E. D. SCHLESSINGER (Rockwell International Corp.), and H. J. ROCKOFF (Rockwell International Corp.)
Apr. 1981

MSC-18785

Vol. 5, No. 4, p. 505

Metalized films placed between layers of fibrous material maintain equivalent thermal conductivity while cutting blanket density in half. Tests indicate that insulation with 1 lb/cu ft density with goldized films has thermal conductivity equal to 2 lb/cu ft of conventional insulation. Concept reduces weight in commercial aircraft and increases cargo space.

B80-10548

LIGHTWEIGHT CRYOGENIC VESSEL

J. C. LEWIS (Caltech)
Apr. 1981

NPO-14794

Vol. 5, No. 4, p. 505

Thin cooling jacket of recirculating liquid nitrogen is contained by relatively thin walls. Nitrogen is maintained at slight positive

pressure, unlike full atmospheric pressure of conventional Dewar design, eliminating need for evacuated insulating spaces and heavy-walled shells. Besides cryogenic applications, design keeps liquids hot when recirculating liquid hotter than nitrogen is used.

B80-10549

DROP TOWER WITH NO AERODYNAMIC DRAG

J. M. KENDALL, JR. (Caltech)

Apr. 1981

NPO-14845

Vol. 5, No. 4, p. 506

Cooling air accelerated to match velocity of falling object eliminates drag. 3 meter drop tower with suction fan and specific geometry causes air to accelerate downward at 1 g. Although cooling of molten material released from top is slow because surrounding air moves with it, drop remains nearly spherical.

B80-10550

NICKEL-DOPED SILICON FOR SOLAR CELLS

A. M. SALAMA (Caltech)

Apr. 1981

NPO-14780

Vol. 5, No. 4, p. 507

Large grain boundaries in polycrystals act as gettering centers for nickel precipitates, improving cell performance. Effects are described in report. Data on open-circuit voltage, short-circuit current, maximum power, and conversion efficiency for illuminated cells are compared with values for undoped cells. Dark forward current versus voltage is also measured for cell types.

B80-10551

CADAT NETWORK TRANSLATOR

E. R. PITTS (M&S Computing, Inc.)

Apr. 1981 See also B80-10432 - B80-10437

M-FS-25055

Vol. 5, No. 4, p. 507

Program converts cell-net data into logic-gate models for use in test and simulation programs. Input consists of either Place, Route, and Fold (PRF) or Place-and-Route-in-Two-Dimensions (PR2D) layout data deck. Output consists of either Test Pattern Generator (TPG) or Logic-Simulation (LOGSIM) logic circuitry data deck. Designer needs to build only logic-gate-model circuit description since program acts as translator. Language is FORTRAN IV.

B80-10552

CADAT INTEGRATED CIRCUIT ARTWORK PROGRAM

R. L. KVELTHAU (M&S Computing, Inc.)

Innovator not given (RCA Corp.) Apr. 1981 See also B80-10551

M-FS-25017

Vol. 5, No. 4, p. 508

Versatile, ready-to-use program (ARTWORK) converts artwork data into mask patterns. ARTWORK generates signals for controlling mask-fabricating equipment. Extensive utility package enables user to create new pattern libraries, develop and incorporate new cells, and perform systems orientation functions. Program is written in FORTRAN IV.

09 MATHEMATICS AND INFORMATION SCIENCES

B80-10142

EFFICIENT TELEMETRY FORMAT

E. GREENBERG (Caltech) and A. J. HOOKE (Caltech)

Aug. 1980

NPO-13679

Vol. 5, No. 1, p. 119

Format would simplify ground processing of telemetry data. Also, missing minor frame would create error in only one set of source data instead of disrupting all sets. Format organizes data from various sources into autonomous blocks. Data are pre-processed, in effect, so main computer only needs to determine block type and process data set as batch.

B80-10143

USER'S GUIDE TO SFTRAN

T. E. FESSLER and W. F. FORD

Aug. 1980

LEWIS-13172

Vol. 5, No. 1, p. 119

Structured programming language has been given new features and some limitations are removed. Language runs more efficiently, and concepts of top down development and modularity are extended to task management.

B80-10144

GODDARD MISSION ANALYSIS SYSTEM

F. E. MCGARRY

Aug. 1980

GSFC-12392

Vol. 5, No. 1, p. 120

Collection of software modules can be configured to solve variety of mission analysis problems. GMAS includes modules for performing large selection of standard mission analyses. Graphics executive system is provided. Program is in FORTRAN IV and Assembler for and interactive execution on IBM 360-series.

B80-10145

SOFTWARE DESIGN AND DOCUMENTATION LANGUAGE

H. KLEINE (Caltech)

Aug. 1980

NPO-14610

Vol. 5, No. 1, p. 121

Language supports design and documentation of complex software. Included are: design and documentation language for expressing design concepts; processor that produces intelligible documentation based on design specifications; and methodology for using language and processor to create well-structured top-down programs and documentation. Processor is written in SIMSCRIPT 11.5 programming language for use on UNIVAC, IBM, and CDC machines.

B80-10146

ESTIMATION OF INCOMPLETE MULTINOMIAL DATA

K. R. CREDEUR

Aug. 1980

LANGLEY-12593

Vol. 5, No. 1, p. 121

Program estimates cell probabilities for data observed to fall in one of two or more categories when exact category cannot be determined. Data are assumed to be randomly incomplete. Estimation minimizes risk of quadratic loss. Program should be useful in projects where multinomial data is analyzed, but where observations are sometimes incomplete. Program is in FORTRAN IV and Assembler for batch execution on CYBER 173.

B80-10147

AUTOMATED FLOW-CHART SYSTEM

W. WOODFORD

Aug. 1980

GSFC-12514

Vol. 5, No. 1, p. 121

Program produces flow chart of any program written in FORTRAN. Each FORTRAN statement is printed with symbol representing actions required during execution. Flow chart is generated on line-printer. This program is in COBOL for batch execution on IBM 370-series computer.

B80-10148

SYSTEMS IMPROVED NUMERICAL DIFFERENCING ANALYZER

Innovator not given (Johnson Space Center) Aug. 1980

MSC-18597

Vol. 5, No. 1, p. 122

Program solves physical problems governed by diffusion-type equations, provided that equations can be modeled by lumped-parameter representation. Program is used for thermal analysis, and could be adapted to solve Fourier, Poisson, and Laplace differential equations. Program is in FORTRAN IV and Assembler for execution on UNIVAC 1100-series or CYBER 175.

B80-10284

AN APPROXIMATION TO STUDENT'S T-DISTRIBUTION

D. R. RUMMLER and C. W. STODD

Sep. 1980

LANGLEY-12238

Vol. 5, No. 2, p. 251

09 MATHEMATICS AND INFORMATION SCIENCES

Three equations relate Student's t-distribution to standard normal distribution with maximum error of less than 0.8 percent. First equation, used for degrees of freedom (v) greater than 2, expresses t variable in terms of standard normal variable z. For v=1 and 2, second and third equations express t exactly in terms of probability P.

B80-10285

LOW-COST LANDSAT PROCESSING SYSTEM

N. L. FAUST (Metrics, Inc.), N. J. HOOPER (Metrics, Inc.), and G. W. SPANN (Metrics, Inc.)
Sep. 1980

M-FS-25396

Vol. 5, No. 2, p. 252

LANDSAT analysis system is assembled from commercially available components at relatively low cost. Small-scale system is put together for price affordable for state agencies and universities. It processes LANDSAT data for subscene areas on repetitive basis. Amount of time required for processing decreases linearly with number of classifications desired. Computer programs written in FORTRAN IV are available for analyzing data.

B80-10286

NASA PERT TIME II

R. C. BAINBRIDGE, F. FUNICELLI, D. J. HIRSCH, E. A. PALLAT, E. RYAN, J. D. WALKER, and H. BREMMER
Sep. 1980

LEWIS-13145

Vol. 5, No. 2, p. 252

Program Evaluation and Review Technique (PERT) is disciplined management technique involving computer processing. NASA PERT Time II gives project manager insight into current and future project development and forewarns of potential problems. Program utilizes modular technique. Module is 'fragnet'; once aspects of project are described in terms of fragnets, control network is automatically generated. Program is written in FORTRAN IV and OS Assembler for batch execution and has been implemented on IBM 370.

B80-10287

LINEAR STOCHASTIC OPTIMAL CONTROL AND ESTIMATION PROBLEM

L. C. GEYSER and F. K. B. LEHTINEN
Sep. 1980

LEWIS-13206

Vol. 5, No. 2, p. 253

Problem involves design of controls for linear time-invariant system disturbed by white noise. Solution is Kalman filter coupled through set of optimal regulator gains to produce desired control signal. Key to solution is solving matrix Riccati differential equation. LSOCE effectively solves problem for wide range of practical applications. Program is written in FORTRAN IV for batch execution and has been implemented on IBM 360.

B80-10288

MULTIPLE LINEAR REGRESSION ANALYSIS

T. R. EDWARDS
Sep. 1980

M-FS-23764

Vol. 5, No. 2, p. 254

Program rapidly selects best-suited set of coefficients. User supplies only vectors of independent and dependent data and specifies confidence level required. Program uses stepwise statistical procedure for relating minimal set of variables to set of observations; final regression contains only most statistically significant coefficients. Program is written in FORTRAN IV for batch execution and has been implemented on NOVA 1200.

B80-10289

STRUCTURED FORTRAN PREPROCESSOR

S. AUSTIN (Science Applications, Inc.), B. BUCKLES (Science Applications, Inc.), and J. P. RYAN (Science Applications, Inc.)
Sep. 1980

M-FS-23713

Vol. 5, No. 2, p. 254

Structured-programming features simplify software design. Programmer needs only few control statements to code program in format easy to debug and maintain, freeing him/her from flow constraints of standard FORTRAN. Program is written in ANSI FORTRAN and is compatible with machine supporting

FORTRAN compiler that accepts ANSI statements. It has been implemented on IBM 370.

B80-10290

MBASIC PROCESSOR

R. B. HARTLEY (Caltech) and R. E. HOLZMAN (Caltech)
Sep. 1980

NPO-14245

Vol. 5, No. 2, p. 254

MBASIC is high-level, interactive computer language that reduces time of computer task programming. Outstanding features of MBASIC include: multiple assignments or statements in single instruction; conditional, assignment, and repetitive statement modifiers; and excellent string-handling capabilities. Two machine versions are available: UNIVAC (written in reentrant Assembler code for execution under EXEC 8) AND DEC-10 (written in Assembler code for execution under TOPS-10).

B80-10291

BASIC CLUSTER COMPRESSION ALGORITHM

E. E. HILBERT (Caltech) and J. LEE (Caltech)
Sep. 1980

NPO-14816

Vol. 5, No. 2, p. 255

Feature extraction and data compression of LANDSAT data is accomplished by BCCA program which reduces costs associated with transmitting, storing, distributing, and interpreting multispectral image data. Algorithm uses spatially local clustering to extract features from image data to describe spectral characteristics of data set. Approach requires only simple repetitive computations, and parallel processing can be used for very high data rates. Program is written in FORTRAN IV for batch execution and has been implemented on SEL 32/55.

B80-10292

SYSTEM TIME-DOMAIN SIMULATION

C. T. DAWSON, T. W. EGGLESTON, A. C. GORIS, M. FASHANO (Hughes Aircraft Co.), D. PAYNTER (Hughes Aircraft Co.), and W. H. TRANTER (Missouri Univ.)
Sep. 1980

MSC-18333

Vol. 5, No. 2, p. 255

Complex systems are simulated by engineers without extensive computer experience. Analyst uses free-form engineering-oriented language to input 'black box' description. System Time Domain (SYSTID) Simulation Program generates appropriate algorithms and proceeds with simulation. Program is easily linked to postprocessing routines. SYSTID program is written in FORTRAN IV for batch execution and has been implemented on UNIVAC 1110 under control of EXEC 8, Level 31.

B80-10293

IMAGE-BASED INFORMATION, COMMUNICATION, AND RETRIEVAL

N. A. BRYANT (Caltech) and A. L. ZOBRIST (Caltech)
Sep. 1980

NPO-14893

Vol. 5, No. 2, p. 256

IBIS/VICAR system combines video image processing and information management. Flexible programs require user to supply only parameters specific to particular application. Special-purpose input/output routines transfer image data with reduced memory requirements. New application programs are easily incorporated. Program is written in FORTRAN IV, Assembler, and OS JCL for batch execution and has been implemented on IBM 360.

B80-10438

AN IMAGE-DATA-COMPRESSION ALGORITHM

E. E. HILBERT (Caltech) and R. F. RICE (Caltech)
Jan. 1981

NPO-14496

Vol. 5, No. 3, p. 399

Cluster Compression Algorithm (CCA) preprocesses LANDSAT image data immediately following satellite data sensor (receiver). Data are reduced by extracting pertinent image features and compressing this result into concise format for transmission to ground station. This results in narrower transmission bandwidth, increased data-communication efficiency, and reduced computer time in reconstructing and analyzing image. Similar technique could be applied to other types of recorded data to cut costs of

transmitting, storing, distributing, and interpreting complex information.

B80-10439
DETERMINING MANUFACTURING COST FROM PRODUCT COMPLEXITY

L. M. DELIONBACK

Jan. 1981

M-FS-25371

Vol. 5, No. 3, p. 400

Procedure allows calculation of manufacturing complexity - the totality of cost elements that determine cost of manufacturing unit. Procedure is based on premise that manufacturing follows learning curve; that is costs are assumed to decrease as experience is acquired and improvements are made in design, tooling, and methods.

B80-10553
AN APPROXIMATION FOR INVERSE LAPLACE TRANSFORMS

W. M. LEAR (TRW, Inc.)

Apr. 1981 See also NASA-TM-81064(N80-25056)

MSC-18867

Vol. 5, No. 4, p. 511

Programmable calculator runs simple finite-series approximation for Laplace transform inversions. Utilizing family of orthonormal functions, approximation is used for wide range of transforms, including those encountered in feedback control problems. Method works well as long as $F(t)$ decays to zero as it approaches infinity and so is applicable to most physical systems.

B80-10554
SAFETY ANALYSIS FOR COMPLEX SYSTEMS

J. P. ONESTY (Rockwell International Corp.) and R. L. PEERCY, JR. (Rockwell International Corp.)

Apr. 1981

MSC-18745

Vol. 5, No. 4, p. 511

Operational risk assessment considers hardware, environment, and human factors. Technique starts with division of postulated mission into segments which are further subdivided into separate operational steps. Consequences of steps, nonoccurrence, premature operation, out-of-sequence operation, and inadvertent execution are examined at subevent, event, and phase levels. Hazards are identified and treated individually. Analysis is well suited to application in energy and transportation fields.

B80-10555
EVALUATING COMPUTER-DRAWN GROUND-COVER MAPS

L. G. ARVANITIS (Univ. of Florida), R. NEWBURNE (Univ. of Florida), and R. REICH (Univ. of Florida)

Apr. 1981 See also NASA-CR-154635(N80-32805)

KSC-11195

Vol. 5, No. 4, p. 512

Computer-generated character maps from LANDSAT data are compared to aerial photos for test sites in Florida. Report Describes extraction of ground features by two analytical techniques: unsupervised clustering algorithm, called LANDSAT Signature Development Program (LSDP), and interactive algorithm based on multispectral image analyzer. Study concluded that computer classification of digital LANDSAT multispectral data, supplemented with certain ground-cover information, is valuable tool for analysis of renewable resources.

B80-10556
OCCULT-ORSER COMPLETE CONVERSATIONAL USER-LANGUAGE TRANSLATOR

H. K. RAMAPRIYAN and K. YOUNG (Computer Science Corp.)

Apr. 1981

GSFC-12604

Vol. 5, No. 4, p. 512

Translator program (OCCULT) assists non-computer-oriented users in setting up and submitting jobs for complex ORSER system. ORSER is collection of image processing programs for analyzing remotely sensed data. OCCULT is designed for those who would like to use ORSER but cannot justify acquiring and maintaining necessary proficiency in Remote Job Entry Language, Job Control Language, and control-card formats. OCCULT is written in FORTRAN IV and OS Assembler for interactive execution.

B80-10557
SELECTING OPTIMUM ALGORITHMS FOR IMAGE PROCESSING

R. R. JAROE, J. HODGES, R. E. ATKINSON, B. GAGGINI, L. CALLAS, and J. PETERSON

Apr. 1981

M-FS-25367

Vol. 5, No. 4, p. 513

Collection of registration, compression, and classification algorithms allows users to evaluate approaches and select best one for particular application. Program includes six registration algorithms, six compression algorithms, and two classification algorithms. Package also includes routines for evaluating effects of processing on image data. Collection is written in FORTRAN IV for batch execution.

B80-10558
A UNIVERSAL STRUCTURED-DESIGN DIAGRAMMER

Innovator not given (Higher Order Software, Inc.) Apr. 1981

LANGLEY-12548

Vol. 5, No. 4, p. 513

Program (FLOWCHARTER) generates standardized flowcharts and concordances for development and debugging of programs in any language. User describes programming-language grammar, providing syntax rules in Backus-Naur form (BNF), list of semantic rules, and set of concordance rules. Once grammar is described, user supplies only source code of program to be diagrammed. FLOWCHARTER automatically produces flow diagram and concordance. Source code for program is written for PASCAL Release 2 compiler, as distributed by University of Minnesota.

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., B80-10326, is located under and to the right of the title and is followed by a two-digit number, e.g., 03, which designates the subject category in which the entire entry can be found.

A

- ABERRATION**
Acoustically-tuned optical spectrometer
HQN-10924 B80-10326 03
- ABSORBERS (EQUIPMENT)**
Self-adjusting mechanical snubbing link
MSC-16134 B80-10246 07
- ABSORBERS (MATERIALS)**
Removal of hydrogen bubbles from nuclear reactors
LANGLEY-12597 B80-10205 04
- ABSORPTANCE**
Selective optical coatings for solar collectors
M-FS-23589 B80-10192 03
User chooses coating properties
LANGLEY-12719 B80-10493 04
- ABSORPTION SPECTROSCOPY**
UV actinometer film
NPO-14479 B80-10179 03
- AC GENERATORS**
Energy saving in ac generators
M-FS-25302 B80-10150 01
A linear magnetic motor and generator
GSFC-12518 B80-10257 07
- ACCELEROMETERS**
Electrofluidic accelerometer
LANGLEY-12493 B80-10225 06
Fiber optic accelerometer
LEWIS-13219 B80-10389 06
- ACOUSTIC MEASUREMENTS**
Low-cost calibration of acoustic locators
LANGLEY-12632 B80-10185 03
- ACOUSTIC PROPAGATION**
Acoustic lens is gas-filled
NPO-14757 B80-10376 06
- ACOUSTIC SIMULATION**
Low-cost calibration of acoustic locators
LANGLEY-12632 B80-10185 03
- ACOUSTO-OPTICS**
Acoustically-tuned optical spectrometer
HQN-10924 B80-10326 03
- ACTINOMETERS**
UV actinometer film
NPO-14479 B80-10179 03
- ACTUATORS**
Clamshell door system
MSC-18468 B80-10101 07
Dual mode actuator
LANGLEY-12412 B80-10106 07
Lock for hydraulic actuators
MSC-18853 B80-10530 07
- ADDITIVES**
Additive improves engine-oil performance
GSFC-12327 B80-10065 04
Improving MOS minority-carrier lifetime
NPO-14738 B80-10301 01
Nickel-doped silicon for solar cells
NPO-14780 B80-10550 08
- ADHESIVE BONDING**
Jig for assembling large composite panels
LANGLEY-12394 B80-10119 08
Ion-beam etching enhances adhesive bonding
LEWIS-13028 B80-10128 08
Arc spraying solderable tabs to glass
NPO-14853 B80-10544 08
- ADHESIVES**
Room-temperature adhesive for high-temperature use
MSC-16930 B80-10129 08
Aluminum ions enhance polyimide adhesive
LANGLEY-12640 B80-10358 04
New pressure-sensitive silicone adhesive
LANGLEY-12737 B80-10495 04
- AERIAL PHOTOGRAPHY**
Applications of remote-sensing imagery
M-FS-25107 B80-10082 06
- AERODYNAMIC CONFIGURATIONS**
Aerodynamic preliminary analysis
LANGLEY-12404 B80-10397 06
- AERODYNAMIC DRAG**
Improved multielement airfoil analysis
LANGLEY-12489 B80-10086 06
Grooves reduce aircraft drag
LANGLEY-12599 B80-10215 06
- AERODYNAMIC LOADS**
A generalized vortex lattice method
LANGLEY-12636 B80-10236 06
- AERODYNAMIC STABILITY**
Aircraft equilibrium spin characteristics
LANGLEY-12502 B80-10087 06
- AERODYNAMICS**
Three-dimensional potential flow
LANGLEY-12623 B80-10090 06
The design and analysis of low-speed airfoils
LANGLEY-12727 B80-10524 06
- Transonic flow over wing/fuselage configurations
LANGLEY-12702 B80-10525 06
- AEROSOLS**
Aerosol lasts up to six minutes
NPO-14947 B80-10360 04
- AGGLOMERATION**
Reducing static charges in fluidized bed reactions
ARC-11245 B80-10068 04
- AIR COOLING**
Air-cooled solar-collector specification
M-FS-25336 B80-10049 03
- AIR POLLUTION**
Fast-response atmospheric-pollutant monitor
LANGLEY-12317 B80-10062 04
Photographic measurement of droplet density
M-FS-25326 B80-10182 03
- AIR QUALITY**
Improved particulate-sampling filter
NPO-14801 B80-10271 08
- AIR WATER INTERACTIONS**
Thermodynamic and transport properties of air/water mixtures
LEWIS-13432 B80-10519 06
- AIRBORNE EQUIPMENT**
Airborne meteorological data-collection system
LEWIS-13346 B80-10314 02
- AIRCRAFT DESIGN**
Three-dimensional potential flow
LANGLEY-12623 B80-10090 06
Disturbance amplification rates
LANGLEY-12556 B80-10092 06
A generalized vortex lattice method
LANGLEY-12636 B80-10236 06
Aerodynamic preliminary analysis
LANGLEY-12404 B80-10397 06
Solar-powered aircraft
LANGLEY-12615 B80-10404 07
- AIRCRAFT ENGINES**
Self-acting shaft seals
LEWIS-13229 B80-10109 07
Composites for aeropropulsion
LEWIS-13438 B80-10209 04
- AIRCRAFT HYDRAULIC SYSTEMS**
Dual mode actuator
LANGLEY-12412 B80-10106 07
- AIRCRAFT MANEUVERS**
Cost-minimized aircraft trajectories
ARC-11282 B80-10396 06
- AIRCRAFT PARTS**
Cap protects aircraft nose cone
LANGLEY-12367 B80-10362 04
- AIRCRAFT PERFORMANCE**
Grooves reduce aircraft drag
LANGLEY-12599 B80-10215 06
- AIRCRAFT SAFETY**
Fire tests for airplane interior materials
MSC-18478 B80-10063 04
- AIRCRAFT WAKES**
Wakeflow analysis by cost
NPO-14705 B80-10387 06

AIRFOILS

- Transonic airfoil design code
 LANGLEY-12460 B80-10085 06
 Improved multielement airfoil analysis
 LANGLEY-12489 B80-10086 06
 A construction technique for wind tunnel models
 LANGLEY-12710 B80-10381 06
 The design and analysis of low-speed airfoils
 LANGLEY-12727 B80-10524 06

ALGAE

- Laser-fluorescence measurement of marine algae
 LANGLEY-12282 B80-10213 05

ALGORITHMS

- Basic cluster compression algorithm
 NPO-14816 B80-10291 09
 Selecting optimum algorithms for image processing
 M-FS-25367 B80-10557 09

ALIGNMENT

- Clamshell door system
 MSC-18468 B80-10101 07
 Adjustable base for centering staked bearings
 MSC-19660 B80-10133 08
 X-ray beam pointer
 MSC-18590 B80-10254 07
 Compact table-tilting mechanism
 NPO-14800 B80-10411 07
 Alining sleeve for optical fibers
 MSC-18756 B80-10424 01

ALLOYS

- Etchant for incoloy-903 welds
 M-FS-19378 B80-10112 08
 Eliminating underbead fissuring in superalloys
 M-FS-19460 B80-10114 08

ALTERNATING CURRENT

- Simple circuit monitors 'third wire' in ac lines
 M-FS-19457 B80-10002 01

ALUMINUM

- Aluminum ions enhance polyimide adhesive
 LANGLEY-12640 B80-10358 04
 User chooses coating properties
 LANGLEY-12719 B80-10493 04

ALUMINUM ALLOYS

- Predicting lifetime of cast parts
 M-FS-19549 B80-10228 06

AMPLIFICATION

- Improved code-tracking loop
 MSC-18035 B80-10034 02

ANALOG SIMULATION

- Converting a digital filter to its analog equivalent
 MSC-18587 B80-10313 02

ANALOG TO DIGITAL CONVERTERS

- Temperature-compensating dc restorer
 LANGLEY-12549 B80-10152 01

ANALYSIS (MATHEMATICS)

- Goddard mission analysis system
 GSFC-12392 B80-10144 09

ANALYZERS

- Fast-response atmospheric-pollutant monitor
 LANGLEY-12317 B80-10062 04
 Automated holographic drop-size analyzer
 B80-10181 03

ANATASE

- Photoproduction of halogens using platinumized TiO₂
 LANGLEY-12713 B80-10491 04

ANCHORS (FASTENERS)

- Eliminating gaps in split rings
 MSC-18854 B80-10540 08

ANGULAR ACCELERATION

- Electrofluidic accelerometer
 LANGLEY-12493 B80-10225 06

ANODES

- Photoelectrochemical cell with nondissolving anode
 LANGLEY-12591 B80-10038 03

ANODIZING

- User chooses coating properties
 LANGLEY-12719 B80-10493 04

ANTENNA ARRAYS

- Receiver array for high-rate telemetry
 NPO-14579 B80-10308 02
 Arrayed receivers for low-rate telemetry
 NPO-14590 B80-10309 02

ANTENNA COUPLERS

- High-power dual-directional coupler
 NPO-14713 B80-10447 02

ANTENNAS

- Multiband microstrip antenna
 MSC-18334 B80-10001 01
 Antenna feed for linear and circular polarization
 NPO-14810 B80-10297 01
 Cavity-backed spiral-slot antenna
 MSC-18532 B80-10448 02
 Trislot-cavity microstrip antenna
 MSC-18793 B80-10450 02

ANTIBODIES

- Hybrid polymer microspheres
 NPO-14462 B80-10208 04

ARC SPRAYING

- Arc spraying solderable tabs to glass
 NPO-14853 B80-10544 08

ARRESTING GEAR

- Gentle arrester for moving bodies
 LANGLEY-12372 B80-10531 07

ARTERIES

- Compliant transducer measures artery profile
 NPO-14899 B80-10369 05

ARTHRITIS

- Gage for evaluating rheumatoid hands
 GSFC-12610 B80-10503 05

ASSEMBLING

- Placement technique for semicustom digital LSI circuits
 M-FS-25324 B80-10117 08

ATMOSPHERIC COMPOSITION

- Simultaneous measurement of three atmospheric pollutants
 NPO-14828 B80-10359 04

ATMOSPHERIC MOISTURE

- Thermodynamic and transport properties of air/water mixtures
 LEWIS-13432 B80-10519 06

ATMOSPHERIC PHYSICS

- Photographic measurement of droplet density
 M-FS-25326 B80-10182 03

ATMOSPHERIC REFRACTION

- Refraction corrections for surveying
 MSC-18664 B80-10231 06

ATTENUATION

- Aliasing filter for multirate systems
 MSC-18472 B80-10153 01

ATTITUDE (INCLINATION)

- Equations of motion for coupled n-body systems
 GSFC-12407 B80-10083 06
 Compact table-tilting mechanism
 NPO-14800 B80-10411 07

ATTITUDE CONTROL

- Aircraft equilibrium spin characteristics
 LANGLEY-12502 B80-10087 06
 The 3-D guidance system with proximity sensors
 NPO-14521 B80-10250 07

AUGMENTATION

- Digital enhancement of X-rays for NDT
 KSC-11118 B80-10232 06

AUTOMATIC CONTROL

- Computer-controlled warmup circuit
 NPO-14815 B80-10155 01
 Automatic thermal switches
 GSFC-12553 B80-10214 06
 Automatic 35 mm slide duplicator
 LEWIS-13399 B80-10249 07
 Automatic chemical vapor deposition
 M-FS-25249 B80-10431 08

AUTOMATIC CONTROL VALVES

- Automatic shutoff valve
 MSC-19385 B80-10097 07

AUTOMATIC FREQUENCY CONTROL

- Ultrastable automatic frequency control
 MSC-18679 B80-10294 01

AUTOMATIC GAIN CONTROL

- Fiber optics transmit clock signal more reliably
 NPO-14749 B80-10456 03

AUTOMATIC PILOTS

- Electrofluidic accelerometer
 LANGLEY-12493 B80-10225 06

AUTOMATIC TEST EQUIPMENT

- Developing experiment instrument packages
 GSFC-12536 B80-10451 02
 Solar-site test module
 M-FS-25543 B80-10460 03

AUTOMOBILE ENGINES

- Reduced hydrogen permeability at high temperatures
 LEWIS-13485 B80-10364 04

AUTOMOBILES

- Four-wheel dual braking for automobiles
 LANGLEY-12687 B80-10529 07

AVALANCHE DIODES

- Semiconductor step-stress testing
 M-FS-25329 B80-10011 01
 JANTX1N2970B zener diode
 M-FS-25260 B80-10012 01
 JANTX1N2989B zener diode
 M-FS-25261 B80-10013 01
 JANTX1N3016B zener diode
 M-FS-25262 B80-10014 01
 JANTX1N3031B zener diode
 M-FS-25263 B80-10015 01

AXISYMMETRIC BODIES

- Predicting propulsion system drag
 LANGLEY-12619 B80-10238 06
 Inviscid transonic flow over axisymmetric bodies
 LANGLEY-12499 B80-10398 06

B**BAGS**

- Soft container for explosive nuts
 MSC-18871 B80-10532 07

BALL BEARINGS

- Measuring ball-bearing loads
 M-FS-19505 B80-10102 07

BALLOONS

- Controlling the shape of glass microballoons
 M-FS-25230 B80-10266 08

BALLS

Ball-joint grounding ring
MSC-18824 B80-10405 07

BANDPASS FILTERS

Continuous control of phase-locked-loop
bandwidth
MSC-16684 B80-10008 01

BANDWIDTH

Continuous control of phase-locked-loop
bandwidth
MSC-16684 B80-10008 01

BASIC (PROGRAMMING LANGUAGE)

MBASIC processor
NPO-14245 B80-10290 09

BATTERY CHARGERS

Improved battery charger for electric
vehicles
NPO-14964 B80-10440 01

BEADS

Eliminating underbead fissuring in
superalloys
M-FS-19460 B80-10114 08

BEAMS (SUPPORTS)

Automatic connector for structural
beams
M-FS-25134 B80-10094 07
Flush-mounting technique for composite
beams
LANGLEY-12389 B80-10121 08
Resistance welding graphite-fiber
composites
MSC-18534 B80-10264 08

BEARINGS

Measuring ball-bearing loads
M-FS-19505 B80-10102 07
Adjustable base for centering staked
bearings
MSC-19660 B80-10133 08
Rotor transient analysis
LEWIS-13230 B80-10259 07
Cylindrical bearing analysis
LEWIS-13393 B80-10533 07

BELLOWS

A versatile tunnel acts as a flexible
duct
M-FS-22636 B80-10242 07

BENDING

Tension-mode loading for bend
specimens in cryogenics
LEWIS-13040 B80-10076 06
Method for shaping polyethylene tubing
MSC-18771 B80-10423 08

BERYLLIUM COMPOUNDS

Ball-joint grounding ring
MSC-18824 B80-10405 07

BIAS

Temperature-compensating dc restorer
LANGLEY-12549 B80-10152 01

BINARY ALLOYS

Diffusion in single-phase binary alloys
LANGLEY-12665 B80-10498 04

BIOINSTRUMENTATION

Cardiopulmonary data-acquisition
system
MSC-18783 B80-10499 05
Microprocessor-based cardiometer
MSC-18775 B80-10501 05

BIOMEDICAL DATA

Flow sensor for biomedical fluids
MSC-18761 B80-10367 05
Microprocessor-based cardiometer
MSC-18775 B80-10501 05

BIOTELEMETRY

Miniaturized physiological data telemetry
system
MSC-18804 B80-10371 05

BIREFRINGENCE

Acoustically-tuned optical spectrometer
HQN-10924 B80-10326 03

BLADES (CUTTERS)

Cutting holes in fabric-faced panels
MSC-18786 B80-10427 08

BLOOD VESSELS

Compliant transducer measures artery
profile
NPO-14899 B80-10369 05

BOLTS

Eddy-current sensor measures bolt
loading
M-FS-19486 B80-10079 06
Bolt-tension indicator
M-FS-19324 B80-10105 07
Two-headed bolt
M-FS-19619 B80-10410 07

BONDING

'Densified' tiles form stronger bonds
MSC-18741 B80-10534 08
Tile densification with TEOS
MSC-18737 B80-10535 08
Arc spraying solderable tabs to glass
NPO-14853 B80-10544 08

BORING MACHINES

Cutting holes in fabric-faced panels
MSC-18786 B80-10427 08

BOUNDARY LAYER STABILITY

Disturbance amplification rates
LANGLEY-12556 B80-10092 06

BRAKES (FOR ARRESTING MOTION)

Four-wheel dual braking for
automobiles
LANGLEY-12687 B80-10529 07
Gentle arrester for moving bodies
LANGLEY-12372 B80-10531 07

BRAYTON CYCLE

Gas absorption/desorption
temperature-differential engine
NPO-14528 B80-10513 06

BRAZING

Alumina barrier for vacuum brazing
MSC-18528 B80-10125 08
A precoat prevents ceramic stopoffs from
spalling
M-FS-19495 B80-10136 08
Time-shaped RF brazing
MSC-18617 B80-10272 08
Time-sharing switch for vacuum brazing
MSC-18699 B80-10412 07

BUBBLES

Removal of hydrogen bubbles from
nuclear reactors
LANGLEY-12597 B80-10205 04
Driving bubbles out of glass
M-FS-25414 B80-10496 04

BUFFER STORAGE

Online assessment of a distributed
processor
KSC-11124 B80-10037 02
Common data buffer
KSC-11048 B80-10303 02

BUNDLES

Handtool assists in bundling cables
MSC-18567 B80-10255 07

BUS CONDUCTORS

Detecting short circuits during
assembly
ARC-11116 B80-10007 01

C**CABLES (ROPES)**

Gentle arrester for moving bodies
LANGLEY-12372 B80-10531 07

CALIBRATING

Broadband electrostatic acoustic
transducer for liquids
LANGLEY-12465 B80-10078 06
Optical calibrator for TDL
spectrometers
GSFC-12562 B80-10178 03
Low-cost calibration of acoustic
locators
LANGLEY-12632 B80-10185 03
A temperature fixed point near 58 C
M-FS-25304 B80-10204 04
Portable zero-delay assembly
NPO-14671 B80-10316 02
Fast calibration of gas flowmeters
KSC-11076 B80-10516 06

CAMERAS

Camera add-on records time of
exposure
LANGLEY-12635 B80-10183 03

CAPACITANCE SWITCHES

Fast response cryogen level sensor
MSC-18697 B80-10374 06

CAPACITIVE FUEL GAGES

Fast response cryogen level sensor
MSC-18697 B80-10374 06

CAPACITORS

Measuring radiation effects on MOS
capacitors
NPO-14700 B80-10227 06

CARBON

Carbon scrubber
MSC-16531 B80-10356 04

CARBON DIOXIDE LASERS

Tunable pulsed carbon dioxide laser
NPO-14984 B80-10458 03

CARBON FIBER REINFORCED PLASTICS

Examining graphite reinforcement in
composites
MSC-19594 B80-10122 08

CARDIOTACHOMETERS

Microprocessor-based cardiometer
MSC-18775 B80-10501 05

CARDIOVASCULAR SYSTEM

Cardiopulmonary data-acquisition
system
MSC-18783 B80-10499 05
Microprocessor-based cardiometer
MSC-18775 B80-10501 05

CARTRIDGES

Quick mixing of epoxy components
MSC-18731 B80-10415 07

CASTING

Forming complex cavities in clear
plastic
LEWIS-13412 B80-10267 08

CASTINGS

Predicting lifetime of cast parts
M-FS-19549 B80-10228 06
Sealing micropores in thin castings
MSC-18623 B80-10428 08

CATALYSTS

Improved cell for water-vapor
electrolysis
MSC-16394 B80-10489 04
Photoproduction of halogens using
platinized TiO₂
LANGLEY-12713 B80-10491 04

CATHETOMETERS

Improved ureteral stone fragmentation catheter
NPO-14745 880-10370 05

CATHODE RAY TUBES

Real-time film recording from stroke-written CRT's
LANGLEY-12529 880-10169 02

CAVITATION FLOW

Dynamics of cavitating cascades and inducer pumps
M-FS-25399 880-10392 06

CAVITIES

Downhole pressure sensor
NPO-14729 880-10223 06
Forming complex cavities in clear plastic
LEWIS-13412 880-10267 08

CAVITY RESONATORS

Cavity-backed spiral-slot antenna
MSC-18532 880-10448 02

CENTRAL PROCESSING UNITS

Microprocessor-controlled data synchronizer
MSC-18535 880-10031 02
Common data buffer
KSC-11048 880-10303 02

CERAMIC COATINGS

Corrosion-resistant ceramic thermal barrier coating
LEWIS-13088 880-10067 04
A precoat prevents ceramic stopoffs from spalling
M-FS-19495 880-10136 08
Mobile glazing unit
KSC-11171 880-10538 08

CERAMICS

'Densified' tiles form stronger bonds
MSC-18741 880-10534 08

CHARGE COUPLED DEVICES

Better-quality CCD-array images
NPO-14426 880-10168 02
Four-quadrant CCD analog multiplier
LANGLEY-12332 880-10305 02
Monolithic four-quadrant multiplier
LANGLEY-12330A 880-10306 02
Monolithic CCD-array readout
LANGLEY-12376 880-10307 02

CHARGE DISTRIBUTION

Crossed-grid charge locator
M-FS-25170 880-10010 01
NASA charging analyzer program
LEWIS-12973 880-10058 03

CHARGED PARTICLES

NASA charging analyzer program
LEWIS-12973 880-10058 03

CHARRING

Heat resistant polyphosphazene polymers
ARC-11176 880-10350 04
Resin char oxidation retardant for composites
LEWIS-13275 880-10354 04
High char yield epoxy curing agents
LEWIS-13226 880-10361 04

CHEMICAL ANALYSIS

Simultaneous measurement of three atmospheric pollutants
NPO-14828 880-10359 04

CHEMICAL MACHINING

Chemical-milling solution for invar alloy
M-FS-25365 880-10113 08

CHEMICAL REACTIONS

Methane/air flames in a concentric tube combustor
LEWIS-13388 880-10211 04

CHEMICAL REACTORS

Producing silicon continuously
NPO-14796 880-10537 08

CHLOROPHYLLS

Laser-fluorescence measurement of marine algae
LANGLEY-12282 880-10213 05

CIRCLES (GEOMETRY)

Electron-beam welder circle generator
M-FS-19441 880-10275 08

CIRCUIT BOARDS

Low-resistance continuity tester
NPO-14881 880-10445 01

CIRCUIT PROTECTION

Simple circuit monitors 'third wire' in ac lines
M-FS-19457 880-10002 01
Voltage controller/current limiter for ac
NPO-13061 880-10032 02
Cooling/grounding mount for hybrid circuits
MSC-18728 880-10302 01

CIRCULAR POLARIZATION

Antenna feed for linear and circular polarization
NPO-14810 880-10297 01

CLAMPS

Vise holds specimens for microscope
MSC-18690 880-10098 07
Drill-motor holding fixture
MSC-18582 880-10108 07
Lock for hydraulic actuators
MSC-18853 880-10530 07
Eliminating gaps in split rings
MSC-18854 880-10540 08

CLEANERS

Removing freon gas from hydraulic fluid
MSC-18740 880-10494 04

CLEANING

Ion-beam cleaning for cold welds
LEWIS-12982 880-10115 08

CLEARANCES

Adjustable base for centering staked bearings
MSC-19660 880-10133 08

CLEAVAGE

Cleaving machine for hard crystals
GSFC-12584 880-10401 07

CLOCKS

Fiber optics transmit clock signal more reliably
NPO-14749 880-10456 03

CLOSURES

Clamshell door system
MSC-18468 880-10101 07

CLOUD COVER

Instrument measures cloud cover
NPO-14936 880-10514 06

CLOUDS

Instrument measures cloud cover
NPO-14936 880-10514 06

CLOUDS (METEOROLOGY)

Instrument measures cloud cover
NPO-14936 880-10514 06

COAL

Measuring coal deposits by radar
M-FS-23922 880-10060 04
Detecting a coal/shale interface
M-FS-23720 880-10061 04
Underground Coal Mining
NPO-14704 880-10071 04
Position monitor for mining machines
M-FS-25342 880-10157 01

COAL GASIFICATION

Coal conversion and synthetic-fuel production
M-FS-25330 880-10070 04

COATING

Spraying suspensions uniformly
M-FS-25139 880-10409 07

COATINGS

Coatings for hybrid microcircuits
M-FS-25292 880-10116 08
Fluorescent radiation converter
GSFC-12528 880-10180 03
Selective optical coatings for solar collectors
M-FS-23589 880-10192 03
Improved adherence of TiC coatings to steel
LEWIS-13169 880-10207 04
Photonitride passivating coating for IC's
M-FS-25401 880-10260 08
Low cost high temperature, duplex coating for superalloys
LEWIS-13497 880-10352 04
Improved metallic and thermal barrier coatings
LEWIS-13324 880-10353 04
Film coatings for contoured surfaces
MSC-18784 880-10425 08
User chooses coating properties
LANGLEY-12719 880-10493 04

CODING

Structured FORTRAN preprocessor
M-FS-23813 880-10289 09
Converting a digital filter to its analog equivalent
MSC-18587 880-10313 02

COINCIDENCE CIRCUITS

Multichannel coincidence circuit
LANGLEY-12531 880-10005 01

COLD WELDING

Ion-beam cleaning for cold welds
LEWIS-12982 880-10115 08

COLLIMATORS

Multibeam collimator uses prism stack
GSFC-12608 880-10452 03

COLLOIDS

Reducing static charges in fluidized bed reactions
ARC-11245 880-10068 04

COLUMNS (SUPPORTS)

Mechanical end joint for structural columns
LANGLEY-12482 880-10095 07
Automatic connector joins structural columns
LANGLEY-12578 880-10251 07

COMBUSTION CHAMBERS

Methane/air flames in a concentric tube combustor
LEWIS-13388 880-10211 04
Flashback-free combustor
LANGLEY-12666 880-10226 06

COMBUSTION PHYSICS

Automated holographic drop-size analyzer
880-10181 03

COMMUNICATION CABLES

Handtool assists in bundling cables
MSC-18567 880-10255 07

COMMUNICATION EQUIPMENT

Multiband microstrip antenna
MSC-18334 880-10001 01
Receiving signals of any polarization
NPO-14836 880-10315 02
Miniaturized physiological data telemetry system
MSC-18804 880-10371 05

COMPLEX SYSTEMS

Safety analysis for complex systems
MSC-18745 880-10554 09

COMPONENT RELIABILITY

Semiconductor step-stress testing
M-FS-25329 880-10011 01
JANTX1N2970B zener diode
M-FS-25260 880-10012 01
JANTX1N2989B zener diode
M-FS-25261 880-10013 01
JANTX1N3016B zener diode
M-FS-25262 880-10014 01
JANTX1N3031B zener diode
M-FS-25263 880-10015 01
JANTX1N5622 diode
M-FS-25280 880-10016 01
JANTX1N5623 switching diode
M-FS-25281 880-10017 01
JANTX2N2060 dual transistor
M-FS-25251 880-10018 01
JANTX2N2219A dual transistor
M-FS-25252 880-10019 01
JANTX2N2369A transistor
M-FS-25254 880-10020 01
JANTX2N2432A transistor
M-FS-26255 880-10021 01
JANTX2N2484 transistor
M-FS-25253 880-10022 01
JANTX2N2605 transistor
M-FS-25150 880-10023 01
JANTX2N2905A transistor
M-FS-25256 880-10024 01
JANTX2N2920 Dual transistor
M-FS-25258 880-10025 01
JANTX2N2945A transistor
M-FS-25259 880-10026 01
JANTX2N3637 transistor
M-FS-25264 880-10027 01
JANTX2N3811 dual transistor
M-FS-25265 880-10028 01
JANTX2N4150 transistor
M-FS-25267 880-10029 01
JANTX2N4856 field-effect transistor
M-FS-25269 880-10030 01

COMPOSITE MATERIALS

Jig for assembling large composite panels
LANGLEY-12394 880-10119 08
Shaping graphite/epoxy stiffeners
MSC-18494 880-10120 08
Flush-mounting technique for composite beams
LANGLEY-12389 880-10121 08
Examining graphite reinforcement in composites
MSC-19594 880-10122 08
Knife-edge seal for vacuum bagging
M-FS-24049 880-10135 08
Plasticizer for polyimide composites
LANGLEY-12642 880-10206 04
Composites for aeropropulsion
LEWIS-13438 880-10209 04
Efficient measurement of shear properties of fiber composites
LEWIS-13011 880-10216 06
Resistance welding graphite-fiber composites
MSC-18534 880-10264 08
Plastic welder
LANGLEY-12540 880-10274 08
Resin char oxidation retardant for composites
LEWIS-13275 880-10354 04
Composites with nearly zero thermal expansion
MSC-18724 880-10355 04

High char yield epoxy curing agents
LEWIS-13226 880-10361 04
Testing panels in tension and flexure
M-FS-25421 880-10380 06
Contour-measuring tool for composite layups
ARC-11246 880-10417 08
Hot forming graphite/polyimide structures
LANGLEY-12547 880-10422 08
Cutting holes in fabric-faced panels
MSC-18786 880-10427 08

COMPRESSED AIR

Pneumatic-power supply
MSC-18855 880-10527 07

COMPRESSIBLE FLOW

Transonic flow over wing/fuselage configurations
LANGLEY-12702 880-10525 06

COMPRESSION TESTS

Environmental testing under load
LANGLEY-12602 880-10379 06

COMPRESSORS

Gas absorption/desorption temperature-differential engine
NPO-14528 880-10513 06

COMPUTER COMPONENTS

Detecting short circuits during assembly
ARC-11116 880-10007 01

COMPUTER GRAPHICS

Real-time film recording from stroke-written CRT's
LANGLEY-12529 880-10169 02

COMPUTER PROGRAMMING

Automated flow-chart system
GSFC-12514 880-10147 09
DDL: Digital systems design language
M-FS-25352 880-10163 01
Structured FORTRAN preprocessor
M-FS-23813 880-10289 09
MBASIC processor
NPO-14245 880-10290 09

COMPUTER PROGRAMS

A universal structured-design diagrammer
LANGLEY-12548 880-10558 09

COMPUTERIZED DESIGN

Aerodynamic preliminary analysis
LANGLEY-12404 880-10397 06

COMPUTERIZED SIMULATION

Equations of motion for coupled n-body systems
GSFC-12407 880-10083 06
Models of MOS and SOS devices
M-FS-25153 880-10141 08
System time-domain simulation
MSC-18333 880-10292 09
Cost-minimized aircraft trajectories
ARC-11282 880-10396 06
Calculating linear A, B, C, and D matrices from a nonlinear dynamic engine simulation
LEWIS-13250 880-10520 06
CADAT network translator
M-FS-25055 880-10551 08
CADAT integrated circuit artwork program
M-FS-25017 880-10552 08

CONCENTRATORS

Offset paraboloidal solar concentrator
NPO-14846 880-10320 03
Low-cost concentrating mirrors
NPO-14962 880-10542 08

CONDUCTIVE HEAT TRANSFER

Heat conduction in three dimensions
MSC-18616 880-10239 06

Powerful copper chloride laser
NPO-14782 880-10330 03
Holes help control temperature
GSFC-12618 880-10373 06

CONNECTORS

Automatic connector for structural beams
M-FS-25134 880-10094 07
Flared tube attachment fitting
MSC-18416 880-10240 07
Automatic connector joins structural columns
LANGLEY-12578 880-10251 07
Ball-joint grounding ring
MSC-18824 880-10405 07
Interlocking wedge joint is easily assembled
LANGLEY-12729 880-10526 07

CONSTRUCTION

Automatic connector joins structural columns
LANGLEY-12578 880-10251 07

CONSTRUCTION MATERIALS

Versatile modular scaffolds
GSFC-12606 880-10406 07

CONTACT RESISTANCE

Ohmic contact to GaAs semiconductor
LANGLEY-12466 880-10263 08

CONTAINERLESS MELTS

Containerless materials processing in the laboratory
M-FS-25242 880-10059 04

CONTAINMENT

Soft container for explosive nuts
MSC-18871 880-10532 07

CONTAMINANTS

Detecting contaminants by ultraviolet photography
M-FS-25296 880-10229 06
Removing freon gas from hydraulic fluid
MSC-18740 880-10494 04

CONTAMINATION

Bulk lifetime indicates surface contamination
NPO-14966 880-10511 06

CONTOURS

Contour-measuring tool for composite layups
ARC-11246 880-10417 08
Film coatings for contoured surfaces
MSC-18784 880-10425 08

CONTROL

One-year assessment of a solar space/water heater--Clinton, Mississippi
M-FS-25539 880-10477 03

CONTROL EQUIPMENT

Torque control for electric motors
MSC-18635 880-10170 02
Electromechanical slip sensor
NPO-14654 880-10253 07
Multiplexed logic controls solar-heating system
M-FS-25287 880-10318 03
Speed control for synchronous motors
MSC-18680 880-10444 01

CONTROLLERS

Controller for solar-energy systems
M-FS-25386 880-10054 03
Controller and temperature monitor for solar heating
M-FS-25387 880-10055 03
Final report on development of a programmable controller
M-FS-25388 880-10189 03

Toggle signal for prevention of control errors
 MSC-18779 880-10312 02
 Temperature controller adapts to fatigue tester
 LANGLEY-12393 880-10378 06

CONVECTION

Recording fluid currents by holography
 M-FS-25373 880-10222 06

CONVECTIVE FLOW

Analysis of a cooled, turbine blade or vane with an insert
 LEWIS-13293 880-10400 06

COOLING

Inhibiting corrosion in solar-heating and cooling systems
 M-FS-25387 880-10056 03
 Compact, super heat exchanger
 LEWIS-12441 880-10081 06
 Solar-heating and cooling demonstration project
 M-FS-25443 880-10203 03
 Cooling/grounding mount for hybrid circuits
 MSC-18728 880-10302 01
 Heat pipes cool probe and sandwich panel
 LANGLEY-12588; LANGLEY-12637 880-10518 06

COORDINATES

Crossed-grid charge locator
 M-FS-25170 880-10010 01

COPPER CHLORIDES

Powerful copper chloride laser
 NPO-14782 880-10330 03

CORE SAMPLING

Drilling side holes from a borehole
 NPO-14465 880-10066 04

CORES

Producing gapped-ferrite transformer cores
 NPO-14715 880-10273 08

CORROSION PREVENTION

Silicon nitride passivation of IC's
 M-FS-25309 880-10279 08

CORROSION RESISTANCE

Inhibiting corrosion in solar-heating and cooling systems
 M-FS-25387 880-10056 03
 Corrosion-resistant ceramic thermal barrier coating
 LEWIS-13088 880-10067 04
 Photocatalytic passivating coating for IC's
 M-FS-25401 880-10260 08
 Low cost high temperature, duplex coating for superalloys
 LEWIS-13497 880-10352 04

COST ANALYSIS

Cost models and economical packaging of LSI's
 M-FS-25359 880-10138 08
 Optimizing costs of VLSI circuits
 M-FS-25348 880-10281 08
 Low-cost LANDSAT processing system
 M-FS-25396 880-10285 09
 Determining manufacturing cost from product complexity
 M-FS-25371 880-10439 09

COST REDUCTION

Cost-minimized aircraft trajectories
 ARC-11282 880-10396 06

COUNTING CIRCUITS

Multichannel coincidence circuit
 LANGLEY-12531 880-10005 01
 Universal odd-modulus frequency divider
 NPO-13426 880-10006 01

COUPLINGS

Self-energized screw coupling
 M-FS-25340 880-10096 07
 Flared tube attachment fitting
 MSC-18416 880-10240 07
 The 3-D guidance system with proximity sensors
 NPO-14521 880-10250 07
 Automatic connector joins structural columns
 LANGLEY-12578 880-10251 07
 Heat-shrinkable sleeve aids in insulating universal joints
 MSC-18685 880-10270 08
 Ball-joint grounding ring
 MSC-18824 880-10405 07
 Two-headed bolt
 M-FS-19619 880-10410 07
 Interlocking wedge joint is easily assembled
 LANGLEY-12729 880-10526 07

COVERINGS

Cap protects aircraft nose cone
 LANGLEY-12367 880-10362 04

CRACK PROPAGATION

Modified displacement gage for cryogenic testing
 LEWIS-13039 880-10077 06
 Predicting crack propagation
 MSC-18718; MSC-18721 880-10283 08

CRACKING (FRACTURING)

Eliminating underbead fissuring in superalloys
 M-FS-19460 880-10114 08

CREEP ANALYSIS

Plastic deformation of engines and other nonlinear structures
 M-FS-23814 880-10399 06

CREEP PROPERTIES

Multiple-creep-test apparatus
 GSFC-12561 880-10080 06
 New pressure-sensitive silicone adhesive
 LANGLEY-12737 880-10495 04

CREEP TESTS

Multiple-creep-test apparatus
 GSFC-12561 880-10080 06

CRUCIFORM WINGS

Solar-powered aircraft
 LANGLEY-12615 880-10404 07

CRYOGENIC EQUIPMENT

LVDT gage for fracture-toughness tests in liquid hydrogen
 LEWIS-13038 880-10075 06
 Tension-mode loading for bend specimens in cryogenics
 LEWIS-13040 880-10076 06
 Modified displacement gage for cryogenic testing
 LEWIS-13039 880-10077 06
 Cryogenic machining of polyurethane foam
 MSC-18572 880-10123 08
 Cryogenic-storage-tank support
 MSC-14848 880-10258 07
 Fast response cryogen level sensor
 MSC-18697 880-10374 06
 Spiral-wound gasket forms low-temperature seal
 LANGLEY-12315 880-10543 08

CRYOGENIC FLUID STORAGE

Lightweight cryogenic vessel
 NPO-14794 880-10548 08

CRYOGENIC FLUIDS

Fiber optic level sensor for cryogenics
 MSC-18674 880-10375 06

CRYOSTATS

Modified displacement gage for cryogenic testing
 LEWIS-13039 880-10077 06

CRYSTAL GROWTH

Reduced gravity favors columnar crystal growth
 M-FS-25205 880-10366 04

CRYSTALLIZATION

Containerless materials processing in the laboratory
 M-FS-25242 880-10059 04

CRYSTALS

Cleaving machine for hard crystals
 GSFC-12584 880-10401 07

CURING

Knife-edge seal for vacuum bagging
 M-FS-24049 880-10135 08
 High char yield epoxy curing agents
 LEWIS-13226 880-10361 04
 One-step microwave foaming and curing
 MSC-18707 880-10420 08

CURRENT REGULATORS

Limiting current in electron-beam welders
 M-FS-19503 880-10413 07

CURVATURE

Stream tube curvature analysis
 LANGLEY-11535 880-10235 06
 NASTRAN modifications for recovering strains and curvatures
 LEWIS-12592 880-10395 06

CUSHIONS

Modified fire-resistant foams for seat cushions
 MSC-18704 880-10419 08

CUTTERS

Precision filament cutter
 LANGLEY-12564 880-10093 07
 Tubing cutter for tight spaces
 MSC-18538 880-10099 07
 Cutting holes in fabric-faced panels
 MSC-18786 880-10427 08

CYANIDES

A temperature fixed point near 58 C
 M-FS-25304 880-10204 04

D**DAMPING**

Rotor transient analysis
 LEWIS-13230 880-10259 07

DATA ACQUISITION

Solar-site test module
 M-FS-25543 880-10460 03
 Cardiopulmonary data-acquisition system
 MSC-18783 880-10499 05
 Microprocessor-based cardiometer
 MSC-18775 880-10501 05

DATA COLLECTION PLATFORMS

Applications of remote-sensing imagery
 M-FS-25107 880-10082 06

DATA COMPRESSION

Basic cluster compression algorithm
 NPO-14816 880-10291 09
 Compressing TV-image data
 NPO-14823 880-10310 02
 An image-data-compression algorithm
 NPO-14496 880-10438 09

DATA CONVERTERS

11-Line to 512-line decoder
 MSC-19751 880-10158 01

DATA LINKS

Multipath star switch controller
NPO-13422 B80-10035 02

DATA MANAGEMENT

NASA PERT time II
LEWIS-13145 B80-10286 09

DATA PROCESSING

Selecting optimum algorithms for image processing
M-FS-25367 B80-10557 09

DATA PROCESSING EQUIPMENT

Microprocessor-controlled data synchronizer
MSC-18535 B80-10031 02
RAM-Based frame synchronizer
GSFC-12430 B80-10164 02
RAM-Based parallel-output controller
GSFC-12447 B80-10165 02
Simultaneous disk storage and retrieval
KSC-11167 B80-10304 02

DATA REDUCTION

Low-cost LANDSAT processing system
M-FS-25396 B80-10285 09
Image-based information, communication, and retrieval
NPO-14893 B80-10293 09

DATA RETRIEVAL

Software design and documentation language
NPO-14610 B80-10145 09
RAM-Based parallel-output controller
GSFC-12447 B80-10165 02
Simultaneous disk storage and retrieval
KSC-11167 B80-10304 02

DATA SAMPLING

Aliasing filter for multirate systems
MSC-18472 B80-10153 01
Frequency response for multiple-sampling rate systems
MSC-18473 B80-10173 02

DATA STORAGE

Input/output interface module
MSC-18180 B80-10159 01
Simultaneous disk storage and retrieval
KSC-11167 B80-10304 02

DATA TRANSMISSION

Efficient telemetry format
NPO-13679 B80-10142 09
RAM-Based frame synchronizer
GSFC-12430 B80-10164 02

DECARBONATION

Carbon scrubber
MSC-16531 B80-10356 04

DECODERS

Independent synchronizer for digital decoders
MSC-16723 B80-10004 01
11-Line to 512-line decoder
MSC-19751 B80-10158 01

DECONTAMINATION

Removing freon gas from hydraulic fluid
MSC-18740 B80-10494 04

DECOUPLING

Passive wing/store flutter suppression
LANGLEY-12468 B80-10219 06

DEFECTS

Fresnel lenses for ultrasonic inspection
MSC-18469 B80-10217 06
Detection of tanker defects with infrared thermography
LANGLEY-12655 B80-10221 06

DEFORMATION

Reshaping tube ends for welding
MSC-18462 B80-10407 07

DEFORMETERS

Biaxial method for in-plane shear testing
LANGLEY-12680 B80-10512 06

DELAY

Improved code-tracking loop
MSC-18035 B80-10034 02

DEMODULATORS

Microprocessor-based detector for PSK commands
NPO-14440 B80-10036 02

DENSIFICATION

'Densified' tiles form stronger bonds
MSC-18741 B80-10534 08
Tile densification with TEOS
MSC-18737 B80-10535 08

DEPOSITION

Automatic chemical vapor deposition
M-FS-25249 B80-10431 08

DEPTH MEASUREMENT

Electronic depth micrometer
KSC-11181 B80-10385 06

DESTRUCTIVE TESTS

Bulk lifetime indicates surface contamination
NPO-14966 B80-10511 06

DIFFERENCE EQUATIONS

Systems improved numerical differencing analyzer
MSC-18597 B80-10148 09

DIFFUSION

Systems improved numerical differencing analyzer
MSC-18597 B80-10148 09
Diffusion in single-phase binary alloys
LANGLEY-12665 B80-10498 04

DIGITAL COMMAND SYSTEMS

Frequency response for multiple-sampling rate systems
MSC-18473 B80-10173 02

DIGITAL DATA

11-Line to 512-line decoder
MSC-19751 B80-10158 01
Real-time image enhancement
NPO-14281 B80-10311 02

DIGITAL FILTERS

Aliasing filter for multirate systems
MSC-18472 B80-10153 01
Smoothing the output from a DAC
FRC-11025 B80-10160 01
Converting a digital filter to its analog equivalent
MSC-18587 B80-10313 02

DIGITAL SYSTEMS

DDL: Digital systems design language
M-FS-25352 B80-10163 01

DIGITAL TO ANALOG CONVERTERS

Smoothing the output from a DAC
FRC-11025 B80-10160 01
Converting a digital filter to its analog equivalent
MSC-18587 B80-10313 02

DIMENSIONAL MEASUREMENT

Electronic depth micrometer
KSC-11181 B80-10385 06
Contour-measuring tool for composite layouts
ARC-11246 B80-10417 08

DIMENSIONAL STABILITY

Test fittings for dimensionally critical tubes
NPO-14399 B80-10252 07

DIODES

Semiconductor step-stress testing
M-FS-25329 B80-10011 01
JANTX1N2970B zener diode
M-FS-25260 B80-10012 01

JANTX1N2989B zener diode
M-FS-25261 B80-10013 01
JANTX1N3016B zener diode
M-FS-25262 B80-10014 01
JANTX1N3031B zener diode
M-FS-25263 B80-10015 01
JANTX1N5622 diode
M-FS-25280 B80-10016 01
JANTX1N5623 switching diode
M-FS-25281 B80-10017 01

DIPLEXERS

Diplexer for laser-beam heterodyne receiver
GSFC-12589 B80-10329 03

DIRECTIONAL ANTENNAS

Dual-frequency bidirectional antenna
GSFC-12501 B80-10154 01

DISCONNECT DEVICES

Automatic connector joins structural columns
LANGLEY-12578 B80-10251 07

DISEASES

Compliant transducer measures artery profile
NPO-14899 B80-10369 05

DISPERSING

Spraying suspensions uniformly
M-FS-25139 B80-10409 07

DISPERSIONS

Oxide dispersion strengthened superalloy
LEWIS-13589 B80-10351 04

DISPLACEMENT MEASUREMENT

LVDT gage for fracture-toughness tests in liquid hydrogen
LEWIS-13038 B80-10075 06
Modified displacement gage for cryogenic testing
LEWIS-13039 B80-10077 06

DISPLAY DEVICES

Monolithic CCD-array readout
LANGLEY-12376 B80-10307 02
Rain, fog, and clouds for aircraft simulators
ARC-11158 B80-10383 06
Imager displays free fall in stop action
NPO-14779 B80-10509 06

DISTANCE MEASURING EQUIPMENT

Short-range self-pulsed optical radar
NPO-14901 B80-10459 03

DISTRIBUTION FUNCTIONS

An approximation to student's t-distribution
LANGLEY-12238 B80-10284 09

DOORS

Clamshell door system
MSC-18468 B80-10101 07

DOPPLER EFFECT

Instrument remotely measures wind velocities
NPO-14524 B80-10176 03

DOPPLER RADAR

Microcomputer-based doppler systems for weather monitoring
GSFC-12448 B80-10166 02

DOSIMETERS

Miniature personal UV solar dosimeter
LANGLEY-12469 B80-10321 03

DRAG

Predicting propulsion system drag
LANGLEY-12619 B80-10238 06

DRAG REDUCTION

Grooves reduce aircraft drag
LANGLEY-12599 B80-10215 06

DRILL BITS

Abrasive drill for resilient materials
LEWIS-13411 B80-10402 07

DRILLING

- Drilling side holes from a borehole
NPO-14465 B80-10066 04
- Drill-motor holding fixture
MSC-18582 B80-10108 07
- Drilling at right angles in blind holes
M-FS-19535 B80-10403 07
- Sidewall penetrator for oil wells
NPO-14306 B80-10528 07

DROP SIZE

- Automated holographic drop-size analyzer
B80-10181 03

DROPS (LIQUIDS)

- Photographic measurement of droplet density
M-FS-25326 B80-10182 03
- Drop tower with no aerodynamic drag
NPO-14845 B80-10549 08

DUCTS

- A versatile tunnel acts as a flexible duct
M-FS-22636 B80-10242 07

DUST STORMS

- Predicting and monitoring duststorms
NPO-14277 B80-10323 03

DYE LASERS

- Simultaneous measurement of three atmospheric pollutants
NPO-14828 B80-10359 04

DYNAMIC CHARACTERISTICS

- Frequency response to multiple-sampling rate systems
MSC-18473 B80-10173 02

DYNAMIC LOADS

- Isolation and measurement of rotor vibration forces
LANGLEY-12476 B80-10507 06

DYNAMIC RESPONSE

- Rotor transient analysis
LEWIS-13230 B80-10259 07
- An all-FORTRAN version of NASTRAN for the VAX
GSFC-12600 B80-10522 06

DYNAMIC STABILITY

- Isolation and measurement of rotor vibration forces
LANGLEY-12476 B80-10507 06

E

EARTH ATMOSPHERE

- Ultraviolet spectrometer/polarimeter
M-FS-25298 B80-10042 03

ECONOMIC ANALYSIS

- Optimizing costs of VLSI circuits
M-FS-25348 B80-10281 08

ECONOMIC DEVELOPMENT

- Should we industrialize space?
M-FS-23963 B80-10137 08

EDDY CURRENTS

- Eddy-current sensor measures bolt loading
M-FS-19486 B80-10079 06

EDITING ROUTINES (COMPUTERS)

- A universal structured-design diagrammer
LANGLEY-12548 B80-10558 09

EDUCATION

- Learning high-quality soldering
NPO-14869 B80-10539 08

ELASTIC DEFORMATION

- Plastic deformation of engines and other nonlinear structures
M-FS-23814 B80-10399 06

ELASTIC PROPERTIES

- Composites with nearly zero thermal expansion
MSC-18724 B80-10355 04

ELASTOMERS

- Film coatings for contoured surfaces
MSC-18784 B80-10425 08

ELECTRIC CONDUCTORS

- NASA charging analyzer program
LEWIS-12973 B80-10058 03
- Electrically conductive palladium-containing polyimide films
LANGLEY-12629 B80-10357 04

ELECTRIC CONNECTORS

- Connector heat shield
MSC-16282 B80-10126 08
- Kilovolt vacuum feed through is less noisy
NPO-14802 B80-10426 08

ELECTRIC CONTACTS

- Back contacts for silicon-on-ceramic solar cells
NPO-14809 B80-10545 08

ELECTRIC CONTROL

- Torque control for electric motors
MSC-18635 B80-10170 02

ELECTRIC DISCHARGES

- Pulse-shaping circuit for laser excitation
NPO-14556 B80-10453 03

ELECTRIC GENERATORS

- A linear magnetic motor and generator
GSFC-12518 B80-10257 07

ELECTRIC MOTORS

- Improved power factor controller
M-FS-25323 B80-10149 01
- Torque control for electric motors
MSC-18635 B80-10170 02
- A linear magnetic motor and generator
GSFC-12518 B80-10257 07

ELECTRIC WIRE

- Wire harness twisting aid
MSC-18581 B80-10132 08

ELECTRICAL FAULTS

- Coatings for hybrid microcircuits
M-FS-25292 B80-10116 08
- Model for MOS field-time-dependent breakdown
NPO-14701 B80-10162 01

ELECTRICAL GROUNDING

- Simple circuit monitors 'third wire' in ac lines
M-FS-19457 B80-10002 01
- Cooling/grounding mount for hybrid circuits
MSC-18728 B80-10302 01
- Ball-joint grounding ring
MSC-18824 B80-10405 07

ELECTRICAL MEASUREMENT

- Low-resistance continuity tester
NPO-14881 B80-10445 01

ELECTRICAL RESISTANCE

- Low-resistance continuity tester
NPO-14881 B80-10445 01

ELECTRICAL RESISTIVITY

- Electrically conductive palladium-containing polyimide films
LANGLEY-12629 B80-10357 04

ELECTROACOUSTIC TRANSDUCERS

- Broadband electrostatic acoustic transducer for liquids
LANGLEY-12465 B80-10078 06

ELECTROCARDIOGRAPHY

- Testing EKG electrodes on-line
MSC-18696 B80-10212 05
- Microprocessor-based cardiometer
MSC-18775 B80-10501 05

ELECTROCATALYSTS

- REDOX electrochemical energy storage
LEWIS-13398 B80-10064 04
- Improved cell for water-vapor electrolysis
MSC-16394 B80-10489 04

ELECTROCHEMICAL CELLS

- REDOX electrochemical energy storage
LEWIS-13398 B80-10064 04

ELECTRODES

- Testing EKG electrodes on-line
MSC-18696 B80-10212 05
- Honing fixture for welded electrodes
M-FS-19537 B80-10278 08
- Limiting current in electron-beam welders
M-FS-19503 B80-10413 07

ELECTROLYTES

- Photoelectrochemical cell with nondissolving anode
LANGLEY-12591 B80-10038 03

ELECTROLYTIC CELLS

- Improved cell for water-vapor electrolysis
MSC-16394 B80-10489 04

ELECTROMAGNETIC INTERFERENCE

- Improved battery charger for electric vehicles
NPO-14964 B80-10440 01

ELECTROMAGNETIC WAVE FILTERS

- Smoothing the output from a DAC
FRC-11025 B80-10160 01

ELECTROMECHANICAL DEVICES

- Improved battery charger for electric vehicles
NPO-14964 B80-10440 01

ELECTRON AVALANCHE

- Measuring radiation effects on MOS capacitors
NPO-14700 B80-10227 06

ELECTRON BEAM WELDING

- Verifying root fusion in electron-beam welds
M-FS-19499 B80-10110 08
- X-ray technique verifies weld-root fusion
M-FS-19468 B80-10111 08
- Electron-beam welder circle generator
M-FS-19441 B80-10275 08
- 'Foreign material' to verify root fusion in welded joints
M-FS-19496 B80-10276 08
- Limiting current in electron-beam welders
M-FS-19503 B80-10413 07

ELECTRON BEAMS

- Superconducting gyrocon would be very efficient
NPO-14975 B80-10446 02
- Improved LEEM ranges over four decades
LANGLEY-12706 B80-10508 06

ELECTRON DISTRIBUTION

- Crossed-grid charge locator
M-FS-25170 B80-10010 01

ELECTRON MICROSCOPES

- Vise holds specimens for microscope
MSC-18690 B80-10098 07

ELECTRON RADIATION

- Applying the helium ionization detector in chromatography
MSC-18835 B80-10490 04

ELECTRON TRAJECTORIES

- Numerical tracing of electron trajectories
GSFC-12535 B80-10057 03

ELECTRON TUBES

Superconducting gyrocon would be very efficient

NPO-14975 880-10446 02

ELECTRONIC CONTROL

Speed control for synchronous motors

MSC-18680 880-10444 01

ELECTRONIC EQUIPMENT

Signal conditioner for nickel temperature sensors

MSC-18367 880-10298 01

ELECTRONIC EQUIPMENT TESTS

Testing EKG electrodes on-line

MSC-18696 880-10212 05

ELECTRONIC PACKAGING

Placement technique for semicustom digital LSI circuits

M-FS-25324 880-10117 08

Double metalization for VLSI

M-FS-25149 880-10261 08

Cooling/grounding mount for hybrid circuits

MSC-18728 880-10302 01

Lightweight terminal board

MSC-18787 880-10429 08

Transistor package for high pressure applications

MSC-18743 880-10430 08

CADAT logic simulation program

M-F-25183 880-10432 08

CADAT test pattern generator

M-FS-25066 880-10433 08

CADAT field-effect-transistor simulator

M-FS-25067 880-10434 08

CADAT place-and-routine in two dimensions

M-FS-25058 880-10435 08

CADAT multiport placement and routing

M-FS-25065 880-10436 08

CADAT integrated circuit mask analysis

M-FS-25054 880-10437 08

ELECTRONIC TRANSDUCERS

Ultrasonic frequency analysis

LANGLEY-12697 880-10377 06

ELECTROPLATING

Selective optical coatings for solar collectors

M-FS-23589 880-10192 03

ELECTROSTATIC CHARGE

Reducing static charges in fluidized bed reactions

ARC-11245 880-10068 04

ELLIPTICAL POLARIZATION

Multiband microstrip antenna

MSC-18334 880-10001 01

ELONGATION

Gentle arrester for moving bodies

LANGLEY-12372 880-10531 07

EMITTANCE

User chooses coating properties

LANGLEY-12719 880-10493 04

ENDOSCOPES

Fiber-optics couple arthroscope to TV

LANGLEY-12718 880-10504 05

ENERGY CONSERVATION

Energy-saving thermostat

LANGLEY-12450 880-10040 03

Energy-reduction concept for incandescent lamps

MSC-18757 880-10325 03

ENERGY CONVERSION

Extracting energy from natural flow

M-FS-23989 880-10045 03

Solar cell is housed in light-bulb enclosure

LEWIS-13418 880-10442 01

Gas absorption/desorption

temperature-differential engine

NPO-14528 880-10513 06

ENERGY CONVERSION EFFICIENCY

New mounting improves solar-cell efficiency

NPO-14467 880-10039 03

Improved power factor controller

M-FS-25323 880-10149 01

Energy saving in ac generators

M-FS-25302 880-10150 01

Combined photovoltaic and thermal-storage module

NPO-14591 880-10327 03

ENERGY DISSIPATION

A redundant regulator control with low standby losses

NPO-13165 880-10172 02

ENERGY DISTRIBUTION

Far-field radiation pattern of tunable diode lasers

LANGLEY-12631 880-10177 03

ENERGY POLICY

Coal conversion and synthetic-fuel production

M-FS-25330 880-10070 04

Underground Coal Mining

NPO-14704 880-10071 04

ENERGY STORAGE

REDOX electrochemical energy storage

LEWIS-13398 880-10064 04

Self-energized screw coupling

M-FS-25340 880-10096 07

ENERGY TECHNOLOGY

A survey of photovoltaic systems

M-FS-25397 880-10187 03

A test program for solar collectors

M-FS-25433 880-10194 03

Operational tests of a solar energy system Florida site

M-FS-25423 880-10196 03

A solar-energy system in Pennsylvania

M-FS-25427 880-10197 03

Installation guidelines for the Pennsylvania system

M-FS-25424 880-10198 03

A solar-energy system in Minnesota

M-FS-25428 880-10199 03

Solar-energy system evaluation-Pennsylvania site

M-FS-25434 880-10200 03

A hot-water system tested onsite--Togus, Maine

M-FS-25435 880-10201 03

A reliable solar-heating system--Huntsville, Alabama

M-FS-25431 880-10202 03

Solar-heating and cooling demonstration project

M-FS-25443 880-10203 03

ENGINE COOLANTS

Full-coverage film cooling

LEWIS-13249 880-10091 06

ENGINE DESIGN

Viscous characteristics analysis

LANGLEY-12598 880-10084 06

Plastic deformation of engines and other nonlinear structures

M-FS-23814 880-10399 06

Gas absorption/desorption temperature-differential engine

NPO-14528 880-10513 06

Calculating linear A, B, C, and D matrices from a nonlinear dynamic engine simulation

LEWIS-13250 880-10520 06

ENGINES

Additive improves engine-oil performance

GSFC-12327 880-10065 04

ENVIRONMENT EFFECTS

Environmental testing under load

LANGLEY-12602 880-10379 06

ENVIRONMENT POLLUTION

Recycling paper-pulp waste liquors

NPO-14797 880-10492 04

ENVIRONMENT SIMULATORS

Environmental testing under load

LANGLEY-12602 880-10379 06

ENVIRONMENTAL CONTROL

Data-acquisition and control system for severe environments

M-FS-25471 880-10333 03

ENVIRONMENTAL TESTS

A test program for solar collectors

M-FS-25433 880-10194 03

Environmental testing under load

LANGLEY-12602 880-10379 06

ENZYMES

Hybrid polymer microspheres

NPO-14462 880-10208 04

EPOXY RESINS

Examining graphite reinforcement in composites

MSC-19594 880-10122 08

High char yield epoxy curing agents

LEWIS-13226 880-10361 04

Quick mixing of epoxy components

MSC-18731 880-10415 07

EQUATIONS OF MOTION

Equations of motion for coupled n-body systems

GSFC-12407 880-10083 06

EQUATIONS OF STATE

An equation of state for liquids

NPO-14821 880-10174 03

EQUILIBRIUM FLOW

Analysis of a cooled, turbine blade or vane with an insert

LEWIS-13293 880-10400 06

ERROR CORRECTING CODES

Improved code-tracking loop

MSC-18035 880-10034 02

ESTIMATING

Estimation of incomplete multinomial data

LANGLEY-12593 880-10146 09

ETCHANTS

Etchant for incoloy-903 welds

M-FS-19378 880-10112 08

ETCHING

Ion-beam etching enhances adhesive bonding

LEWIS-13028 880-10128 08

ETHYLENE COMPOUNDS

A temperature fixed point near 58 C

M-FS-25304 880-10204 04

EXPANDABLE STRUCTURES

A versatile tunnel acts as a flexible duct

M-FS-22636 880-10242 07

EXPLOSIVES

Soft container for explosive nuts

MSC-18871 880-10532 07

EXPOSURE

Camera add-on records time of exposure

LANGLEY-12635 880-10183 03

EXTENSIONS

Torque-wrench extension

MSC-18769 880-10414 07

EXTENSOMETERS

Eddy-current sensor measures bolt loading
 M-FS-19486 B80-10079 06
 Bolt-tension indicator
 M-FS-19324 B80-10105 07
EXTRACTION
 Wrench for smooth or damaged fasteners
 MSC-18772 B80-10416 07

F**FABRICATION**

Lightweight terminal board
 MSC-18787 B80-10429 08

FABRICS

Cutting holes in fabric-faced panels
 MSC-18786 B80-10427 08

FAILURE MODES

Toggle signal for prevention of control errors
 MSC-18779 B80-10312 02

FALLING SPHERES

Tracking falling objects
 NPO-14813 B80-10328 03
 Drop tower with no aerodynamic drag
 NPO-14845 B80-10549 08

FASTENERS

Self-energized screw coupling
 M-FS-25340 B80-10096 07
 Retaining a sleeve on a shaft
 M-FS-19518 B80-10103 07
 Flush-mounting technique for composite beams
 LANGLEY-12389 B80-10121 08
 Locknut preload tool
 MSC-16153 B80-10245 07
 Bayonet plug with ramp-activated lock
 MSC-18526 B80-10247 07
 Handtool assists in bundling cables
 MSC-18567 B80-10255 07
 Two-headed bolt
 M-FS-19619 B80-10410 07
 Interlocking wedge joint is easily assembled
 LANGLEY-12729 B80-10526 07
 Eliminating gaps in split rings
 MSC-18854 B80-10540 08

FATIGUE (MATERIALS)

Predicting crack propagation
 MSC-18718; MSC-18721 B80-10283 08

FATIGUE TESTING MACHINES

Temperature controller adapts to fatigue tester
 LANGLEY-12393 B80-10378 06

FATIGUE TESTS

Predicting lifetime of cast parts
 M-FS-19549 B80-10228 06

FEEDBACK CONTROL

Temperature-compensating dc restorer
 LANGLEY-12549 B80-10152 01
 Speed control for synchronous motors
 MSC-18680 B80-10444 01

FERRITES

Producing gapped-ferrite transformer cores
 NPO-14715 B80-10273 08

FIBER OPTICS

Improved ureteral stone fragmentation catheter
 NPO-14745 B80-10370 05
 Fiber optic level sensor for cryogenics
 MSC-18674 B80-10375 06

Fiber optic accelerometer
 LEWIS-13219 B80-10389 06
 Aligning sleeve for optical fibers
 MSC-18756 B80-10424 01
 Fiber-optics couple arthroscope to TV
 LANGLEY-12718 B80-10504 05

FIBERS

Precision filament cutter
 LANGLEY-12564 B80-10093 07

FIELD EFFECT TRANSISTORS

Continuous control of phase-locked-loop bandwidth
 MSC-16684 B80-10008 01
 JANTX2N4856 field-effect transistor
 M-FS-25269 B80-10030 01
 Progress in MOSFET double-layer metalization
 M-FS-25239 B80-10280 08
 CADAT field-effect-transistor simulator
 M-FS-25067 B80-10434 08

Simple JFET oscillator

GSFC-12555 B80-10443 01

FILLERS

Repairing high-temperature glazed tiles
 MSC-18736 B80-10536 08

FILM COOLING

Full-coverage film cooling
 LEWIS-13249 B80-10091 06

FILMS

Reflecting layers reduce weight of insulation
 MSC-18785 B80-10547 08

FILTRATION

Improved particulate-sampling filter
 NPO-14801 B80-10271 08
 Treating domestic wastewater with water hyacinths
 M-FS-23964 B80-10368 05

FINITE ELEMENT METHOD

Resizing structures for minimum weight
 LANGLEY-12699 B80-10394 06

FIRE PREVENTION

A new family of fire-resistant foams
 MSC-16921 B80-10418 08
 Modified fire-resistant foams for seat cushions
 MSC-18704 B80-10419 08
 One-step microwave foaming and curing
 MSC-18707 B80-10420 08
 Rigid fire-resistant foams for walls and floors
 MSC-18708 B80-10421 08

FITTINGS

Flared tube attachment fitting
 MSC-18416 B80-10240 07
 Test fittings for dimensionally critical tubes
 NPO-14399 B80-10252 07

FLAME PROPAGATION

Methane/air flames in a concentric tube combustor
 LEWIS-13388 B80-10211 04

FLAME RETARDANTS

Resin char oxidation retardant for composites
 LEWIS-13275 B80-10354 04
 High char yield epoxy curing agents
 LEWIS-13226 B80-10361 04
 A new family of fire-resistant foams
 MSC-16921 B80-10418 08
 Modified fire-resistant foams for seat cushions
 MSC-18704 B80-10419 08
 One-step microwave foaming and curing
 MSC-18707 B80-10420 08

Rigid fire-resistant foams for walls and floors
 MSC-18708 B80-10421 08

FLAMMABILITY

Fire tests for airplane interior materials
 MSC-18478 B80-10063 04
 Safely splicing glass optical fibers
 KSC-11107 B80-10134 08

FLANGES

Compact positioning flange
 MSC-14876 B80-10104 07

FLARED BODIES

Flared tube attachment fitting
 MSC-18416 B80-10240 07
 Tube flare inspection tool
 MSC-19636 B80-10241 07

FLASHBACK

Flashback-free combustor
 LANGLEY-12666 B80-10226 06

FLEXIBILITY

Aluminum ions enhance polyimide adhesive
 LANGLEY-12640 B80-10358 04

FLEXING

Testing panels in tension and flexure
 M-FS-25421 B80-10380 06

FLICKER

Real-time film recording from stroke-written CRT's
 LANGLEY-12529 B80-10169 02

FLIGHT CONTROL

Dual mode actuator
 LANGLEY-12412 B80-10106 07

FLIGHT HAZARDS

Fire tests for airplane interior materials
 MSC-18478 B80-10063 04

FLIGHT MECHANICS

Cost-minimized aircraft trajectories
 ARC-11282 B80-10396 06

FLIGHT SIMULATORS

Rain, fog, and clouds for aircraft simulators
 ARC-11158 B80-10383 06

FLOW CHARACTERISTICS

Improved multielement airfoil analysis
 LANGLEY-12489 B80-10086 06

FLOW CHARTS

Automated flow-chart system
 GSFC-12514 B80-10147 09
 A universal structured-design diagrammer
 LANGLEY-12548 B80-10558 09

FLOW DISTRIBUTION

Viscous characteristics analysis
 LANGLEY-12598 B80-10084 06
 Flow field in supersonic mixed-compression inlets
 LEWIS-13279 B80-10088 06
 Stream tube curvature analysis
 LANGLEY-11535 B80-10235 06
 A generalized vortex lattice method
 LANGLEY-12636 B80-10236 06
 Wakeflow analysis by cost
 NPO-14705 B80-10387 06
 Inviscid transonic flow over axisymmetric bodies
 LANGLEY-12499 B80-10398 06
 The design and analysis of low-speed airfoils
 LANGLEY-12727 B80-10524 06

FLOW MEASUREMENT

Fast calibration of gas flowmeters
 KSC-11076 B80-10516 06

FLOWMETERS

Flow sensor for biomedical fluids
 MSC-18761 B80-10367 05

FLUID FILTERS

Improved particulate-sampling filter
NPO-14801 880-10271 08

FLUID FLOW

Grooves reduce aircraft drag
LANGLEY-12599 880-10215 06
Recording fluid currents by holography
M-FS-25373 880-10222 06
Design considerations for mechanical face seals
LEWIS-13146 880-10233 06
Test fittings for dimensionally critical tubes
NPO-14399 880-10252 07
Dynamics of cavitating cascades and inducer pumps
M-FS-25399 880-10392 06
Reduced viscosity interpreted for fluid/gas mixtures
NPO-14976 880-10457 03
Potential flow in two-dimensional deflected nozzles
LEWIS-13461 880-10523 06
Transonic flow over wing/fuselage configurations
LANGLEY-12702 880-10525 06

FLUID POWER

Extracting energy from natural flow
M-FS-23989 880-10045 03

FLUID TRANSMISSION LINES

Flared tube attachment fitting
MSC-18416 880-10240 07

FLUIDIZED BED PROCESSORS

Reducing static charges in fluidized bed reactions
ARC-11245 880-10068 04
Producing silicon continuously
NPO-14796 880-10537 08

FLUORESCENCE

Fluorescent radiation converter
GSFC-12528 880-10180 03
Laser-fluorescence measurement of marine algae
LANGLEY-12282 880-10213 05
Simultaneous measurement of three atmospheric pollutants
NPO-14828 880-10359 04

FLUOROCARBONS

Film coatings for contoured surfaces
MSC-18784 880-10425 08

FLUTTER

Extracting energy from natural flow
M-FS-23989 880-10045 03
Passive wing/store flutter suppression
LANGLEY-12468 880-10219 06

FLUX DENSITY

Improved magnetic material analyzer
LEWIS-13493 880-10384 06

FOAMS

Cryogenic machining of polyurethane foam
MSC-18572 880-10123 08
Foam-filled cushions for sliding trays
MSC-18565 880-10127 08
A new family of fire-resistant foams
MSC-16921 880-10418 08
Modified fire-resistant foams for seat cushions
MSC-18704 880-10419 08
One-step microwave foaming and curing
MSC-18707 880-10420 08
Rigid fire-resistant foams for walls and floors
MSC-18708 880-10421 08

FOCUSING

Acoustic lens is gas-filled
NPO-14757 880-10376 06

FORMING TECHNIQUES

Forming complex cavities in clear plastic
LEWIS-13412 880-10267 08

FORTRAN

Automated flow-chart system
GSFC-12514 880-10147 09
Structured FORTRAN preprocessor
M-FS-23813 880-10289 09
An all-FORTRAN version of NASTRAN for the VAX
GSFC-12600 880-10522 06

FORWARD SCATTERING

Noise suppression in forward-scattering optical instruments
LANGLEY-12730 880-10324 03

FRACTURE MECHANICS

Predicting crack propagation
MSC-18718; MSC-18721 880-10283 08

FRACTURE STRENGTH

LVDT gage for fracture-toughness tests in liquid hydrogen
LEWIS-13038 880-10075 06
Tension-mode loading for bend specimens in cryogenics
LEWIS-13040 880-10076 06
Modified displacement gage for cryogenic testing
LEWIS-13039 880-10077 06

FRAMES

Versatile modular scaffolds
GSFC-12606 880-10406 07

FREE FALL

Tracking falling objects
NPO-14813 880-10328 03
Imager displays free fall in stop action
NPO-14779 880-10509 06
Drop tower with no aerodynamic drag
NPO-14845 880-10549 08

FREE FLOW

Extracting energy from natural flow
M-FS-23989 880-10045 03

FREON

Removing freon gas from hydraulic fluid
MSC-18740 880-10494 04

FREQUENCIES

Vibration modes and frequencies of structures
LANGLEY-12647 880-10237 06

FREQUENCY ANALYZERS

Frequency response to multiple-sampling rate systems
MSC-18473 880-10173 02
Ultrasonic frequency analysis
LANGLEY-12697 880-10377 06

FREQUENCY CONTROL

Frequency-controlled voltage regulator
NPO-13633 880-10171 02

FREQUENCY CONVERTERS

Frequency-controlled voltage regulator
NPO-13633 880-10171 02
Fluorescent radiation converter
GSFC-12528 880-10180 03

FREQUENCY DIVIDERS

Universal odd-modulus frequency divider
NPO-13426 880-10006 01

FREQUENCY MEASUREMENT

Optical calibrator for TDL spectrometers
GSFC-12562 880-10178 03

FREQUENCY MODULATION

Ultrastable automatic frequency control
MSC-18679 880-10294 01

FREQUENCY MULTIPLIERS

Superconducting gyrotron would be very efficient
NPO-14975 880-10446 02

FREQUENCY STABILITY

Ultrastable automatic frequency control
MSC-18679 880-10294 01

FREQUENCY STANDARDS

Integral storage-bulb and microwave cavity for masers
GSFC-12542 880-10186 03

FRESNEL DIFFRACTION

Fresnel lens tracking solar collector
M-FS-25419 880-10190 03
Fresnel lenses for ultrasonic inspection
MSC-18469 880-10217 06

FRICTION REDUCTION

Lubrication handbook
M-FS-25158 880-10210 04

FUEL INJECTION

Flashback-free combustor
LANGLEY-12666 880-10226 06

FUEL TESTS

Flashback-free combustor
LANGLEY-12666 880-10226 06

FURNACES

Controlling the shape of glass microballoons
M-FS-25230 880-10266 08

FUSION (MELTING)

Safely splicing glass optical fibers
KSC-11107 880-10134 08

FUSION WELDING

'Foreign material' to verify root fusion in welded joints
M-FS-19496 880-10276 08

G**GALLIUM ARSENIDES**

'Pelled-film' solar cells
NPO-14734 880-10151 01
Ohmic contact to GaAs semiconductor
LANGLEY-12466 880-10263 08

GAPS

Producing gapped-ferrite transformer cores
NPO-14715 880-10273 08

GAS CHROMATOGRAPHY

Applying the helium ionization detector in chromatography
MSC-18835 880-10490 04

GAS COOLING

Compact, super heat exchanger
LEWIS-12441 880-10081 06

GAS DETECTORS

Laser beam methane detector
NPO-14929 880-10363 04
Applying the helium ionization detector in chromatography
MSC-18835 880-10490 04

GAS DYNAMICS

Methane/air flames in a concentric tube combustor
LEWIS-13388 880-10211 04

GAS FLOW

Fast calibration of gas flowmeters
KSC-11076 880-10516 06

GAS HEATING

Benefit assessment of solar-augmented natural gas systems
NPO-14568 880-10048 03

GAS LASERS

- Powerful copper chloride laser
NPO-14782 B80-10330 03
Gas-laser power monitor
LANGLEY-12682 B80-10455 03

GAS PRESSURE

- Downhole pressure sensor
NPO-14729 B80-10223 06

GAS TURBINE ENGINES

- Corrosion-resistant ceramic thermal barrier coating
LEWIS-13088 B80-10067 04
Full-coverage film cooling
LEWIS-13249 B80-10091 06
Oxide dispersion strengthened superalloy
LEWIS-13589 B80-10351 04
Gas absorption/desorption temperature-differential engine
NPO-14528 B80-10513 06

GAS-LIQUID INTERACTIONS

- Driving bubbles out of glass
M-FS-25414 B80-10496 04

GASEOUS DIFFUSION

- An automated oxide and diffusion facility for IC's
M-FS-25357 B80-10282 08

GASKETS

- Spiral-wound gasket forms
low-temperature seal
LANGLEY-12315 B80-10543 08

GEARS

- Self-lubricating gearset
MSC-18801 B80-10546 08

GEOLOGICAL SURVEYS

- Refraction corrections for surveying
MSC-18664 B80-10231 06

GEOMAGNETISM

- Improved LEEM ranges over four decades
LANGLEY-12706 B80-10508 06

GIMBALS

- Compact positioning flange
MSC-14876 B80-10104 07

GLASS

- Controlling the shape of glass microballoons
M-FS-25230 B80-10266 08
Driving bubbles out of glass
M-FS-25414 B80-10496 04
Arc spraying solderable tabs to glass
NPO-14853 B80-10544 08

GLASS FIBERS

- Safely splicing glass optical fibers
KSC-11107 B80-10134 08

GLAZES

- Mobile glazing unit
KSC-11171 B80-10538 08

GLOW DISCHARGES

- Reducing static charges in fluidized bed reactions
ARC-11245 B80-10068 04

GLYCOLS

- Glycol/water evacuated-tube solar collector
M-FS-25337 B80-10052 03

GOLD COATINGS

- Reflecting layers reduce weight of insulation
MSC-18785 B80-10547 08

GONIOMETERS

- Gage for evaluating rheumatoid hands
GSFC-12610 B80-10503 05

GRAVITATION

- Containerless materials processing in the laboratory
M-FS-25242 B80-10059 04

GRINDING (MATERIAL REMOVAL)

- 'Grinding' cavities in polyurethane foam
MSC-18564 B80-10124 08

GROOVING

- Grooves reduce aircraft drag
LANGLEY-12599 B80-10215 06

GROUND SUPPORT EQUIPMENT

- Developing experiment instrument packages
GSFC-12536 B80-10451 02

GUIDANCE SENSORS

- The 3-D guidance system with proximity sensors
NPO-14521 B80-10250 07

GUNN DIODES

- High-power solid-state microwave transmitter
NPO-14803 B80-10296 01

H**HALOGENS**

- Photoproduction of halogens using platinized TiO₂
LANGLEY-12713 B80-10491 04

HAMMERS

- Aluminum-encased lead mallet
MSC-18529 B80-10100 07

HAND (ANATOMY)

- Gage for evaluating rheumatoid hands
GSFC-12610 B80-10503 05

HARNESSES

- Wire harness twisting aid
MSC-18581 B80-10132 08

HEART RATE

- Microprocessor-based cardiometer
MSC-18775 B80-10501 05

HEAT BALANCE

- Heat-pipe sensor for remote leveling
GSFC-12095 B80-10248 07

HEAT EXCHANGERS

- Thermosyphon heat exchanger
M-FS-25389 B80-10053 03
Compact, super heat exchanger
LEWIS-12441 B80-10081 06
Alumina barrier for vacuum brazing
MSC-18528 B80-10125 08
Operational tests of a solar-energy system in Georgia
M-FS-25420 B80-10195 03

HEAT PIPES

- Heat-pipe sensor for remote leveling
GSFC-12095 B80-10248 07
Heat pipes cool probe and sandwich panel
LANGLEY-12588; LANGLEY-12637 B80-10518 06

HEAT RESISTANT ALLOYS

- Eliminating underbead fissuring in superalloys
M-FS-19460 B80-10114 08
Oxide dispersion strengthened superalloy
LEWIS-13589 B80-10351 04
Low cost high temperature, duplex coating for superalloys
LEWIS-13497 B80-10352 04

HEAT SHIELDING

- Connector heat shield
MSC-16282 B80-10126 08
Thermal barrier and gas seal
MSC-18390 B80-10269 08
Heat/pressure seal for moving parts
MSC-18422 B80-10390 06

Tile densification with TEOS

- MSC-18737 B80-10535 08
Repairing high-temperature glazed tiles
MSC-18736 B80-10536 08

HEAT STORAGE

- Thermal stratification in liquid storage tanks
M-FS-25416 B80-10188 03
Combined photovoltaic and thermal-storage module
NPO-14591 B80-10327 03

HEAT TRANSFER

- Automatic thermal switches
GSFC-12553 B80-10214 06
Heat conduction in three dimensions
MSC-18616 B80-10239 06
Cooling/grounding mount for hybrid circuits
MSC-18728 B80-10302 01
Holes help control temperature
GSFC-12618 B80-10373 06
Heat switch has no moving parts
GSFC-12625 B80-10391 06
Simplified thermal analyzer
GSFC-12638 B80-10393 06
Heat pipes cool probe and sandwich panel
LANGLEY-12588; LANGLEY-12637 B80-10518 06

HEAT TREATMENT

- Mobile glazing unit
KSC-11171 B80-10538 08

HEATING

- Computer-controlled warmup circuit
NPO-14815 B80-10155 01

HEATING EQUIPMENT

- Energy-saving thermostat
LANGLEY-12450 B80-10040 03
An adjustable solar concentrator
NPO-14710 B80-10043 03
Twelve solar-heating/cooling systems: Design and development
M-FS-25358 B80-10046 03
Solar-heating and cooling system design package
M-FS-25393 B80-10047 03
Benefit assessment of solar-augmented natural gas systems
NPO-14568 B80-10048 03
Air-cooled solar-collector specification
M-FS-25336 B80-10049 03
Indoor tests of the concentric-tube solar collector
M-FS-25390 B80-10050 03
Evacuated-tube solar collector--performance evaluation
M-FS-25339 B80-10051 03
Glycol/water evacuated-tube solar collector
M-FS-25337 B80-10052 03
Thermosyphon heat exchanger
M-FS-25389 B80-10053 03
Controller for solar-energy systems
M-FS-25386 B80-10054 03
Controller and temperature monitor for solar heating
M-FS-25387 B80-10055 03
Inhibiting corrosion in solar-heating and cooling systems
M-FS-25387 B80-10056 03
Easily-assembled helical heater
LANGLEY-11712 B80-10130 08
Final report on development of a programmable controller
M-FS-25388 B80-10189 03
Fresnel lens tracking solar collector
M-FS-25419 B80-10190 03

- Outdoor tests of the concentric-tube collector
M-FS-25398 B80-10191 03
- Selective optical coatings for solar collectors
M-FS-23589 B80-10192 03
- Finned-absorber solar collector
M-FS-25385 B80-10193 03
- A test program for solar collectors
M-FS-25433 B80-10194 03
- Operational tests of a solar-energy system in Georgia
M-FS-25420 B80-10195 03
- Operational tests of a solar energy system Florida site
M-FS-25423 B80-10196 03
- A solar-energy system in Pennsylvania
M-FS-25427 B80-10197 03
- Installation guidelines for the Pennsylvania system
M-FS-25424 B80-10198 03
- A solar-energy system in Minnesota
M-FS-25428 B80-10199 03
- Solar-energy system evaluation-Pennsylvania site
M-FS-25434 B80-10200 03
- A hot-water system tested onsite--Togus, Maine
M-FS-25435 B80-10201 03
- A reliable solar-heating system--Huntsville, Alabama
M-FS-25431 B80-10202 03
- Solar-heating and cooling demonstration project
M-FS-25443 B80-10203 03
- Multiplexed logic controls solar-heating system
M-FS-25287 B80-10318 03
- Offset paraboloidal solar concentrator
NPO-14846 B80-10320 03
- Heat for film processing from solar energy
M-FS-25444 B80-10331 03
- Solar heater/cooler for mass market
M-FS-25452 B80-10332 03
- Data-acquisition and control system for severe environments
M-FS-25471 B80-10333 03
- Solar heater/cooler for mass market
M-FS-25468 B80-10334 03
- Solar--heated and cooled office building--Dalton, Georgia
M-FS-25451 B80-10335 03
- Solar-heating and hot water system--St. Louis, Missouri
M-FS-25453 B80-10336 03
- Solar heating for an electronics manufacturing plant--Blue Earth, Minnesota
M-FS-25469 B80-10337 03
- Costs and description of a solar-energy system--Austin, Texas
M-FS-25472 B80-10338 03
- Solar energy in a historical city--Abbreville, South Carolina
M-FS-25479 B80-10339 03
- municipal recreation center is heated and cooled by solar energy
M-FS-25478 B80-10340 03
- Solar energy meets 50 percent of motel hot water needs--Key West, Florida
M-FS-25454 B80-10341 03
- Solar heated office complex--Greenwood, South Carolina
M-FS-25458 B80-10342 03
- Residential system tested in an office--Huntsville, Alabama
M-FS-25481 B80-10343 03
- Solar heated two level residence--Akron, Ohio
M-FS-25480 B80-10344 03
- Solar energy workshop--Tucson, Arizona
M-FS-25473 B80-10345 03
- Residential solar hot water system--Tempe, Arizona
M-FS-25490 B80-10346 03
- Residential solar heating installation--Stillwater, Minnesota
M-FS-25504 B80-10347 03
- Three story residence with solar heat--Manchester, New Hampshire
M-FS-25499 B80-10348 03
- A high school is supplied with solar energy--Dallas, Texas
M-FS-25514 B80-10349 03
- Evaluation of an evacuated-tube liquid solar collector
M-FS-25450 B80-10461 03
- Solar water heater design package
M-FS-25521 B80-10462 03
- Five-city economics of a solar hot-water-system
M-FS-25532 B80-10463 03
- Economic evaluation of a solar hot-water-system
M-FS-25529 B80-10464 03
- Residential solar-heating system uses pyramidal optics
M-FS-25567 B80-10465 03
- Solar-heated bank-Marks Mississippi
M-FS-25558 B80-10466 03
- Solar water-heating performance evaluation--San Diego, California
M-FS-25502 B80-10467 03
- Solar-heated and cooled savings and loan building-1-Leavenworth, Kansas
M-FS-25520 B80-10468 03
- Solar-energy landmark Building-Columbia, Missouri
M-FS-25524 B80-10469 03
- Solar heating for an observatory--Lincoln, Nebraska
M-FS-25525 B80-10470 03
- Two-story residence with solar heating--Newman, Georgia
M-FS-25526 B80-10471 03
- Solar-energy heats a transportation test center--Pueblo, Colorado
M-FS-25527 B80-10472 03
- Single-family-residence solar heating--Carlsbad, New Mexico
M-FS-25528 B80-10473 03
- Multimode solar-heating system--Columbia, South Carolina
M-FS-25552 B80-10474 03
- Solar-heated swimming school--Wilmington, Delaware
M-FS-25548 B80-10475 03
- Winter performance of a domestic solar-heating system--Duffield, Virginia
M-FS-25540 B80-10476 03
- One-year assessment of a solar space/water heater--Clinton, Mississippi
M-FS-25539 B80-10477 03
- Fire-station solar-energy system--Kansas City, Missouri
M-FS-25538 B80-10478 03
- Solar-heated ranger station--Glendo, Wyoming
M-FS-25537 B80-10479 03
- Economic evaluation of a solar hot-water system--Palm Beach County, Florida
M-FS-25536 B80-10480 03
- Residential system--Lansing, Michigan
M-FS-25530 B80-10481 03
- Solar space-heating system--Yosemite National Park, California
M-FS-25553 B80-10482 03
- Motel solar-hot-water system--Dallas, Texas
M-FS-25575 B80-10483 03
- Motel solar-hot-water system with nonpressurized storage--Jacksonville, Florida
M-FS-25569 B80-10484 03
- Closed-circulation system for motel hot water--Savannah, Georgia
M-FS-25572 B80-10485 03
- Solar heating for a restaurant--North Little Rock, Arkansas
M-FS-25568 B80-10486 03
- Motel solar hot-water installation--Atlanta, Georgia
M-FS-25564 B80-10487 03
- Building with integral solar-heat storage--Starkville, Mississippi
M-FS-25559 B80-10488 03
- Less-toxic corrosion inhibitors
M-FS-25496 B80-10497 04
- HELICAL WINDINGS**
Easily-assembled helical heater
LANGLEY-11712 B80-10130 08
- HELICOPTER DESIGN**
Isolation and measurement of rotor vibration forces
LANGLEY-12476 B80-10507 06
- HELIUM**
Applying the helium ionization detector in chromatography
MSC-18835 B80-10490 04
- HERMETIC SEALS**
Sealing micropores in thin castings
MSC-18623 B80-10428 08
- HIGH PRESSURE**
Transistor package for high pressure applications
MSC-18743 B80-10430 08
- Transducer for extreme temperatures and pressures
MSC-18778 B80-10510 06
- HIGH RESOLUTION**
High-resolution ferometer
NPO-14448 B80-10175 03
- HIGH TEMPERATURE**
Low cost high temperature, duplex coating for superalloys
LEWIS-13497 B80-10352 04
- HIGH TEMPERATURE ENVIRONMENTS**
Transducer for extreme temperatures and pressures
MSC-18778 B80-10510 06
- HIGH TEMPERATURE GASES**
Reduced hydrogen permeability at high temperatures
LEWIS-13485 B80-10364 04
- HIGH VOLTAGES**
Direct-current converter for gas-discharge lamps
MSC-18407 B80-10156 01
- Kilovolt vacuum feed through is less noisy
NPO-14802 B80-10426 08
- HOLDERS**
Vise holds specimens for microscope
MSC-18690 B80-10098 07

- Drill-motor holding fixture
MSC-18582 880-10108 07
- HOLOGRAPHY**
Automated holographic drop-size analyzer 880-10181 03
Recording fluid currents by holography
M-FS-25373 880-10222 06
- HONING**
Honing fixture for welded electrodes
M-FS-19537 880-10278 08
- HORN ANTENNAS**
Dual-frequency bidirectional antenna
GSFC-12501 880-10154 01
- HOT WORKING**
Hot forming graphite/polyimide structures
LANGLEY-12547 880-10422 08
- HYBRID CIRCUITS**
Cooling/grounding mount for hybrid circuits
MSC-18728 880-10302 01
- HYDRAULIC EQUIPMENT**
Locknut preload tool
MSC-16153 880-10245 07
Lock for hydraulic actuators
MSC-18853 880-10530 07
- HYDRAULIC FLUIDS**
Removing freon gas from hydraulic fluid
MSC-18740 880-10494 04
- HYDROCARBONS**
Removing freon gas from hydraulic fluid
MSC-18740 880-10494 04
- HYDRODYNAMICS**
Methane/air flames in a concentric tube combustor
LEWIS-13388 880-10211 04
- HYDROFLUORIC ACID**
Chemical-milling solution for invar alloy
M-FS-25365 880-10113 08
- HYDROGEN**
Removal of hydrogen bubbles from nuclear reactors
LANGLEY-12597 880-10205 04
Reduced hydrogen permeability at high temperatures
LEWIS-13485 880-10364 04
- HYPERTHERMIA**
Temperature controller for hyperthermia devices
LANGLEY-12528 880-10072 05
- IMAGE CONVERTERS**
Photocapacitive image converter
LANGLEY-12513 880-10009 01
Four-quadrant CCD analog multiplier
LANGLEY-12332 880-10305 02
Monolithic four-quadrant multiplier
LANGLEY-12330A 880-10306 02
Monolithic CCD-array readout
LANGLEY-12376 880-10307 02
An image-data-compression algorithm
NPO-14496 880-10438 09
- IMAGE ENHANCEMENT**
Better-quality CCD-array images
NPO-14426 880-10168 02
Digital enhancement of X-rays for NDT
KSC-11118 880-10232 06
Real-time image enhancement
NPO-14281 880-10311 02
- OCCULT-ORSER** complete
conversational user-language translator
GSFC-12604 880-10556 09
- IMAGERY**
Applications of remote-sensing imagery
M-FS-25107 880-10082 06
Low-cost LANDSAT processing system
M-FS-25396 880-10285 09
Image-based information, communication, and retrieval
NPO-14893 880-10293 09
Evaluating computer-drawn ground-cover maps
KSC-11195 880-10555 09
Selecting optimum algorithms for image processing
M-FS-25367 880-10557 09
- IMAGING TECHNIQUES**
Numerical tracing of electron trajectories
GSFC-12535 880-10057 03
Acoustically-tuned optical spectrometer
HQN-10924 880-10326 03
Imager displays free fall in stop action
NPO-14779 880-10509 06
- IMPACTORS**
Aluminum-encased lead mallet
MSC-18529 880-10100 07
- IMPELLERS**
Dynamics of cavitating cascades and inducer pumps
M-FS-25399 880-10392 06
- IMPINGEMENT**
Analysis of a cooled, turbine blade or vane with an insert
LEWIS-13293 880-10400 06
- INDUCTION HEATING**
Plastic welder
LANGLEY-12540 880-10274 08
- INDUCTION MOTORS**
Improved power factor controller
M-FS-25323 880-10149 01
- INDUCTORS**
Improved magnetic material analyzer
LEWIS-13493 880-10384 06
- INDUSTRIAL PLANTS**
Microprocessor systems for industrial process control
NPO-14661 880-10131 08
- INDUSTRIES**
Should we industrialize space?
M-FS-23963 880-10137 08
- INERTIA**
Interchangeable spring modules for inertia measurements
LANGLEY-12402 880-10386 06
- INFORMATION RETRIEVAL**
Photocapacitive image converter
LANGLEY-12513 880-10009 01
- INFRARED DETECTORS**
Compact infrared detector
NPO-14864 880-10515 06
- INFRARED INSPECTION**
Detection of tanker defects with infrared thermography
LANGLEY-12655 880-10221 06
- INFRARED RADIATION**
Fast-response atmospheric-pollutant monitor
LANGLEY-12317 880-10062 04
- INFRARED REFLECTION**
Energy-reduction concept for incandescent lamps
MSC-18757 880-10325 03
- INHIBITORS**
Additive improves engine-oil performance
GSFC-12327 880-10065 04
Silicon nitride passivation of IC's
M-FS-25309 880-10279 08
- INJECTION LASERS**
Tunable pulsed carbon dioxide laser
NPO-14984 880-10458 03
- INSPECTION**
Detecting contaminants by ultraviolet photography
M-FS-25296 880-10229 06
- INSTALLATION MANUALS**
Installation guidelines for the Pennsylvania system
M-FS-25424 880-10198 03
- INSTALLING**
Heat-shrinkable sleeve aids in insulating universal joints
MSC-18685 880-10270 08
- INSTRUMENT ORIENTATION**
Compact positioning flange
MSC-14876 880-10104 07
X-ray beam pointer
MSC-18590 880-10254 07
- INSTRUMENT PACKAGES**
Developing experiment instrument packages
GSFC-12536 880-10451 02
- INSULATION**
Measuring the thermal conductivity of insulation
NPO-14871 880-10382 06
Electronic depth micrometer
KSC-11181 880-10385 06
Reflecting layers reduce weight of insulation
MSC-18785 880-10547 08
- INTEGRAL TRANSFORMATIONS**
An approximation for inverse Laplace transforms
MSC-18867 880-10553 09
- INTEGRATED CIRCUITS**
Coatings for hybrid microcircuits
M-FS-25292 880-10116 08
Placement technique for semicustom digital LSI circuits
M-FS-25324 880-10117 08
Cost models and economical packaging of LSI's
M-FS-25359 880-10138 08
Automated ion implantation for IC's
M-FS-25193 880-10139 08
An automated photolithography facility for IC's
M-FS-25073 880-10140 08
Models of MOS and SOS devices
M-FS-25153 880-10141 08
Photonitride passivating coating for IC's
M-FS-25401 880-10260 08
Double metalization for VLSI
M-FS-25149 880-10261 08
More-reliable SOS ion implantations
M-FS-25322 880-10262 08
Silicon nitride passivation of IC's
M-FS-25309 880-10279 08
Progress in MOSFET double-layer metalization
M-FS-25239 880-10280 08
Optimizing costs of VLSI circuits
M-FS-25348 880-10281 08
An automated oxide and diffusion facility for IC's
M-FS-25357 880-10282 08

- Cooling/grounding mount for hybrid circuits
 MSC-18728 880-10302 01
 Four-quadrant CCD analog multiplier
 LANGLEY-12332 880-10305 02
 Monolithic four-quadrant multiplier
 LANGLEY-12330A 880-10306 02
 Monolithic CCD-array readout
 LANGLEY-12376 880-10307 02
 Automatic chemical vapor deposition
 M-FS-25249 880-10431 08
 CADAT logic simulation program
 M-FS-25183 880-10432 08
 CADAT test pattern generator
 M-FS-25066 880-10433 08
 CADAT field-effect-transistor simulator
 M-FS-25067 880-10434 08
 CADAT place-and-routine in two dimensions
 M-FS-25058 880-10435 08
 CADAT multiport placement and routing
 M-FS-25065 880-10436 08
 CADAT integrated circuit mask analysis
 M-FS-25054 880-10437 08
 Low-resistance continuity tester
 NPO-14881 880-10445 01
 CADAT network translator
 M-FS-25055 880-10551 08
 CADAT integrated circuit artwork program
 M-FS-25017 880-10552 08
- INTERFACES**
 Input/output interface module
 MSC-18180 880-10159 01
- INTERFACIAL TENSION**
 Driving bubbles out of glass
 M-FS-25414 880-10496 04
- INTERFEROMETERS**
 High-resolution spectrometry/interferometer
 NPO-14448 880-10175 03
 Diplexer for laser-beam heterodyne receiver
 GSFC-12589 880-10329 03
- INTERNAL COMBUSTION ENGINES**
 Additive improves engine-oil performance
 GSFC-12327 880-10065 04
- INTRAVENOUS PROCEDURES**
 Flow sensor for biomedical fluids
 MSC-18761 880-10367 05
- INVERTED CONVERTERS (DC TO AC)**
 Direct-current converter for gas-discharge lamps
 MSC-18407 880-10156 01
- INVESTMENT CASTING**
 Forming complex cavities in clear plastic
 LEWIS-13412 880-10267 08
 Sealing micropores in thin castings
 MSC-18623 880-10428 08
- INVISID FLOW**
 Viscous characteristics analysis
 LANGLEY-12598 880-10084 06
 Stream tube curvature analysis
 LANGLEY-11535 880-10235 06
 Inviscid transonic flow over axisymmetric bodies
 LANGLEY-12499 880-10398 06
- ION BEAMS**
 Ion-beam cleaning for cold welds
 LEWIS-12982 880-10115 08
 Ion-beam etching enhances adhesive bonding
 LEWIS-13028 880-10128 08
- ION EXCHANGE MEMBRANE ELECTROLYTES**
 REDOX electrochemical energy storage
 LEWIS-13398 880-10064 04
- ION EXCHANGING**
 Hybrid polymer microspheres
 NPO-14462 880-10208 04
- ION IMPLANTATION**
 Automated ion implantation for IC's
 M-FS-25193 880-10139 08
 More-reliable SOS ion implantations
 M-FS-25322 880-10262 08
- IONIZATION CHAMBERS**
 Applying the helium ionization detector in chromatography
 MSC-18835 880-10490 04
- IRON ALLOYS**
 Etchant for incoloy-903 welds
 M-FS-19378 880-10112 08
 Chemical-milling solution for invar alloy
 M-FS-25365 880-10113 08
- ISOLATORS**
 Self-adjusting mechanical snubbing link
 MSC-16134 880-10246 07
- J**
- JET ENGINES**
 Suppressing buzz-saw noise in jet engines
 LANGLEY-12645 880-10220 06
- JIGS**
 Jig for assembling large composite panels
 LANGLEY-12394 880-10119 08
- JOINTS (ANATOMY)**
 Gage for evaluating rheumatoid hands
 GSFC-12610 880-10503 05
- JOINTS (JUNCTIONS)**
 Automatic connector for structural beams
 M-FS-25134 880-10094 07
 Mechanical end joint for structural columns
 LANGLEY-12482 880-10095 07
 Heat-shrinkable sleeve aids in insulating universal joints
 MSC-18685 880-10270 08
 Ball-joint grounding ring
 MSC-18824 880-10405 07
 Alining sleeve for optical fibers
 MSC-18756 880-10424 01
 Interlocking wedge joint is easily assembled
 LANGLEY-12729 880-10526 07
- JUNCTION TRANSISTORS**
 Simple JFET oscillator
 GSFC-12555 880-10443 01
- K**
- KALMAN-SCHMIDT FILTERING**
 Linear stochastic optimal control and estimation problem
 LEWIS-13206 880-10287 09
- KLYSTRONS**
 Computer-controlled warmup circuit
 NPO-14815 880-10155 01
- L**
- LAMINAR FLOW AIRFOILS**
 Disturbance amplification rates
 LANGLEY-12556 880-10092 06
- LAMINATES**
 Jig for assembling large composite panels
 LANGLEY-12394 880-10119 08
 Shaping graphite/epoxy stiffeners
 MSC-18494 880-10120 08
 Plasticizer for polyimide composites
 LANGLEY-12642 880-10206 04
 Cutting holes in fabric-faced panels
 MSC-18786 880-10427 08
- LAND USE**
 Applications of remote-sensing imagery
 M-FS-25107 880-10082 06
- LANDSAT SATELLITES**
 Applications of remote-sensing imagery
 M-FS-25107 880-10082 06
 Low-cost LANDSAT processing system
 M-FS-25396 880-10285 09
 Basic cluster compression algorithm
 NPO-14816 880-10291 09
 Image-based information, communication, and retrieval
 NPO-14893 880-10293 09
 An image-data-compression algorithm
 NPO-14496 880-10438 09
 Evaluating computer-drawn ground-cover maps
 KSC-11195 880-10555 09
- LANGUAGE PROGRAMMING**
 DDL: Digital systems design language
 M-FS-25352 880-10163 01
- LAPLACE TRANSFORMATION**
 An approximation for inverse Laplace transforms
 MSC-18867 880-10553 09
- LARGE SCALE INTEGRATION**
 A general logic structure for custom LSI's
 NPO-14410 880-10118 08
 LSI logic for phase-control rectifiers
 M-FS-25208 880-10161 01
 Optimizing costs of VLSI circuits
 M-FS-25348 880-10281 08
 An automated oxide and diffusion facility for IC's
 M-FS-25357 880-10282 08
- LASER APPLICATIONS**
 Laser-fluorescence measurement of marine algae
 LANGLEY-12282 880-10213 05
 Changes in 'thermal lens' measure diffusivity
 NPO-14657 880-10218 06
 Simultaneous measurement of three atmospheric pollutants
 NPO-14828 880-10359 04
 Laser beam methane detector
 NPO-14929 880-10363 04
- LASER DOPPLER VELOCIMETERS**
 Noise suppression in forward-scattering optical instruments
 LANGLEY-12730 880-10324 03
- LASER HEATING**
 Changes in 'thermal lens' measure diffusivity
 NPO-14657 880-10218 06
- LASER MODE LOCKING**
 Tunable pulsed carbon dioxide laser
 NPO-14984 880-10458 03

LASER OUTPUTS

- Powerful copper chloride laser
NPO-14782 B80-10330 03
Gas-laser power monitor
LANGLEY-12682 B80-10455 03

LASER RANGE FINDERS

- Short-range self-pulsed optical radar
NPO-14901 B80-10459 03

LASERS

- Large-volume multiple-path
nuclear-pumped laser
LANGLEY-12592 B80-10044 03
Far-field radiation pattern of tunable
diode lasers
LANGLEY-12631 B80-10177 03
Ohmic contact to GaAs semiconductor
LANGLEY-12466 B80-10263 08
Diplexer for laser-beam heterodyne
receiver
GSFC-12589 B80-10329 03
Tunable pulsed carbon dioxide laser
NPO-14984 B80-10458 03

LATCHES

- Clamshell door system
MSC-18468 B80-10101 07

LEG (ANATOMY)

- Microprocessor-controlled ultrasonic
plethysmograph
MSC-18759 B80-10500 05

LENSES

- Fresnel lenses for ultrasonic inspection
MSC-18469 B80-10217 06
Acoustic lens is gas-filled
NPO-14757 B80-10376 06

LEVEL (HORIZONTAL)

- Heat-pipe sensor for remote leveling
GSFC-12095 B80-10248 07

LEVEL (QUANTITY)

- Fast response cryogen level sensor
MSC-18697 B80-10374 06
Fiber optic level sensor for cryogenics
MSC-18674 B80-10375 06

LIFE (DURABILITY)

- Predicting lifetime of cast parts
M-FS-19549 B80-10228 06

LIFT

- Three-dimnsional potential flow
LANGLEY-12623 B80-10090 06

LIGHT BEAMS

- Multibeam collimator uses prism stack
GSFC-12608 B80-10452 03

LIGHT SCATTERING

- Noise suppression in forward-scattering
optical instruments
LANGLEY-12730 B80-10324 03

LIGHT TRANSMISSION

- Safely splicing glass optical fibers
KSC-11107 B80-10134 08

LIGHTING EQUIPMENT

- Direct-current converter for
gas-discharge lamps
MSC-18407 B80-10156 01

LINEARIZATION

- Linearizing magnetic-amplifier dc
transducer output
NPO-14617 B80-10167 02

LINKAGES

- Lock for hydraulic actuators
MSC-18853 B80-10530 07

LIQUEFIED GASES

- Fiber optic level sensor for cryogenics
MSC-18674 B80-10375 06

LIQUEFIED NATURAL GAS

- Detection of tanker defects with infrared
thermography
LANGLEY-12655 B80-10221 06

- Laser beam methane detector
NPO-14929 B80-10363 04

LIQUID HELIUM

- Cryogenic-storage-tank support
MSC-14848 B80-10258 07

LIQUID NITROGEN

- Lightweight cryogenic vessel
NPO-14794 B80-10548 08

LIQUIDS

- An equation of state for liquids
NPO-14821 B80-10174 03

LITHIUM FLUORIDES

- Cleaving machine for hard crystals
GSFC-12584 B80-10401 07

LITHOGRAPHY

- An automated photolithography facility
for IC's
M-FS-25073 B80-10140 08

LIVESTOCK

- Beef grading by ultrasound
NPO-14812 B80-10505 05

LOAD DISTRIBUTION (FORCES)

- Flush-mounting technique for composite
beams
LANGLEY-12389 B80-10121 08

LOAD TESTS

- Eddy-current sensor measures bolt
loading
M-FS-19486 B80-10079 06
Measuring ball-bearing loads
M-FS-19505 B80-10102 07

LOADS (FORCES)

- Self-adjusting mechanical snubbing link
MSC-16134 B80-10246 07

LOCKS (FASTENERS)

- Bayonet plug with ramp-activated lock
MSC-18526 B80-10247 07
Lock for hydraulic actuators
MSC-18853 B80-10530 07

LOGIC CIRCUITS

- Independent synchronizer for digital
decoders
MSC-16723 B80-10004 01
LSI logic for phase-control rectifiers
M-FS-25208 B80-10161 01
CADAT logic simulation program
M-FS-25183 B80-10432 08
CADAT test pattern generator
M-FS-25066 B80-10433 08
CADAT field-effect-transistor simulator
M-FS-25067 B80-10434 08
CADAT place-and-routine in two
dimensions
M-FS-25058 B80-10435 08
CADAT multiport placement and
routing
M-FS-25065 B80-10436 08
CADAT integrated circuit mask analysis
M-FS-25054 B80-10437 08
CADAT network translator
M-FS-25055 B80-10551 08
CADAT integrated circuit artwork
program
M-FS-25017 B80-10552 08

LOGIC DESIGN

- A general logic structure for custom
LSI'S
NPO-14410 B80-10118 08

LOOPS

- Improved code-tracking loop
MSC-18035 B80-10034 02

LOW FREQUENCIES

- Converting a digital filter to its analog
equivalent
MSC-18587 B80-10313 02

LOW GRAVITY MANUFACTURING

- Reduced gravity favors columnar crystal
growth
M-FS-25205 B80-10366 04

LOW PASS FILTERS

- Smoothing the output from a DAC
FRC-11025 B80-10160 01

LOW TEMPERATURE

- Spiral-wound gasket forms
low-temperature seal
LANGLEY-12315 B80-10543 08

LUBRICANTS

- Lubrication handbook
M-FS-25158 B80-10210 04

LUBRICATING OILS

- Additive improves engine-oil
performance
GSFC-12327 B80-10065 04

LUBRICATION

- Additive improves engine-oil
performance
GSFC-12327 B80-10065 04

- Design considerations for mechanical
face seals

- LEWIS-13146 B80-10233 06

- High-performance, multiroller traction
drive

- LEWIS-13347 B80-10244 07

LUMINAIRES

- Energy-reduction concept for
incandescent lamps
MSC-18757 B80-10325 03
Solar cell is housed in light-bulb
enclosure
LEWIS-13418 B80-10442 01

M**MACHINE ORIENTED LANGUAGES**

- DDL:Digital systems design language
M-FS-25352 B80-10163 01

MACHINE TOOLS

- Precision filament cutter
LANGLEY-12564 B80-10093 07
Abrasive drill for resilient materials
LEWIS-13411 B80-10402 07

MACHINE-INDEPENDENT PROGRAMS

- A universal structured-design diagrammer
LANGLEY-12548 B80-10558 09

MACHINING

- Cryogenic machining of polyurethane
foam
MSC-18572 B80-10123 08
A construction technique for wind tunnel
models
LANGLEY-12710 B80-10381 06

MAGNETIC AMPLIFIERS

- Linearizing magnetic-amplifier dc
transducer output
NPO-14617 B80-10167 02

MAGNETIC CORES

- Producing gapped-ferrite transformer
cores
NPO-14715 B80-10273 08
Improved magnetic material analyzer
LEWIS-13493 B80-10384 06

MAGNETIC MATERIALS

- Improved magnetic material analyzer
LEWIS-13493 B80-10384 06

MAGNETIC MEASUREMENT

- Improved LEEM ranges over four
decades
LANGLEY-12706 B80-10508 06

MAGNETIC TRANSDUCERS

Cable-splice detector
ARC-11291 880-10074 06
Transducer for extreme temperatures and pressures
MSC-18778 880-10510 06

MAGNETOMETERS

Improved LEEM ranges over four decades
LANGLEY-12706 880-10508 06

MAGNETOSPHERE

NASA charging analyzer program
LEWIS-12973 880-10058 03

MAINTENANCE

Honing fixture for welded electrodes
M-FS-19537 880-10278 08
Repairing high-temperature glazed tiles
MSC-18736 880-10536 08

MANAGEMENT

SYSTEMS

User's guide to SFTRAN
LEWIS-13172 880-10143 09

MANAGEMENT SYSTEMS

NASA PERT time II
LEWIS-13145 880-10286 09

MANIPULATORS

Mechanical hand for gripping objects
M-FS-23692 880-10243 07
Electromechanical slip sensor
NPO-14654 880-10253 07
Remote manipulator with force feed-back
ARC-11272 880-10408 07

MANUFACTURING

Automated ion implantation for IC's
M-FS-25193 880-10139 08
An automated photolithography facility for IC's
M-FS-25073 880-10140 08
Producing gapped-ferrite transformer cores
NPO-14715 880-10273 08
Determining manufacturing cost from product complexity
M-FS-25371 880-10439 09

MANY BODY PROBLEM

Equations of motion for coupled n-body systems
GSFC-12407 880-10083 06

MAPS

Evaluating computer-drawn ground-cover maps
KSC-11195 880-10555 09

MARINE TECHNOLOGY

Laser-fluorescence measurement of marine algae
LANGLEY-12282 880-10213 05

MASERS

Integral storage-bulb and microwave cavity for masers
GSFC-12542 880-10186 03

MASS DISTRIBUTION

Interchangeable spring modules for inertia measurements
LANGLEY-12402 880-10386 06

MATERIAL BALANCE

Interchangeable spring modules for inertia measurements
LANGLEY-12402 880-10386 06

MATERIALS HANDLING

Transferring small samples of viscous liquid
MSC-18533 880-10069 04
Mechanical hand for gripping objects
M-FS-23692 880-10243 07

Remote manipulator with force feed-back
ARC-11272 880-10408 07
Soft container for explosive nuts
MSC-18871 880-10532 07
Lightweight cryogenic vessel
NPO-14794 880-10548 08

MATERIALS RECOVERY

Chlorinolysis reclaims rubber of waste tires
NPO-14935 880-10365 04
Recycling paper-pulp waste liquors
NPO-14797 880-10492 04

MATERIALS TESTS

Temperature controller adapts to fatigue tester
LANGLEY-12393 880-10378 06
Environmental testing under load
LANGLEY-12602 880-10379 06

MATHEMATICAL MODELS

Models of MOS and SOS devices
M-FS-25153 880-10141 08

MATRICES (MATHEMATICS)

Calculating linear A, B, C, and D matrices from a nonlinear dynamic engine simulation
LEWIS-13250 880-10520 06

MAXIMUM LIKELIHOOD ESTIMATES

Estimation of incomplete multinomial data
LANGLEY-12593 880-10146 09

MEASUREMENT

Measuring radiation effects on MOS capacitors
NPO-14700 880-10227 06

MEASURING INSTRUMENTS

Measuring water properties from a moving boat
LANGLEY-12325 880-10073 05
Eddy-current sensor measures bolt loading
M-FS-19486 880-10079 06
Measuring ball-bearing loads
M-FS-19505 880-10102 07
Electromechanical slip sensor
NPO-14654 880-10253 07
Improved magnetic material analyzer
LEWIS-13493 880-10384 06

MECHANICAL DRIVES

Design considerations for mechanical face seals
LEWIS-13146 880-10233 06
High-performance, multiroller traction drive
LEWIS-13347 880-10244 07
Compact table-tilting mechanism
NPO-14800 880-10411 07
Torque-wrench extension
MSC-18769 880-10414 07

MECHANICAL PROPERTIES

Multiple-creep-test apparatus
GSFC-12561 880-10080 06
Examining graphite reinforcement in composites
MSC-19594 880-10122 08
Efficient measurement of shear properties of fiber composites
LEWIS-13011 880-10216 06
Environmental testing under load
LANGLEY-12602 880-10379 06

MECHANICAL SHOCK

Self-adjusting mechanical snubbing link
MSC-16134 880-10246 07

MEDICAL ELECTRONICS

Testing EKG electrodes on-line
MSC-18696 880-10212 05

Improved ureteral stone fragmentation catheter
NPO-14745 880-10370 05

MEDICAL EQUIPMENT

Temperature controller for hyperthermia devices
LANGLEY-12528 880-10072 05
Cardiopulmonary data-acquisition system
MSC-18783 880-10499 05
Microprocessor-controlled ultrasonic plethysmograph
MSC-18759 880-10500 05
Microprocessor-based cardiometer
MSC-18775 880-10501 05
Fiber-optics couple arthroscope to TV
LANGLEY-12718 880-10504 05

MERCURY LAMPS

Direct-current converter for gas-discharge lamps
MSC-18407 880-10156 01

METAL BONDING

Room-temperature adhesive for high-temperature use
MSC-16930 880-10129 08
Time-shaped RF brazing
MSC-18617 880-10272 08
Arc spraying solderable tabs to glass
NPO-14853 880-10544 08

METAL COATINGS

Improved metallic and thermal barrier coatings
LEWIS-13324 880-10353 04

METAL MATRIX COMPOSITES

Composites for aeropropulsion
LEWIS-13438 880-10209 04

METAL OXIDE SEMICONDUCTORS

Models of MOS and SOS devices
M-FS-25153 880-10141 08
Model for MOS field-time-dependent breakdown
NPO-14701 880-10162 01
Measuring radiation effects on MOS capacitors
NPO-14700 880-10227 06
Progress in MOSFET double-layer metalization
M-FS-25239 880-10280 08
Improving MOS minority-carrier lifetime
NPO-14738 880-10301 01

METAL SURFACES

Detecting contaminants by ultraviolet photography
M-FS-25296 880-10229 06

METAL-METAL BONDING

Ion-beam cleaning for cold welds
LEWIS-12982 880-10115 08

METALLIZING

Double metalization for VLSI
M-FS-25149 880-10261 08
Progress in MOSFET double-layer metalization
M-FS-25239 880-10280 08

METALS

Ion-beam etching enhances adhesive bonding
LEWIS-13028 880-10128 08

METASTABLE STATE

Containerless materials processing in the laboratory
M-FS-25242 880-10059 04

METEOROLOGICAL FLIGHT

Airborne meteorological data-collection system
LEWIS-13346 880-10314 02

METEOROLOGICAL SATELLITES

Microcomputer-based doppler systems
for weather monitoring
GSFC-12448 B80-10166 02

METEOROLOGY

Instrument measures cloud cover
NPO-14936 B80-10514 06

METHANE

Methane/air flames in a concentric tube
combustor
LEWIS-13388 B80-10211 04
Laser beam methane detector
NPO-14929 B80-10363 04

METHOD OF CHARACTERISTICS

Flow field in supersonic
mixed-compression inlets
LEWIS-13279 B80-10088 06

MICROELECTRONICS

Improving MOS minority-carrier lifetime
NPO-14738 B80-10301 01

MICROMETERS

Electronic depth micrometer
KSC-11181 B80-10385 06

MICROORGANISMS

Improved microbe detection in water
samples
LANGLEY-12709 B80-10502 05

MICROPARTICLES

Recording fluid currents by holography
M-FS-25373 B80-10222 06

MICROPOROSITY

Sealing micropores in thin castings
MSC-18623 B80-10428 08

MICROPROCESSORS

Microprocessor systems for industrial
process control
NPO-14661 B80-10131 08

MICROSCOPES

Vise holds specimens for microscope
MSC-18690 B80-10098 07

MICROSTRUCTURE

Reduced gravity favors columnar crystal
growth
M-FS-25205 B80-10366 04

MICROWAVE ANTENNAS

Cavity-backed spiral-slot antenna
MSC-18532 B80-10448 02

MICROWAVE COUPLING

One-step microwave foaming and
curing
MSC-18707 B80-10420 08
High-power dual-directional coupler
NPO-14713 B80-10447 02

MICROWAVE EQUIPMENT

Computer-controlled warmup circuit
NPO-14815 B80-10155 01
Integral storage-bulb and microwave
cavity for masers
GSFC-12542 B80-10186 03
Portable zero-delay assembly
NPO-14671 B80-10316 02

MICROWAVE SWITCHING

Fast microwave switching power
divider
GSFC-12420 B80-10295 01

MICROWAVE TRANSMISSION

High-power solid-state microwave
transmitter
NPO-14803 B80-10296 01

MICROWAVE TUBES

Superconducting gyrocon would be very
efficient
NPO-14975 B80-10446 02

MICROWAVES

Trislot-cavity microstrip antenna
MSC-18793 B80-10450 02

MILLING (MACHINING)

Chemical-milling solution for invar alloy
M-FS-25365 B80-10113 08
'Grinding' cavities in polyurethane foam
MSC-18564 B80-10124 08

MINES (EXCAVATIONS)

Drilling side holes from a borehole
NPO-14465 B80-10066 04
Underground Coal Mining
NPO-14704 B80-10071 04

MINIATURIZATION

Miniature personal UV solar dosimeter
LANGLEY-12469 B80-10321 03

MINICOMPUTERS

Low-cost LANDSAT processing system
M-FS-25396 B80-10285 09
Common data buffer
KSC-11048 B80-10303 02

MINING

Measuring coal deposits by radar
M-FS-23922 B80-10060 04
Detecting a coal/shale interface
M-FS-23720 B80-10061 04
Position monitor for mining machines
M-FS-25342 B80-10157 01

MINORITY CARRIERS

Improving MOS minority-carrier lifetime
NPO-14738 B80-10301 01

MIRRORS

Detecting surface faults on solar
mirrors
NPO-14684 B80-10230 06
Low-cost concentrating mirrors
NPO-14962 B80-10542 08

MISSION PLANNING

Goddard mission analysis system
GSFC-12392 B80-10144 09

MIST

Aeolol lasts up to six minutes
NPO-14947 B80-10360 04

MIXING

Quick mixing of epoxy components
MSC-18731 B80-10415 07

MODAL RESPONSE

Rotor transient analysis
LEWIS-13230 B80-10259 07

MODULES

Versatile modular scaffolds
GSFC-12606 B80-10406 07

MOLDING MATERIALS

Producing gapped-ferrite transformer
cores
NPO-14715 B80-10273 08

MOLDS

Forming complex cavities in clear
plastic
LEWIS-13412 B80-10267 08

MOLYBDENUM SULFIDES

Self-lubricating gearset
MSC-18801 B80-10546 08

MONITORS

Measuring coal deposits by radar
M-FS-23922 B80-10060 04
Fast-response atmospheric-pollutant
monitor
LANGLEY-12317 B80-10062 04
Linearizing magnetic-amplifier dc
transducer output
NPO-14617 B80-10167 02

MOTORS

A linear magnetic motor and generator
GSFC-12518 B80-10257 07

MOUNTING

New mounting improves solar-cell
efficiency
NPO-14467 B80-10039 03

Compact positioning flange

MSC-14876 B80-10104 07

Flush-mounting technique for composite
beams

LANGLEY-12389 B80-10121 08

Compact table-tilting mechanism
NPO-14800 B80-10411 07

MULTICHANNEL COMMUNICATION

28-Channel rotary transformer
NPO-14861 B80-10300 01

MULTIPHASE FLOW

Reduced viscosity interpreted for
fluid/gas mixtures
NPO-14976 B80-10457 03

MULTIPLEXING

Efficient telemetry format
NPO-13679 B80-10142 09
Multiplexed logic controls solar-heating
system
M-FS-25287 B80-10318 03

MULTIPLIERS

Four-quadrant CCD analog multiplier
LANGLEY-12332 B80-10305 02
Monolithic four-quadrant multiplier
LANGLEY-12330A B80-10306 02

MULTIPROCESSING (COMPUTERS)

Online assessment of a distributed
processor
KSC-11124 B80-10037 02
Simultaneous disk storage and retrieval
KSC-11167 B80-10304 02

MUSCULAR STRENGTH

Manual for physical fitness
MSC-18915 B80-10372 05

N**NACELLES**

Stream tube curvature analysis
LANGLEY-11535 B80-10235 06

NEOPLASMS

Temperature controller for hyperthermia
devices
LANGLEY-12528 B80-10072 05

NEUTRON BEAMS

Large-volume multiple-path
nuclear-pumped laser
LANGLEY-12592 B80-10044 03

NICKEL ALLOYS

Etchant for incoloy-903 welds
M-FS-19378 B80-10112 08
A precoat prevents ceramic stopoffs from
spalling
M-FS-19495 B80-10136 08
Low cost high temperature, duplex
coating for superalloys
LEWIS-13497 B80-10352 04

NICKEL COATINGS

A precoat prevents ceramic stopoffs from
spalling
M-FS-19495 B80-10136 08

NITRIC ACID

Chemical-milling solution for invar alloy
M-FS-25365 B80-10113 08

NITROGEN

Removing freon gas from hydraulic
fluid
MSC-18740 B80-10494 04

NOISE REDUCTION

Suppressing buzz-saw noise in jet
engines
LANGLEY-12645 B80-10220 06
Linear stochastic optimal control and
estimation problem
LEWIS-13206 B80-10287 09

Noise suppression in forward-scattering optical instruments
 LANGLEY-12730 B80-10324 03
 Kilovolt vacuum feed through is less noisy
 NPO-14802 B80-10426 08

NONDESTRUCTIVE TESTS
 X-ray technique verifies weld-root fusion
 M-FS-19468 B80-10111 08
 Digital enhancement of X-rays for NDT
 KSC-11118 B80-10232 06

NONLINEAR SYSTEMS
 Plastic deformation of engines and other nonlinear structures
 M-FS-23814 B80-10399 06

NONLINEARITY
 Linearizing magnetic-amplifier dc transducer output
 NPO-14617 B80-10167 02

NONNEWTONIAN FLOW
 Reduced viscosity interpreted for fluid/gas mixtures
 NPO-14976 B80-10457 03

NORMAL DENSITY FUNCTIONS
 An approximation to student's t-distribution
 LANGLEY-12238 B80-10284 09

NOSE CONES
 Cap protects aircraft nose cone
 LANGLEY-12367 B80-10362 04

NOTCH TESTS
 Predicting lifetime of cast parts
 M-FS-19549 B80-10228 06

NOZZLE DESIGN
 Predicting propulsion system drag
 LANGLEY-12619 B80-10238 06

NOZZLE FLOW
 Potential flow in two-dimensional deflected nozzles
 LEWIS-13461 B80-10523 06

NOZZLE GEOMETRY
 Potential flow in two-dimensional deflected nozzles
 LEWIS-13461 B80-10523 06

NUCLEAR REACTIONS
 Large-volume multiple-path nuclear-pumped laser
 LANGLEY-12592 B80-10044 03

NUCLEAR REACTORS
 Removal of hydrogen bubbles from nuclear reactors
 LANGLEY-12597 B80-10205 04

NUMERICAL ANALYSIS
 Numerical tracing of electron trajectories
 GSFC-12535 B80-10057 03
 Systems improved numerical differencing analyzer
 MSC-18597 B80-10148 09

NUMERICAL CONTROL
 Microprocessor systems for industrial process control
 NPO-14661 B80-10131 08
 Computer-controlled warmup circuit
 NPO-14815 B80-10155 01
 Final report on development of a programmable controller
 M-FS-25388 B80-10189 03
 Rain, fog, and clouds for aircraft simulators
 ARC-11158 B80-10383 06

NUMERICAL INTEGRATION
 Shell theory automated for rotational structures
 M-FS-23027 B80-10089 06

NUTS (FASTENERS)
 Locknut preload tool
 MSC-16153 B80-10245 07
 Wrench for smooth or damaged fasteners
 MSC-18772 B80-10416 07

O

OCEAN SURFACE
 Oceanic-wave-measurement system
 M-FS-23862 B80-10224 06

OIL ADDITIVES
 Additive improves engine-oil performance
 GSFC-12327 B80-10065 04

OIL EXPLORATION
 Drilling side holes from a borehole
 NPO-14465 B80-10066 04

OIL RECOVERY
 Downhole pressure sensor
 NPO-14729 B80-10223 06
 Sidewall penetrator for oil wells
 NPO-14306 B80-10528 07

OPENINGS
 Clamshell door system
 MSC-18468 B80-10101 07

OPERATIONAL AMPLIFIERS
 Low-resistance continuity tester
 NPO-14881 B80-10445 01

OPTICAL COMMUNICATION
 Safely splicing glass optical fibers
 KSC-11107 B80-10134 08
 Diplexer for laser-beam heterodyne receiver
 GSFC-12589 B80-10329 03
 Fiber optics transmit clock signal more reliably
 NPO-14749 B80-10456 03

OPTICAL DATA PROCESSING
 Better-quality CCD-array images
 NPO-14426 B80-10168 02

OPTICAL EQUIPMENT
 Optical calibrator for TDL spectrometers
 GSFC-12562 B80-10178 03
 Noise suppression in forward-scattering optical instruments
 LANGLEY-12730 B80-10324 03
 Multibeam collimator uses prism stack
 GSFC-12608 B80-10452 03

OPTICAL FILTERS
 Acoustically-tuned optical spectrometer
 HQN-10924 B80-10326 03

OPTICAL MEASUREMENT
 Detecting surface faults on solar mirrors
 NPO-14684 B80-10230 06

OPTICAL MEASURING INSTRUMENTS
 Noise suppression in forward-scattering optical instruments
 LANGLEY-12730 B80-10324 03

OPTICAL RADAR
 Short-range self-pulsed optical radar
 NPO-14901 B80-10459 03

OPTICAL REFLECTION
 Large-volume multiple-path nuclear-pumped laser
 LANGLEY-12592 B80-10044 03

OPTICAL TRACKING
 An adjustable solar concentrator
 NPO-14710 B80-10043 03
 Tracking falling objects
 NPO-14813 B80-10328 03

OPTICAL TRANSITION
 Fluorescent radiation converter
 GSFC-12528 B80-10180 03

OPTICS
 Improved multispectral solar cell array
 HQN-10937 B80-10184 03

OPTIMIZATION
 Structural design with stress and displacement constraints
 M-FS-25235 B80-10521 06

ORTHONORMAL FUNCTIONS
 An approximation for inverse Laplace transforms
 MSC-18867 B80-10553 09

OSCILLATORS
 Ultrastable automatic frequency control
 MSC-18679 B80-10294 01
 Simple JFET oscillator
 GSFC-12555 B80-10443 01

OUTGASSING
 All-inorganic spark-chamber frame
 GSFC-12354 B80-10265 08

Ovens
 An oven for many thermocouple reference junctions
 FRC-10112 B80-10506 06

OXIDATION
 REDOX electrochemical energy storage
 LEWIS-13398 B80-10064 04
 An automated oxide and diffusion facility for IC's
 M-FS-25357 B80-10282 08

OXIDATION RESISTANCE
 Resin char oxidation retardant for composites
 LEWIS-13275 B80-10354 04

P

PACKAGING
 Cost models and economical packaging of LSI's
 M-FS-25359 B80-10138 08

PACKINGS (SEALS)
 Spiral-wound gasket forms low-temperature seal
 LANGLEY-12315 B80-10543 08

PALLADIUM
 Removal of hydrogen bubbles from nuclear reactors
 LANGLEY-12597 B80-10205 04
 Electrically conductive palladium-containing polyimide films
 LANGLEY-12629 B80-10357 04

PANELS
 Testing panels in tension and flexure
 M-FS-25421 B80-10380 06

PANORAMIC SCANNING
 Rotatable prism for pan and tilt
 LANGLEY-12388 B80-10041 03

PAPERS
 Recycling paper-pulp waste liquors
 NPO-14797 B80-10492 04

PARABOLIC BODIES
 Offset paraboloidal solar concentrator
 NPO-14846 B80-10320 03

PARABOLIC REFLECTORS
 Low-cost concentrating mirrors
 NPO-14962 B80-10542 08

PARALLEL PROCESSING (COMPUTERS)
 Input/output interface module
 MSC-18180 B80-10159 01

PARAMETERIZATION

Determining manufacturing cost from product complexity
M-FS-25371 880-10439 09

PARTICLE DENSITY (CONCENTRATION)

Photographic measurement of droplet density
M-FS-25326 880-10182 03

PARTICULATE SAMPLING

Improved particulate-sampling filter
NPO-14801 880-10271 08

PASSIVITY

Photonitride passivating coating for IC's
M-FS-25401 880-10260 08
Silicon nitride passivation of IC's
M-FS-25309 880-10279 08
Passivation layer for steel substrate of solar cell
NPO-14961 880-10541 08

PENETRATION

Sidewall penetrator for oil wells
NPO-14306 880-10528 07

PENETROMETERS

Detecting a coal/shale interface
M-FS-23720 880-10061 04

PERFORMANCE PREDICTION

NASA PERT time II
LEWIS-13145 880-10286 09

PERFORMANCE TESTS

Indoor tests of the concentric-tube solar collector
M-FS-25390 880-10050 03
Outdoor tests of the concentric-tube collector
M-FS-25398 880-10191 03
Finned-absorber solar collector
M-FS-25385 880-10193 03
A test program for solar collectors
M-FS-25433 880-10194 03
Operational tests of a solar-energy system in Georgia
M-FS-25420 880-10195 03
Operational tests of a solar energy system Florida site
M-FS-25423 880-10196 03
A hot-water system tested onsite--Togus, Maine
M-FS-25435 880-10201 03

PERMEABILITY

Reduced hydrogen permeability at high temperatures
LEWIS-13485 880-10364 04

PHASE CONTROL

Improved power factor controller
M-FS-25323 880-10149 01
Energy saving in ac generators
M-FS-25302 880-10150 01
LSI logic for phase-control rectifiers
M-FS-25208 880-10161 01

PHASE LOCKED SYSTEMS

Continuous control of phase-locked-loop bandwidth
MSC-16684 880-10008 01
Microprocessor control for phase-lock receiver
NPO-14438 880-10033 02
Torque control for electric motors
MSC-18635 880-10170 02
Fiber optics transmit clock signal more reliably
NPO-14749 880-10456 03

PHASE SHIFT

Timing signal propagates without phase shift
MSC-18777 880-10449 02

PHASE SHIFT KEYING

Microprocessor-based detector for PSK commands
NPO-14440 880-10036 02

PHASE TRANSFORMATIONS

Combined photovoltaic and thermal-storage module
NPO-14591 880-10327 03

PHOTOCHEMICAL REACTIONS

UV actinometer film
NPO-14479 880-10179 03
Photonitride passivating coating for IC's
M-FS-25401 880-10260 08

PHOTOCONDUCTIVITY

Bulk lifetime indicates surface contamination
NPO-14966 880-10511 06

PHOTOELECTRIC CELLS

Solar cell is housed in light-bulb enclosure
LEWIS-13418 880-10442 01

PHOTOGRAPHIC FILM

Automatic 35 mm slide duplicator
LEWIS-13399 880-10249 07

PHOTOGRAPHIC MEASUREMENT

Photographic measurement of droplet density
M-FS-25326 880-10182 03

PHOTOGRAPHIC PROCESSING

Automatic 35 mm slide duplicator
LEWIS-13399 880-10249 07
Heat for film processing from solar energy
M-FS-25444 880-10331 03

PHOTOGRAPHIC RECORDING

Recording fluid currents by holography
M-FS-25373 880-10222 06

PHOTOGRAPHY

Camera add-on records time of exposure
LANGLEY-12635 880-10183 03

PHOTOMETERS

Photometer used for response time measurement
MSC-18712 880-10317 02
Gas-laser power monitor
LANGLEY-12682 880-10455 03
Compact infrared detector
NPO-14864 880-10515 06

PHOTOPRODUCTION

Photoproduction of halogens using platinized TiO₂
LANGLEY-12713 880-10491 04

PHOTOVOLTAIC CELLS

Photoelectrochemical cell with nondissolving anode
LANGLEY-12591 880-10038 03
A survey of photovoltaic systems
M-FS-25397 880-10187 03
Multijunction high-voltage solar cell
LEWIS-13400 880-10441 01

PHOTOVOLTAIC CONVERSION

Combined photovoltaic and thermal-storage module
NPO-14591 880-10327 03

PHYSICAL EXERCISE

Manual for physical fitness
MSC-18915 880-10372 05

PHYSICAL FITNESS

Manual for physical fitness
MSC-18915 880-10372 05

PHYSIOLOGICAL TESTS

Miniaturized physiological data telemetry system
MSC-18804 880-10371 05

Cardiopulmonary system
MSC-18783 880-10499 05

PHYSIOLOGY

Microprocessor-controlled ultrasonic plethysmograph
MSC-18759 880-10500 05

PIERCING

Abrasive drill for resilient materials
LEWIS-13411 880-10402 07

PIEZOELECTRIC TRANSDUCERS

Low-cost calibration of acoustic locators
LANGLEY-12632 880-10185 03

PILOT TRAINING

Rain, fog, and clouds for aircraft simulators
ARC-11158 880-10383 06

PIPES (TUBES)

Tubing cutter for tight spaces
MSC-18538 880-10099 07
Flared tube attachment fitting
MSC-18416 880-10240 07
Tube flare inspection tool
MSC-19636 880-10241 07
Test fittings for dimensionally critical tubes
NPO-14399 880-10252 07
Sleeve puller salvages welded tubes
MSC-18686 880-10256 07
Shrinking plastic tubing and nonstandard diameters
MSC-18430 880-10268 08
Heat-shrinkable sleeve aids in insulating universal joints
MSC-18685 880-10270 08
Tube-welder aids
MSC-18687 880-10277 08
A construction technique for wind tunnel models
LANGLEY-12710 880-10381 06
Reshaping tube ends for welding
MSC-18462 880-10407 07
Method for shaping polyethylene tubing
MSC-18771 880-10423 08

PLASTIC COATINGS

UV actinometer film
NPO-14479 880-10179 03

PLASTIC DEFORMATION

Plastic deformation of engines and other nonlinear structures
M-FS-23814 880-10399 06

PLASTICIZERS

Plasticizer for polyimide composites
LANGLEY-12642 880-10206 04

PLASTICS

Ion-beam etching enhances adhesive bonding
LEWIS-13028 880-10128 08
Hybrid polymer microspheres
NPO-14462 880-10208 04
Forming complex cavities in clear plastic
LEWIS-13412 880-10267 08
Shrinking plastic tubing and nonstandard diameters
MSC-18430 880-10268 08
Plastic welder
LANGLEY-12540 880-10274 08

PLATINUM

Removal of hydrogen bubbles from nuclear reactors
LANGLEY-12597 880-10205 04
Photoproduction of halogens using platinized TiO₂
LANGLEY-12713 880-10491 04

PLETHYSMOGRAPHY

Microprocessor-controlled ultrasonic
plethysmograph
MSC-18759 880-10500 05

PLUGS

Bayonet plug with ramp-activated lock
MSC-18526 880-10247 07

PNEUMATIC EQUIPMENT

Method for shaping polyethylene tubing
MSC-18771 880-10423 08
Pneumatic-power supply
MSC-18855 880-10527 07

POLARIMETERS

Ultraviolet spectrometer/polarimeter
M-FS-25298 880-10042 03

POLARIZATION (WAVES)

Antenna feed for linear and circular
polarization
NPO-14810 880-10297 01

POLARIZED ELECTROMAGNETIC RADIATION

Receiving signals of any polarization
NPO-14836 880-10315 02

POLARIZED RADIATION

Dual-frequency bidirectional antenna
GSFC-12501 880-10154 01

POLISHING

Honing fixture for welded electrodes
M-FS-19537 880-10278 08

POLLUTION MONITORING

Measuring water properties from a
moving boat
LANGLEY-12325 880-10073 05
Simultaneous measurement of three
atmospheric pollutants
NPO-14828 880-10359 04
Improved microbe detection in water
samples
LANGLEY-12709 880-10502 05

POLYAMIDE RESINS

One-step microwave foaming and
curing
MSC-18707 880-10420 08

POLYCARBONATES

Cap protects aircraft nose cone
LANGLEY-12367 880-10362 04

POLYETHYLENES

Method for shaping polyethylene tubing
MSC-18771 880-10423 08

POLYIMIDE RESINS

A new family of fire-resistant foams
MSC-16921 880-10418 08
Modified fire-resistant foams for seat
cushions
MSC-18704 880-10419 08
Rigid fire-resistant foams for walls and
floors
MSC-18708 880-10421 08

POLYIMIDES

Plasticizer for polyimide composites
LANGLEY-12642 880-10206 04
Electrically conductive
palladium-containing polyimide films
LANGLEY-12629 880-10357 04
Aluminum ions enhance polyimide
adhesive
LANGLEY-12640 880-10358 04
Self-lubricating gearset
MSC-18801 880-10546 08

POLYMER CHEMISTRY

Heat resistant polyphosphazene
polymers
ARC-11176 880-10350 04

POLYMERIC FILMS

UV actinometer film
NPO-14479 880-10179 03

POLYPHENYLS

Room-temperature adhesive for
high-temperature use
MSC-16930 880-10129 08

POLYQUINOXALINES

Room-temperature adhesive for
high-temperature use
MSC-16930 880-10129 08

POLYURETHANE FOAM

Cryogenic machining of polyurethane
foam
MSC-18572 880-10123 08
'Grinding' cavities in polyurethane foam
MSC-18564 880-10124 08
Foam-filled cushions for sliding trays
MSC-18565 880-10127 08

POROUS MATERIALS

Compact, super heat exchanger
LEWIS-12441 880-10081 06

PORTABLE EQUIPMENT

Pneumatic-power supply
MSC-18855 880-10527 07

POSITION (LOCATION)

Crossed-grid charge locator
M-FS-25170 880-10010 01
Microcomputer-based doppler systems
for weather monitoring
GSFC-12448 880-10166 02

POSITION INDICATORS

Position monitor for mining machines
M-FS-25342 880-10157 01

POSITIONING

Compact positioning flange
MSC-14876 880-10104 07

POSITIONING DEVICES (MACHINERY)

Drill-motor holding fixture
MSC-18582 880-10108 07
Jig for assembling large composite
panels
LANGLEY-12394 880-10119 08

POTENTIAL FLOW

Three-dimensional potential flow
LANGLEY-12623 880-10090 06
Potential flow in two-dimensional
deflected nozzles
LEWIS-13461 880-10523 06

POWER CONDITIONING

Fast microwave switching power
divider
GSFC-12420 880-10295 01

POWER EFFICIENCY

Improved power factor controller
M-FS-25323 880-10149 01

POWER LIMITERS

Voltage controller/current limiter for ac
NPO-13061 880-10032 02

POWER LINES

Handtool assists in bundling cables
MSC-18567 880-10255 07

POWER SUPPLY CIRCUITS

Frequency-controlled voltage regulator
NPO-13633 880-10171 02
Efficient, lightweight dc/dc switching
converter
LEWIS-12809 880-10299 01

PREFORMS

Hot forming graphite/polyimide
structures
LANGLEY-12547 880-10422 08

PREIMPREGNATION

Plasticizer for polyimide composites
LANGLEY-12642 880-10206 04

PRESSING (FORMING)

Knife-edge seal for vacuum bagging
M-FS-24049 880-10135 08

PRESSURE

An equation of state for liquids
NPO-14821 880-10174 03

PRESSURE DISTRIBUTION

Three-dimensional potential flow
LANGLEY-12623 880-10090 06
Stream tube curvature analysis
LANGLEY-11535 880-10235 06

PRESSURE EFFECTS

Wind-simulation tester for solar
modules
NPO-14837 880-10517 06

PRESSURE REGULATORS

Pneumatic-power supply
MSC-18855 880-10527 07

PRESSURE SENSORS

Downhole pressure sensor
NPO-14729 880-10223 06

PRESSURE VESSELS

Integral storage-bulb and microwave
cavity for masers
GSFC-12542 880-10186 03

PRESSURE WELDING

Resistance welding graphite-fiber
composites
MSC-18534 880-10264 08

PRETREATMENT

Sealing micropores in thin castings
MSC-18623 880-10428 08

PRINTED CIRCUITS

Low-resistance continuity tester
NPO-14881 880-10445 01

PRISMS

Rotatable prism for pan and tilt
LANGLEY-12388 880-10041 03
Diplexer for laser-beam heterodyne
receiver
GSFC-12589 880-10329 03
Multibeam collimator uses prism stack
GSFC-12608 880-10452 03

PROBABILITY THEORY

Estimation of incomplete multinomial
data
LANGLEY-12593 880-10146 09

PROBLEM SOLVING

Linear stochastic optimal control and
estimation problem
LEWIS-13206 880-10287 09

PRODUCTION ENGINEERING

Microprocessor systems for industrial
process control
NPO-14661 880-10131 08

PRODUCTION MANAGEMENT

Determining manufacturing cost from
product complexity
M-FS-25371 880-10439 09

PRODUCTIVITY

Underground Coal Mining
NPO-14704 880-10071 04

PROGRAMMING LANGUAGES

User's guide to SFTRAN
LEWIS-13172 880-10143 09
Software design and documentation
language
NPO-14610 880-10145 09
MBASIC processor
NPO-14245 880-10290 09
OCCULT-ORSER complete
conversational user-language translator
GSFC-12604 880-10556 09

PROJECT MANAGEMENT

NASA PERT time II
LEWIS-13145 880-10286 09

PROPULSION SYSTEM CONFIGURATIONS

Predicting propulsion system drag
LANGLEY-12619 880-10238 06

PROPULSION SYSTEM PERFORMANCE

Calculating linear A, B, C, and D matrices from a nonlinear dynamic engine simulation
LEWIS-13250 B80-10520 06

PROTECTIVE COATINGS

Coatings for hybrid microcircuits
M-FS-25292 B80-10116 08
Alumina barrier for vacuum brazing
MSC-18528 B80-10125 08
A precoat prevents ceramic stopoffs from spalling
M-FS-19495 B80-10136 08
Low cost high temperature, duplex coating for superalloys
LEWIS-13497 B80-10352 04
Improved metallic and thermal barrier coatings
LEWIS-13324 B80-10353 04
Film coatings for contoured surfaces
MSC-18784 B80-10425 08
Passivation layer for steel substrate of solar cell
NPO-14961 B80-10541 08

PROXIMITY

The 3-D guidance system with proximity sensors
NPO-14521 B80-10250 07

PULMONARY CIRCULATION

Cardiopulmonary data-acquisition system
MSC-18783 B80-10499 05

PULSE COMPRESSION

Pulse-shaping circuit for laser excitation
NPO-14556 B80-10453 03

PULSE GENERATORS

Ultrasonic frequency analysis
LANGLEY-12697 B80-10377 06
Pulse-shaping circuit for laser excitation
NPO-14556 B80-10453 03

PULSED LASERS

Tunable pulsed carbon dioxide laser
NPO-14984 B80-10458 03

PUMPS

Dynamics of cavitating cascades and inducer pumps
M-FS-25399 B80-10392 06

PURIFICATION

Treating domestic wastewater with water hyacinths
M-FS-23964 B80-10368 05
Driving bubbles out of glass
M-FS-25414 B80-10496 04

PYLONS

Passive wing/store flutter suppression
LANGLEY-12468 B80-10219 06

PYROTECHNICS

Soft container for explosive nuts
MSC-18871 B80-10532 07

Q

QUALITY CONTROL

Controlling the shape of glass microballoons
M-FS-25230 B80-10266 08

R

RACKS (FRAMES)

Versatile modular scaffolds
GSFC-12606 B80-10406 07

RADAR

Short-range self-pulsed optical radar
NPO-14901 B80-10459 03

RADAR MEASUREMENT

Measuring coal deposits by radar
M-FS-23922 B80-10060 04

RADIANT HEATING

Operational tests of a solar energy system Florida site
M-FS-25423 B80-10196 03
A solar-energy system in Pennsylvania
M-FS-25427 B80-10197 03
Installation guidelines for the Pennsylvania system
M-FS-25424 B80-10198 03
A solar-energy system in Minnesota
M-FS-25428 B80-10199 03
Solar-energy system evaluation-Pennsylvania site
M-FS-25434 B80-10200 03
A hot-water system tested onsite--Togus, Maine
M-FS-25435 B80-10201 03
A reliable solar-heating system--Huntsville, Alabama
M-FS-25431 B80-10202 03
Solar-heating and cooling demonstration project
M-FS-25443 B80-10203 03
Mobile glazing unit
KSC-11171 B80-10538 08

RADIATION DETECTORS

Crossed-grid charge locator
M-FS-25170 B80-10010 01

RADIATION EFFECTS

Measuring radiation effects on MOS capacitors
NPO-14700 B80-10227 06

RADIATION MEASUREMENT

Miniature personal UV solar dosimeter
LANGLEY-12469 B80-10321 03
Economical ultraviolet radiometer
NPO-14843 B80-10322 03
Field limiter for solar radiometers
NPO-14781 B80-10454 03

RADIATION

INSTRUMENTS

Far-field radiation pattern of tunable diode lasers
LANGLEY-12631 B80-10177 03
All-inorganic spark-chamber frame
GSFC-12354 B80-10265 08

RADIATIVE HEAT TRANSFER

Holes help control temperature
GSFC-12618 B80-10373 06

RADIO FREQUENCY HEATING

Time-shaped RF brazing
MSC-18617 B80-10272 08

RADIO TELEMETRY

Receiver array for high-rate telemetry
NPO-14579 B80-10308 02
Receiving signals of any polarization
NPO-14836 B80-10315 02

RADIOGRAPHY

X-ray beam pointer
MSC-18590 B80-10254 07

RADIOMETERS

Economical ultraviolet radiometer
NPO-14843 B80-10322 03
Field limiter for solar radiometers
NPO-14781 B80-10454 03
Gas-laser power monitor
LANGLEY-12682 B80-10455 03
Compact infrared detector
NPO-14864 B80-10515 06

RANDOM ACCESS MEMORY

RAM-Based frame synchronizer
GSFC-12430 B80-10164 02
RAM-Based parallel-output controller
GSFC-12447 B80-10165 02

RANGE FINDERS

Short-range self-pulsed optical radar
NPO-14901 B80-10459 03

READOUT

Monolithic CCD-array readout
LANGLEY-12376 B80-10307 02

REAL TIME OPERATION

Simultaneous disk storage and retrieval
KSC-11167 B80-10304 02

RECEIVERS

Microprocessor control for phase-lock receiver
NPO-14438 B80-10033 02
Receiver array for high-rate telemetry
NPO-14579 B80-10308 02
Arrayed receivers for low-rate telemetry
NPO-14590 B80-10309 02
Receiving signals of any polarization
NPO-14836 B80-10315 02

RECLAMATION

Chlorinolysis reclaims rubber of waste tires
NPO-14935 B80-10365 04

RECORDING

Real-time film recording from stroke-written CRT's
LANGLEY-12529 B80-10169 02

RECTIFIERS

LSI logic for phase-control rectifiers
M-FS-25208 B80-10161 01

RECYCLING

Chlorinolysis reclaims rubber of waste tires
NPO-14935 B80-10365 04
Treating domestic wastewater with water hyacinths
M-FS-23964 B80-10368 05
Recycling paper-pulp waste liquors
NPO-14797 B80-10492 04

REDUCTION (CHEMISTRY)

REDOX electrochemical energy storage
LEWIS-13398 B80-10064 04

REDUNDANCY

Toggled signal for prevention of control errors
MSC-18779 B80-10312 02

REDUNDANT COMPONENTS

A redundant regulator control with low standby losses
NPO-13165 B80-10172 02
Four-wheel dual braking for automobiles
LANGLEY-12687 B80-10529 07

REFLECTOMETERS

Detecting a coal/shale interface
M-FS-23720 B80-10061 04

REFLECTORS

Low-cost concentrating mirrors
NPO-14962 B80-10542 08

REFRACTIVITY

Changes in 'thermal lens' measure diffusivity
NPO-14657 B80-10218 06

REFRACTORY MATERIALS

Thermal barrier and gas seal
MSC-18390 B80-10269 08
Tile densification with TEOS
MSC-18737 B80-10535 08
Repairing high-temperature glazed tiles
MSC-18736 B80-10536 08

REGENERATION (ENGINEERING)

Regenerative superheated steam turbine cycles
LEWIS-13392 880-10234 06

REGRESSION ANALYSIS

Multiple linear regression analysis
M-FS-23764 880-10288 09

RELIABILITY

A redundant regulator control with low standby losses
NPO-13165 880-10172 02

REMOTE CONTROL

The 3-D guidance system with proximity sensors
NPO-14521 880-10250 07
Electromechanical slip sensor
NPO-14654 880-10253 07

REMOTE HANDLING

Mechanical hand for gripping objects
M-FS-23692 880-10243 07
Remote manipulator with force feed-back
ARC-11272 880-10408 07

REMOTE SENSORS

Applications of remote-sensing imagery
M-FS-25107 880-10082 06
Laser-fluorescence measurement of marine algae
LANGLEY-12282 880-10213 05
Heat-pipe sensor for remote leveling
GSFC-12095 880-10248 07
Evaluating computer-drawn ground-cover maps
KSC-11195 880-10555 09

RENDEZVOUS SPACECRAFT

High-power dual-directional coupler
NPO-14713 880-10447 02

REPORTS

Final report on development of a programmable controller
M-FS-25388 880-10189 03
Finned-absorber solar collector
M-FS-25385 880-10193 03

REPRODUCTION (COPYING)

Automatic 35 mm slide duplicator
LEWIS-13399 880-10249 07

RESILIENCY

Abrasive drill for resilient materials
LEWIS-13411 880-10402 07

RESISTANCE HEATING

Easily-assembled helical heater
LANGLEY-11712 880-10130 08

RESPONSE TIME (COMPUTERS)

Photometer used for response time measurement
MSC-18712 880-10317 02

RETAINING

Retaining a sleeve on a shaft
M-FS-19518 880-10103 07

REUSE

Sleeve puller salvages welded tubes
MSC-18686 880-10256 07

RIBBONS

Handtool assists in bundling cables
MSC-18567 880-10255 07

RIBS (SUPPORTS)

Shaping graphite/epoxy stiffeners
MSC-18494 880-10120 08

RING STRUCTURES

Eliminating gaps in split rings
MSC-18854 880-10540 08

RISK

Estimation of incomplete multinomial data
LANGLEY-12593 880-10146 09

RODS

Lock for hydraulic actuators
MSC-18853 880-10530 07

ROLLER BEARINGS

Cylindrical bearing analysis
LEWIS-13393 880-10533 07

ROLLERS

High-performance, multiroller traction drive
LEWIS-13347 880-10244 07

ROLLING CONTACT LOADS

Cylindrical bearing analysis
LEWIS-13393 880-10533 07

ROTARY WINGS

Isolation and measurement of rotor vibration forces
LANGLEY-12476 880-10507 06

ROTATING SHAFTS

28-Channel rotary transformer
NPO-14861 880-10300 01

ROTORS

Rotor transient analysis
LEWIS-13230 880-10259 07

RUBBER

Chlorinolysis reclaims rubber of waste tires
NPO-14935 880-10365 04

RUGGEDNESS

Self-lubricating gearset
MSC-18801 880-10546 08

RUNNING

Manual for physical fitness
MSC-18915 880-10372 05

S**SAFETY DEVICES**

Cable-splice detector
ARC-11291 880-10074 06

SAFETY FACTORS

Safety analysis for complex systems
MSC-18745 880-10554 09

SAMPLING

Better-quality CCD-array images
NPO-14426 880-10168 02
Improved particulate-sampling filter
NPO-14801 880-10271 08

SANDWICH STRUCTURES

Lightweight terminal board
MSC-18787 880-10429 08
Heat pipes cool probe and sandwich panel
LANGLEY-12588; LANGLEY-12637 880-10518 06

SAPPHIRE

More-reliable SOS ion implantations
M-FS-25322 880-10262 08

SATELLITE OBSERVATION

Ultraviolet spectrometer/polarimeter
M-FS-25298 880-10042 03

SATELLITE-BORNE INSTRUMENTS

Applications of remote-sensing imagery
M-FS-25107 880-10082 06

SCHOOLS

Learning high-quality soldering
NPO-14869 880-10539 08

SCINTILLATION COUNTERS

Multiple-creep-test apparatus
GSFC-12561 880-10080 06

SCREWS

Self-energized screw coupling
M-FS-25340 880-10096 07

SCRUBBERS

Carbon scrubber
MSC-16531 880-10356 04

SEA ROUGHNESS

Oceanic-wave-measurement system
M-FS-23862 880-10224 06

SEALING

Sealing micropores in thin castings
MSC-18623 880-10428 08
Transistor package for high pressure applications
MSC-18743 880-10430 08
Spiral-wound gasket forms
LANGLEY-12315 880-10543 08

SEALS (STOPPERS)

Self-acting shaft seals
LEWIS-13229 880-10109 07
Knife-edge seal for vacuum bagging
M-FS-24049 880-10135 08
Design considerations for mechanical face seals
LEWIS-13146 880-10233 06
Thermal barrier and gas seal
MSC-18390 880-10269 08
Heat/pressure seal for moving parts
MSC-18422 880-10390 06

SELF LUBRICATING MATERIALS

Self-lubricating gearset
MSC-18801 880-10546 08

SEMICONDUCTING FILMS

'Pelled-film' solar cells
NPO-14734 880-10151 01

SEMICONDUCTOR DEVICES

Photocapacitive image converter
LANGLEY-12513 880-10009 01
Semiconductor step-stress testing
M-FS-25329 880-10011 01
JANTX1N2970B zener diode
M-FS-25260 880-10012 01
JANTX1N2989B zener diode
M-FS-25261 880-10013 01
JANTX1N3016B zener diode
M-FS-25262 880-10014 01
JANTX1N3031B zener diode
M-FS-25263 880-10015 01
JANTX1N5622 diode
M-FS-25280 880-10016 01
JANTX1N5623 switching diode
M-FS-25281 880-10017 01
JANTX2N2060 dual transistor
M-FS-25251 880-10018 01
JANTX2N2219A dual transistor
M-FS-25252 880-10019 01
JANTX2N2369A transistor
M-FS-25254 880-10020 01
JANTX2N2432A transistor
M-FS-26255 880-10021 01
JANTX2N2484 transistor
M-FS-25253 880-10022 01
JANTX2N2605 transistor
M-FS-25150 880-10023 01
JANTX2N2905A transistor
M-FS-25256 880-10024 01
JANTX2N2920 Dual transistor
M-FS-25258 880-10025 01
JANTX2N2945A transistor
M-FS-25259 880-10026 01
JANTX2N3637 transistor
M-FS-25264 880-10027 01
JANTX2N3811 dual transistor
M-FS-25265 880-10028 01
JANTX2N4150 transistor
M-FS-25267 880-10029 01
JANTX2N4856 field-effect transistor
M-FS-25269 880-10030 01
Model for MOS field-time-dependent breakdown
NPO-14701 880-10162 01

Ohmic contact to GaAs semiconductor
LANGLEY-12466 B80-10263 08

SENSORY FEEDBACK
 Remote manipulator with force
 feed-back
ARC-11272 B80-10408 07

SEQUENCING
 Multipath star switch controller
NPO-13422 B80-10035 02

SERVOCONTROL
 Photometer used for response time
 measurement
MSC-18712 B80-10317 02

SETUPS
 Wire harness twisting aid
MSC-18581 B80-10132 08

SHAFTS (MACHINE ELEMENTS)
 Retaining a sleeve on a shaft
M-FS-19518 B80-10103 07
 Self-acting shaft seals
LEWIS-13229 B80-10109 07

SHALES
 Detecting a coal/shale interface
M-FS-23720 B80-10061 04

SHAPERS
 Shaping graphite/epoxy stiffeners
MSC-18494 B80-10120 08
 Controlling the shape of glass
 microballoons
M-FS-25230 B80-10266 08
 Reshaping tube ends for welding
MSC-18462 B80-10407 07

SHAPES
 Contour-measuring tool for composite
 layups
ARC-11246 B80-10417 08

SHEAR PROPERTIES
 Efficient measurement of shear properties
 of fiber composites
LEWIS-13011 B80-10216 06
 Biaxial method for in-plane shear
 testing
LANGLEY-12680 B80-10512 06

SHELL THEORY
 Shell theory automated for rotational
 structures
M-FS-23027 B80-10089 06

SHOCK ABSORBERS
 Self-adjusting mechanical snubbing link
MSC-16134 B80-10246 07

SHOCK WAVE CONTROL
 Suppressing buzz-saw noise in jet
 engines
LANGLEY-12645 B80-10220 06

SHORT CIRCUITS
 Detecting short circuits during
 assembly
ARC-11116 B80-10007 01
 Voltage controller/current limiter for ac
NPO-13061 B80-10032 02

SHRINKAGE
 Shrinking plastic tubing and nonstandard
 diameters
MSC-18430 B80-10268 08

SIGNAL PROCESSING
 Improved code-tracking loop
MSC-18035 B80-10034 02
 Smoothing the output from a DAC
FRC-11025 B80-10160 01

SIGNAL RECEPTION
 Receiving signals of any polarization
NPO-14836 B80-10315 02

SIGNAL TO NOISE RATIOS
 Real-time image enhancement
NPO-14281 B80-10311 02

Noise suppression in forward-scattering
 optical instruments
LANGLEY-12730 B80-10324 03

SIGNAL TRANSMISSION
 Receiver array for high-rate telemetry
NPO-14579 B80-10308 02
 Compressing TV-image data
NPO-14823 B80-10310 02

SILICON
 More-reliable SOS ion implantations
M-FS-25322 B80-10262 08
 Producing silicon continuously
NPO-14796 B80-10537 08
 Back contacts for silicon-on-ceramic
 solar cells
NPO-14809 B80-10545 08
 Nickel-doped silicon for solar cells
NPO-14780 B80-10550 08

SILICON COMPOUNDS
 Tile densification with TEOS
MSC-18737 B80-10535 08
 Repairing high-temperature glazed tiles
MSC-18736 B80-10536 08

SILICON NITRIDES
 Photoniiride passivating coating for IC's
M-FS-25401 B80-10260 08
 Silicon nitride passivation of IC's
M-FS-25309 B80-10279 08

SILICONES
 A reliable solar-heating
 system--Huntsville, Alabama
M-FS-25431 B80-10202 03
 New pressure-sensitive silicone
 adhesive
LANGLEY-12737 B80-10495 04

SILICONIZING
 Coatings for hybrid microcircuits
M-FS-25292 B80-10116 08
 Photoniiride passivating coating for IC's
M-FS-25401 B80-10260 08

SIMULATION
 CADAT logic simulation program
M-FS-25183 B80-10432 08
 CADAT field-effect-transistor simulator
M-FS-25067 B80-10434 08
 Wind-simulation tester for solar
 modules
NPO-14837 B80-10517 06

SINTERING
 Double metalization for VLSI
M-FS-25149 B80-10261 08

SIZE DETERMINATION
 Resizing structures for minimum weight
LANGLEY-12699 B80-10394 06

SIZING (SHAPING)
 Shrinking plastic tubing and nonstandard
 diameters
MSC-18430 B80-10268 08

SLEEVES
 Retaining a sleeve on a shaft
M-FS-19518 B80-10103 07
 Sleeve puller salvages welded tubes
MSC-18686 B80-10256 07
 Heat-shrinkable sleeve aids in insulating
 universal joints
MSC-18685 B80-10270 08
 Alining sleeve for optical fibers
MSC-18756 B80-10424 01

SLICING
 Precision filament cutter
LANGLEY-12564 B80-10093 07

SLIDING
 Electromechanical slip sensor
NPO-14654 B80-10253 07

SLOT ANTENNAS
 Cavity-backed spiral-slot antenna
MSC-18532 B80-10448 02

Trislot-cavity microstrip antenna
MSC-18793 B80-10450 02

SLUDGE
 Removing freon gas from hydraulic
 fluid
MSC-18740 B80-10494 04

SNELLS LAW
 Refraction corrections for surveying
MSC-18664 B80-10231 06

SODIUM IODIDES
 Multiple-creep-test apparatus
GSFC-12561 B80-10080 06

SOLAR CELLS
 Photoelectrochemical cell with
 nondissolving anode
LANGLEY-12591 B80-10038 03
 'Pelled-film' solar cells
NPO-14734 B80-10151 01
 Improved multispectral solar cell array
HQN-10937 B80-10184 03
 A survey of photovoltaic systems
M-FS-25397 B80-10187 03
 Ohmic contact to GaAs semiconductor
LANGLEY-12466 B80-10263 08
 Solar-powered aircraft
LANGLEY-126'x5 B80-10404 07
 Multijunction high-voltage solar cell
LEWIS-13400 B80-10441 01
 Solar cell is housed in light-bulb
 enclosure
LEWIS-13418 B80-10442 01
 Wind-simulation tester for solar
 modules
NPO-14837 B80-10517 06
 Passivation layer for steel substrate of
 solar cell
NPO-14961 B80-10541 08
 Back contacts for silicon-on-ceramic
 solar cells
NPO-14809 B80-10545 08
 Nickel-doped silicon for solar cells
NPO-14780 B80-10550 08

SOLAR COLLECTORS
 Fresnel lens tracking solar collector
M-FS-25419 B80-10190 03
 Outdoor tests of the concentric-tube
 collector
M-FS-25398 B80-10191 03
 Selective optical coatings for solar
 collectors
M-FS-23589 B80-10192 03
 Finned-absorber solar collector
M-FS-25385 B80-10193 03
 A test program for solar collectors
M-FS-25433 B80-10194 03

SOLAR ENERGY
 New mounting improves solar-cell
 efficiency
NPO-14467 B80-10039 03
 An adjustable solar concentrator
NPO-14710 B80-10043 03
 Twelve solar-heating/cooling systems:
 Design and development
M-FS-25358 B80-10046 03
 Solar-heating and cooling system design
 package
M-FS-25393 B80-10047 03
 Benefit assessment of solar-augmented
 natural gas systems
NPO-14568 B80-10048 03
 Air-cooled solar-collector specification
M-FS-25336 B80-10049 03
 Indoor tests of the concentric-tube solar
 collector
M-FS-25390 B80-10050 03

- Evacuated-tube solar collector--performance evaluation
M-FS-25339 880-10051 03
Glycol/water evacuated-tube solar collector
M-FS-25337 880-10052 03
Thermosyphon heat exchanger
M-FS-25389 880-10053 03
Controller for solar-energy systems
M-FS-25386 880-10054 03
Controller and temperature monitor for solar heating
M-FS-25387 880-10055 03
Inhibiting corrosion in solar-heating and cooling systems
M-FS-25387 880-10056 03
A survey of photovoltaic systems
M-FS-25397 880-10187 03
Thermal stratification in liquid storage tanks
M-FS-25416 880-10188 03
Final report on development of a programmable controller
M-FS-25388 880-10189 03
Fresnel lens tracking solar collector
M-FS-25419 880-10190 03
Outdoor tests of the concentric-tube collector
M-FS-25398 880-10191 03
Selective optical coatings for solar collectors
M-FS-23589 880-10192 03
Finned-absorber solar collector
M-FS-25385 880-10193 03
A test program for solar collectors
M-FS-25433 880-10194 03
Operational tests of a solar-energy system in Georgia
M-FS-25420 880-10195 03
Operational tests of a solar energy system Florida site
M-FS-25423 880-10196 03
A solar-energy system in Pennsylvania
M-FS-25427 880-10197 03
Installation guidelines for the Pennsylvania system
M-FS-25424 880-10198 03
A solar-energy system in Minnesota
M-FS-25428 880-10199 03
Solar-energy system evaluation-Pennsylvania site
M-FS-25434 880-10200 03
A hot-water system tested onsite--Togus, Maine
M-FS-25435 880-10201 03
A reliable solar-heating system--Huntsville, Alabama
M-FS-25431 880-10202 03
Solar-heating and cooling demonstration project
M-FS-25443 880-10203 03
Detecting surface faults on solar mirrors
NPO-14684 880-10230 06
Multiplexed logic controls solar-heating system
M-FS-25287 880-10318 03
Four-cell solar tracker
NPO-14811 880-10319 03
Offset paraboloidal solar concentrator
NPO-14846 880-10320 03
Heat for film processing from solar energy
M-FS-25444 880-10331 03
Solar heater/cooler for mass market
M-FS-25452 880-10332 03
Data-acquisition and control system for severe environments
M-FS-25471 880-10333 03
Solar heater/cooler for mass market
M-FS-25468 880-10334 03
Solar--heated and cooled office building--Dalton, Georgia
M-FS-25451 880-10335 03
Solar-heating and hot water system--St. Louis, Missouri
M-FS-25453 880-10336 03
Solar heating for an electronics manufacturing plant--Blue Earth, Minnesota
M-FS-25469 880-10337 03
Costs and description of a solar-energy system--Austin, Texas
M-FS-25472 880-10338 03
Solar energy in a historical city--Abbreville, South Carolina
M-FS-25479 880-10339 03
municipal recreation center is heated and cooled by solar energy
M-FS-25478 880-10340 03
Solar energy meets 50 percent of motel hot water needs--Key West, Florida
M-FS-25454 880-10341 03
Solar heated office complex--Greenwood, South Carolina
M-FS-25458 880-10342 03
Residential system tested in an office--Huntsville, Alabama
M-FS-25481 880-10343 03
Solar heated two level residence--Akron, Ohio
M-FS-25480 880-10344 03
Solar energy workshop--Tucson, Arizona
M-FS-25473 880-10345 03
Residential solar hot water system--Tempe, Arizona
M-FS-25490 880-10346 03
Residential solar heating installation--Stillwater, Minnesota
M-FS-25504 880-10347 03
Three story residence with solar heat--Manchester, New Hampshire
M-FS-25499 880-10348 03
A high school is supplied with solar energy--Dallas, Texas
M-FS-25514 880-10349 03
Solar-powered aircraft
LANGLEY-12615 880-10404 07
Multijunction high-voltage solar cell
LEWIS-13400 880-10441 01
Solar-site test module
M-FS-25543 880-10460 03
Evaluation of an evacuated-tube liquid solar collector
M-FS-25450 880-10461 03
Solar water heater design package
M-FS-25521 880-10462 03
Five-city economics of a solar hot-water-system
M-FS-25532 880-10463 03
Economic evaluation of a solar hot-water-system
M-FS-25529 880-10464 03
Residential solar-heating system uses pyramidal optics
M-FS-25567 880-10465 03
Solar-heated bank-Marks Mississippi
M-FS-25558 880-10466 03
Solar water-heating performance evaluation--San Diego, California
M-FS-25502 880-10467 03
Solar-heated and cooled savings and loan building-1-Leavenworth, Kansas
M-FS-25520 880-10468 03
Solar-energy landmark
Building-Columbia, Missouri
M-FS-25524 880-10469 03
Solar heating for an observatory--Lincoln, Nebraska
M-FS-25525 880-10470 03
Two-story residence with solar heating--Newman, Georgia
M-FS-25526 880-10471 03
Solar-energy heats a transportation test center--Pueblo, Colorado
M-FS-25527 880-10472 03
Single-family-residence solar heating--Carlsbad, New Mexico
M-FS-25528 880-10473 03
Multimode solar-heating system--Columbia, South Carolina
M-FS-25552 880-10474 03
Solar-heated swimming school--Wilmington, Delaware
M-FS-25548 880-10475 03
Winter performance of a domestic solar-heating system--Duffield, Virginia
M-FS-25540 880-10476 03
One-year assessment of a solar space/water heater--Clinton, Mississippi
M-FS-25539 880-10477 03
Fire-station solar-energy system--Kansas City, Missouri
M-FS-25538 880-10478 03
Solar-heated ranger station--Glendo, Wyoming
M-FS-25537 880-10479 03
Economic evaluation of a solar hot-water system--Palm Beach County, Florida
M-FS-25536 880-10480 03
Residential system--Lansing, Michigan
M-FS-25530 880-10481 03
Solar space-heating system--Yosemite National Park, California
M-FS-25553 880-10482 03
Motel solar-hot-water system--Dallas, Texas
M-FS-25575 880-10483 03
Motel solar-hot-water system with nonpressurized storage--Jacksonville, Florida
M-FS-25569 880-10484 03
Closed-circulation system for motel hot water--Savannah, Georgia
M-FS-25572 880-10485 03
Solar heating for a restaurant--North Little Rock, Arkansas
M-FS-25568 880-10486 03
Motel solar hot-water installation--Atlanta, Georgia
M-FS-25564 880-10487 03
Building with integral solar-heat storage--Starkville, Mississippi
M-FS-25559 880-10488 03
Less-toxic corrosion inhibitors
M-FS-25496 880-10497 04
Low-cost concentrating mirrors
NPO-14962 880-10542 08
Nickel-doped silicon for solar cells
NPO-14780 880-10550 08
SOLAR ENERGY CONVERSION
Field limiter for solar radiometers
NPO-14781 880-10454 03
SOLAR HEATING
Final report on development of a programmable controller
M-FS-25388 880-10189 03

SOLAR RADIATION

- Ultraviolet spectrometer/polarimeter
- M-FS-25298 B80-10042 03
- Miniature personal UV solar dosimeter
- LANGLEY-12469 B80-10321 03
- Economical ultraviolet radiometer
- NPO-14843 B80-10322 03
- Field limiter for solar radiometers
- NPO-14781 B80-10454 03

SOLAR REFLECTORS

- Detecting surface faults on solar mirrors
- NPO-14684 B80-10230 06

SOLDERING

- Connector heat shield
- MSC-16282 B80-10126 08
- Learning high-quality soldering
- NPO-14869 B80-10539 08
- Arc spraying solderable tabs to glass
- NPO-14853 B80-10544 08

SOLID LUBRICANTS

- Lubrication handbook
- M-FS-25158 B80-10210 04

SPACE MANUFACTURING

- Should we industrialize space?
- M-FS-23963 B80-10137 08

SPACECRAFT COMMUNICATION

- High-power dual-directional coupler
- NPO-14713 B80-10447 02

SPACECRAFT INSTRUMENTS

- The 3-D guidance system with proximity sensors
- NPO-14521 B80-10250 07

SPALLING

- A precoat prevents ceramic stopoffs from spalling
- M-FS-19495 B80-10136 08

SPARK CHAMBERS

- All-inorganic spark-chamber frame
- GSFC-12354 B80-10265 08

SPECIES DIFFUSION

- Diffusion in single-phase binary alloys
- LANGLEY-12665 B80-10498 04

SPECIMENS

- Vise holds specimens for microscope
- MSC-18690 B80-10098 07

SPECTRAL ENERGY DISTRIBUTION

- Improved multispectral solar cell array
- HQN-10937 B80-10184 03

SPECTROMETERS

- Fast-response atmospheric-pollutant monitor
- LANGLEY-12317 B80-10062 04
- Instrument remotely measures wind velocities
- NPO-14524 B80-10176 03
- Optical calibrator for TDL spectrometers
- GSFC-12562 B80-10178 03
- Acoustically-tuned optical spectrometer
- HQN-10924 B80-10326 03
- Cleaving machine for hard crystals
- GSFC-12584 B80-10401 07

SPECTROSCOPIC ANALYSIS

- Integrated material-surface analyzer
- NPO-14702 B80-10388 06

SPECTROSCOPIC TELESCOPES

- Ultraviolet spectrometer/polarimeter
- M-FS-25298 B80-10042 03

SPECTROSCOPY

- High-resolution spectrometry/interferometer
- NPO-14448 B80-10175 03

SPEED CONTROL

- Speed control for synchronous motors
- MSC-18680 B80-10444 01

SPEED REGULATORS

- Speed control for synchronous motors
- MSC-18680 B80-10444 01

SPHERES

- Hybrid polymer microspheres
- NPO-14462 B80-10208 04

SPHERICAL SHELLS

- Drop tower with no aerodynamic drag
- NPO-14845 B80-10549 08

SPIN STABILIZATION

- Aircraft equilibrium spin characteristics
- LANGLEY-12502 B80-10087 06

SPlicing

- Cable-splice detector
- ARC-11291 B80-10074 06
- Safely splicing glass optical fibers
- KSC-11107 B80-10134 08

SPRAYED COATINGS

- Film coatings for contoured surfaces
- MSC-18784 B80-10425 08

SPRAYING

- Spraying suspensions uniformly
- M-FS-25139 B80-10409 07
- Pneumatic-power supply
- MSC-18855 B80-10527 07

SPRINGS (ELASTIC)

- Self-energized screw coupling
- M-FS-25340 B80-10096 07
- Interchangeable spring modules for inertia measurements
- LANGLEY-12402 B80-10386 06

SPUTTERING

- Improved adherence of TiC coatings to steel
- LEWIS-13169 B80-10207 04

STANDARDS

- A temperature fixed point near 58 C
- M-FS-25304 B80-10204 04

STATIC DISCHARGERS

- More-reliable SOS ion implantations
- M-FS-25322 B80-10262 08

STATIC ELECTRICITY

- Reducing static charges in fluidized bed reactions
- ARC-11245 B80-10068 04

STATISTICAL ANALYSIS

- Estimation of incomplete multinomial data
- LANGLEY-12593 B80-10146 09
- Multiple linear regression analysis
- M-FS-23764 B80-10288 09

STATISTICAL DISTRIBUTIONS

- An approximation to student's t-distribution
- LANGLEY-12238 B80-10284 09

STATISTICS

- Multiple linear regression analysis
- M-FS-23764 B80-10288 09

STEAM TURBINES

- Regenerative superheated steam turbine cycles
- LEWIS-13392 B80-10234 06

STEELS

- Improved adherence of TiC coatings to steel
- LEWIS-13169 B80-10207 04

STIFFENING

- Heat-shrinkable sleeve aids in insulating universal joints
- MSC-18685 B80-10270 08

STOCHASTIC PROCESSES

- Linear stochastic optimal control and estimation problem
- LEWIS-13206 B80-10287 09

STORAGE TANKS

- Thermal stratification in liquid storage tanks
- M-FS-25416 B80-10188 03

- Lightweight cryogenic vessel
- NPO-14794 B80-10548 08

STOWAGE (ONBOARD EQUIPMENT)

- Foam-filled cushions for sliding trays
- MSC-18565 B80-10127 08

STRAIN GAGES

- LVD gage for fracture-toughness tests in liquid hydrogen
- LEWIS-13038 B80-10075 06
- Modified displacement gage for cryogenic testing
- LEWIS-13039 B80-10077 06
- Signal conditioner for nickel temperature sensors
- MSC-18367 B80-10298 01

STRATIFICATION

- Thermal stratification in liquid storage tanks
- M-FS-25416 B80-10188 03

STRESS (PHYSIOLOGY)

- Cardiopulmonary data-acquisition system
- MSC-18783 B80-10499 05
- Microprocessor-based cardiometer
- MSC-18775 B80-10501 05

STRESS ANALYSIS

- Structural design with stress and displacement constraints
- M-FS-25235 B80-10521 06

STRESS CONCENTRATION

- Predicting lifetime of cast parts
- M-FS-19549 B80-10228 06
- NASTRAN modifications for recovering strains and curvatures
- LEWIS-12592 B80-10395 06

STRESS MEASUREMENT

- Efficient measurement of shear properties of fiber composites
- LEWIS-13011 B80-10216 06
- Biaxial method for in-plane shear testing
- LANGLEY-12680 B80-10512 06

STRIP TRANSMISSION LINES

- Multiband microstrip antenna
- MSC-18334 B80-10001 01
- Fast microwave switching power divider
- GSFC-12420 B80-10295 01

STRUCTURAL ANALYSIS

- Shell theory automated for rotational structures
- M-FS-23027 B80-10089 06
- Predicting crack propagation
- MSC-18718; MSC-18721 B80-10283 08
- NASTRAN modifications for recovering strains and curvatures
- LEWIS-12592 B80-10395 06
- Plastic deformation of engines and other nonlinear structures
- M-FS-23814 B80-10399 06
- An all-FORTRAN version of NASTRAN for the VAX
- GSFC-12600 B80-10522 06

STRUCTURAL DESIGN

- Resizing structures for minimum weight
- LANGLEY-12699 B80-10394 06
- Versatile modular scaffolds
- GSFC-12606 B80-10406 07
- Structural design with stress and displacement constraints
- M-FS-25235 B80-10521 06

STRUCTURAL MEMBERS

Automatic connector for structural beams
M-FS-25134 880-10094 07

Mechanical end joint for structural columns
LANGLEY-12482 880-10095 07

Shaping graphite/epoxy stiffeners
MSC-18494 880-10120 08

Automatic connector joins structural columns
LANGLEY-12578 880-10251 07

Lock for hydraulic actuators
MSC-18853 880-10530 07

STRUCTURAL VIBRATION

Vibration modes and frequencies of structures
LANGLEY-12647 880-10237 06

SUBSONIC FLOW

A generalized vortex lattice method
LANGLEY-12636 880-10236 06

SUPERCOOLING

Containerless materials processing in the laboratory
M-FS-25242 880-10059 04

SUPERCritical WINGS

Transonic airfoil design code
LANGLEY-12460 880-10085 06

SUPERHEATING

Regenerative superheated steam turbine cycles
LEWIS-13392 880-10234 06

SUPERSONIC COMBUSTION RAMJET ENGINES

Viscous characteristics analysis
LANGLEY-12598 880-10084 06

SUPERSONIC FLOW

A generalized vortex lattice method
LANGLEY-12636 880-10236 06

SUPERSONIC INLETS

Flow field in supersonic mixed-compression inlets
LEWIS-13279 880-10088 06

SUPPORTS

Drill-motor holding fixture
MSC-18582 880-10108 07

Cryogenic-storage-tank support
MSC-14848 880-10258 07

Versatile modular scaffolds
GSFC-12606 880-10406 07

Compact table-tilting mechanism
NPO-14800 880-10411 07

Lock for hydraulic actuators
MSC-18853 880-10530 07

SUPPRESSORS

Suppressing buzz-saw noise in jet engines
LANGLEY-12645 880-10220 06

SURFACE DEFECTS

Detecting surface faults on solar mirrors
NPO-14684 880-10230 06

SURFACE FINISHING

Chemical-milling solution for invar alloy
M-FS-25365 880-10113 08

SURFACE PROPERTIES

Integrated material-surface analyzer
NPO-14702 880-10388 06

SURFACE VEHICLES

Improved battery charger for electric vehicles
NPO-14964 880-10440 01

SURGERY

Improved ureteral stone fragmentation catheter
NPO-14745 880-10370 05

SURGES

Voltage controller/current limiter for ac
NPO-13061 880-10032 02

SURGICAL INSTRUMENTS

Improved ureteral stone fragmentation catheter
NPO-14745 880-10370 05

SURVEYS

A survey of photovoltaic systems
M-FS-25397 880-10187 03

Thermal stratification in liquid storage tanks
M-FS-25416 880-10188 03

SUSPENDING (MIXING)

Spraying suspensions uniformly
M-FS-25139 880-10409 07

SWAGING

Adjustable base for centering stacked bearings
MSC-19660 880-10133 08

SWITCHES

Automatic thermal switches
GSFC-12553 880-10214 06

Heat switch has no moving parts
GSFC-12625 880-10391 06

SWITCHING

Multipath star switch controller
NPO-13422 880-10035 02

SWITCHING CIRCUITS

Energy saving in ac generators
M-FS-25302 880-10150 01

Frequency-controlled voltage regulator
NPO-13633 880-10171 02

Fast microwave switching power divider
GSFC-12420 880-10295 01

Efficient, lightweight dc/dc switching converter
LEWIS-12809 880-10299 01

Time-sharing switch for vacuum brazing
MSC-18699 880-10412 07

SWIVELS

Ball-joint grounding ring
MSC-18824 880-10405 07

SYNCHRONISM

Timing signal propagates without phase shift
MSC-18777 880-10449 02

Fiber optics transmit clock signal more reliably
NPO-14749 880-10456 03

SYNCHRONIZERS

Independent synchronizer for digital decoders
MSC-16723 880-10004 01

Microprocessor-controlled data synchronizer
MSC-18535 880-10031 02

RAM-Based frame synchronizer
GSFC-12430 880-10164 02

SYNCHRONOUS MOTORS

Speed control for synchronous motors
MSC-18680 880-10444 01

SYNCHRONOUS SATELLITES

Predicting and monitoring duststorms
NPO-14277 880-10323 03

SYNTHETIC FUELS

Coal conversion and synthetic-fuel production
M-FS-25330 880-10070 04

SYRINGES

Transferring small samples of viscous liquid
MSC-18533 880-10069 04

SYSTEMS ANALYSIS

System time-domain simulation
MSC-18333 880-10292 09

SYSTEMS ENGINEERING

Goddard mission analysis system
GSFC-12392 880-10144 09

T

TACKINESS

New pressure-sensitive silicone adhesive
LANGLEY-12737 880-10495 04

TANK GEOMETRY

Lightweight cryogenic vessel
NPO-14794 880-10548 08

TANKER SHIPS

Detection of tanker defects with infrared thermography
LANGLEY-12655 880-10221 06

TASK COMPLEXITY

Determining manufacturing cost from product complexity
M-FS-25371 880-10439 09

TEA LASERS

Tunable pulsed carbon dioxide laser
NPO-14984 880-10458 03

TECHNOLOGY ASSESSMENT

Should we industrialize space?
M-FS-23963 880-10137 08

TEFLON (TRADEMARK)

Shrinking plastic tubing and nonstandard diameters
MSC-18430 880-10268 08

TELECOMMUNICATION

Dual-frequency bidirectional antenna
GSFC-12501 880-10154 01

Basic cluster compression algorithm
NPO-14816 880-10291 09

TELEMETRY

Microprocessor-controlled data synchronizer
MSC-18535 880-10031 02

Efficient telemetry format
NPO-13679 880-10142 09

RAM-Based frame synchronizer
GSFC-12430 880-10164 02

Receiver array for high-rate telemetry
NPO-14579 880-10308 02

Arrayed receivers for low-rate telemetry
NPO-14590 880-10309 02

Receiving signals of any polarization
NPO-14836 880-10315 02

Miniaturized physiological data telemetry system
MSC-18804 880-10371 05

TELEOPERATORS

Electromechanical slip sensor
NPO-14654 880-10253 07

TELESCOPES

Compact positioning flange
MSC-14876 880-10104 07

TELEVISION CAMERAS

Rotatable prism for pan and tilt
LANGLEY-12388 880-10041 03

Temperature-compensating dc restorer
LANGLEY-12549 880-10152 01

TELEVISION TRANSMISSION

Compressing TV-image data
NPO-14823 880-10310 02

TEMPERATURE

An equation of state for liquids
NPO-14821 880-10174 03

One-year assessment of a solar space/water heater--Clinton, Mississippi
M-FS-25539 880-10477 03

TEMPERATURE COMPENSATION

Temperature-compensating dc restorer
 LANGLEY-12549 B80-10152 01

TEMPERATURE CONTROL

Energy-saving thermostat
 LANGLEY-12450 B80-10040 03
 Controller and temperature monitor for solar heating
 M-FS-25387 B80-10055 03
 Temperature controller for hyperthermia devices
 LANGLEY-12528 B80-10072 05
 Final report on development of a programmable controller
 M-FS-25388 B80-10189 03
 Solar-heating and cooling demonstration project
 M-FS-25443 B80-10203 03
 Automatic thermal switches
 GSFC-12553 B80-10214 06
 Cooling/grounding mount for hybrid circuits
 MSC-18728 B80-10302 01
 Multiplexed logic controls solar-heating system
 M-FS-25287 B80-10318 03
 Heat for film processing from solar energy
 M-FS-25444 B80-10331 03
 Solar heater/cooler for mass market
 M-FS-25452 B80-10332 03
 Data-acquisition and control system for severe environments
 M-FS-25471 B80-10333 03
 Solar heater/cooler for mass market
 M-FS-25468 B80-10334 03
 Solar-heated and cooled office building--Dalton, Georgia
 M-FS-25451 B80-10335 03
 Solar-heating and hot water system--St. Louis, Missouri
 M-FS-25453 B80-10336 03
 Solar heating for an electronics manufacturing plant--Blue Earth, Minnesota
 M-FS-25469 B80-10337 03
 Costs and description of a solar-energy system--Austin, Texas
 M-FS-25472 B80-10338 03
 Solar energy in a historical city--Abbreville, South Carolina
 M-FS-25479 B80-10339 03
 municipal recreation center is heated and cooled by solar energy
 M-FS-25478 B80-10340 03
 Solar energy meets 50 percent of motel hot water needs--Key West, Florida
 M-FS-25454 B80-10341 03
 Solar heated office complex--Greenwood, South Carolina
 M-FS-25458 B80-10342 03
 Residential system tested in an office--Huntsville, Alabama
 M-FS-25481 B80-10343 03
 Solar heated two level residence--Akron, Ohio
 M-FS-25480 B80-10344 03
 Solar energy workshop--Tucson, Arizona
 M-FS-25473 B80-10345 03
 Residential solar hot water system--Tempe, Arizona
 M-FS-25490 B80-10346 03
 Residential solar heating installation--Stillwater, Minnesota
 M-FS-25504 B80-10347 03

Three story residence with solar heat--Manchester, New Hampshire
 M-FS-25499 B80-10348 03
 A high school is supplied with solar energy--Dallas, Texas
 M-FS-25514 B80-10349 03
 Holes help control temperature
 GSFC-12618 B80-10373 06
 Temperature controller adapts to fatigue tester
 LANGLEY-12393 B80-10378 06
 Heat/pressure seal for moving parts
 MSC-18422 B80-10390 06
 Heat switch has no moving parts
 GSFC-12625 B80-10391 06
 Evaluation of an evacuated-tube liquid solar collector
 M-FS-25450 B80-10461 03
 Solar water heater design package
 M-FS-25521 B80-10462 03
 Five-city economics of a solar hot-water-system
 M-FS-25532 B80-10463 03
 Economic evaluation of a solar hot-water-system
 M-FS-25529 B80-10464 03
 Residential solar-heating system uses pyramidal optics
 M-FS-25567 B80-10465 03
 Solar-heated bank-Marks Mississippi
 M-FS-25558 B80-10466 03
 Solar water-heating performance evaluation--San Diego, California
 M-FS-25502 B80-10467 03
 Solar-heated and cooled savings and loan building-1-Leavenworth, Kansas
 M-FS-25520 B80-10468 03
 Solar-energy landmark
 Building-Columbia, Missouri
 M-FS-25524 B80-10469 03
 Solar heating for an observatory--Lincoln, Nebraska
 M-FS-25525 B80-10470 03
 Two-story residence with solar heating--Newman, Georgia
 M-FS-25526 B80-10471 03
 Solar-energy heats a transportation test center--Pueblo, Colorado
 M-FS-25527 B80-10472 03
 Single-family-residence solar heating--Carlsbad, New Mexico
 M-FS-25528 B80-10473 03
 Multimode solar-heating system--Columbia, South Carolina
 M-FS-25552 B80-10474 03
 Solar-heated swimming school--Wilmington, Delaware
 M-FS-25548 B80-10475 03
 Winter performance of a domestic solar-heating system--Duffield, Virginia
 M-FS-25540 B80-10476 03
 Fire-station solar-energy system--Kansas City, Missouri
 M-FS-25538 B80-10478 03
 Solar-heated ranger station--Glendo, Wyoming
 M-FS-25537 B80-10479 03
 Economic evaluation of a solar hot-water system--Palm Beach County, Florida
 M-FS-25536 B80-10480 03
 Residential system--Lansing, Michigan
 M-FS-25530 B80-10481 03
 Solar space-heating system--Yosemite National Park, California
 M-FS-25553 B80-10482 03

Motel solar-hot-water system--Dallas, Texas
 M-FS-25575 B80-10483 03
 Motel solar-hot-water system with nonpressurized storage--Jacksonville, Florida
 M-FS-25569 B80-10484 03
 Closed-circulation system for motel hot water--Savannah, Georgia
 M-FS-25572 B80-10485 03
 Solar heating for a restaurant--North Little Rock, Arkansas
 M-FS-25568 B80-10486 03
 Motel solar hot-water installation--Atlanta, Georgia
 M-FS-25564 B80-10487 03
 Building with integral solar-heat storage--Starkville, Mississippi
 M-FS-25559 B80-10488 03
 Less-toxic corrosion inhibitors
 M-FS-25496 B80-10497 04
 An oven for many thermocouple reference junctions
 FRC-10112 B80-10506 06

TEMPERATURE DISTRIBUTION

Thermal stratification in liquid storage tanks
 M-FS-25416 B80-10188 03
 Heat conduction in three dimensions
 MSC-18616 B80-10239 06
 Simplified thermal analyzer
 GSFC-12638 B80-10393 06

TEMPERATURE GRADIENTS

Electrofluidic accelerometer
 LANGLEY-12493 B80-10225 06
 Heat-pipe sensor for remote leveling
 GSFC-12095 B80-10248 07
 Measuring the thermal conductivity of insulation
 NPO-14871 B80-10382 06

TEMPERATURE MEASURING INSTRUMENTS

Measuring the thermal conductivity of insulation
 NPO-14871 B80-10382 06

TEMPERATURE SCALES

A temperature fixed point near 58 C
 M-FS-25304 B80-10204 04

TEMPERATURE SENSORS

Signal conditioner for nickel temperature sensors
 MSC-18367 B80-10298 01

TENSILE TESTS

Tension-mode loading for bend specimens in cryogenics
 LEWIS-13040 B80-10076 06
 Testing panels in tension and flexure
 M-FS-25421 B80-10380 06

TEST EQUIPMENT

Online assessment of a distributed processor
 KSC-11124 B80-10037 02
 Temperature controller adapts to fatigue tester
 LANGLEY-12393 B80-10378 06
 CADAT test pattern generator
 M-FS-25066 B80-10433 08
 Solar-site test module
 M-FS-25543 B80-10460 03

TEST FACILITIES

Environmental testing under load
 LANGLEY-12602 B80-10379 06
 Testing panels in tension and flexure
 M-FS-25421 B80-10380 06

TETHERING

Eliminating gaps in split rings
 MSC-18854 B80-10540 08

THERMAL CONDUCTIVITY

Measuring the thermal conductivity of insulation
NPO-14871 B80-10382 06

THERMAL CONDUCTIVITY GAGES

Measuring the thermal conductivity of insulation
NPO-14871 B80-10382 06

THERMAL CONDUCTORS

An oven for many thermocouple reference junctions
FRC-10112 B80-10506 06

THERMAL CONTROL COATINGS

Corrosion-resistant ceramic thermal barrier coating
LEWIS-13088 B80-10067 04
Improved metallic and thermal barrier coatings
LEWIS-13324 B80-10353 04

THERMAL DIFFUSION

Systems improved numerical differencing analyzer
MSC-18597 B80-10148 09

THERMAL DIFFUSIVITY

Changes in 'thermal lens' measure diffusivity
NPO-14657 B80-10218 06

THERMAL EXPANSION

Composites with nearly zero thermal expansion
MSC-18724 B80-10355 04

THERMAL FATIGUE

Low cost high temperature, duplex coating for superalloys
LEWIS-13497 B80-10352 04

THERMAL INSULATION

Cryogenic-storage-tank support
MSC-14848 B80-10258 07
Thermal barrier and gas seal
MSC-18390 B80-10269 08
Measuring the thermal conductivity of insulation
NPO-14871 B80-10382 06
Reflecting layers reduce weight of insulation
MSC-18785 B80-10547 08

THERMAL PROTECTION

Heat/pressure seal for moving parts
MSC-18422 B80-10390 06

THERMAL RESISTANCE

Heat resistant polyphosphazene polymers
ARC-11176 B80-10350 04
Aluminum ions enhance polyimide adhesive
LANGLEY-12640 B80-10358 04

THERMAL STRESSES

Simplified thermal analyzer
GSFC-12638 B80-10393 06

THERMOCLINES

Thermal stratification in liquid storage tanks
M-FS-25416 B80-10188 03

THERMOCOUPLES

An oven for many thermocouple reference junctions
FRC-10112 B80-10506 06

THERMODYNAMIC EFFICIENCY

Benefit assessment of solar-augmented natural gas systems
NPO-14568 B80-10048 03
Outdoor tests of the concentric-tube collector
M-FS-25398 B80-10191 03

THERMODYNAMIC PROPERTIES

Thermodynamic and transport properties of air/water mixtures
LEWIS-13432 B80-10519 06

THERMODYNAMICS

An equation of state for liquids
NPO-14821 B80-10174 03

THERMOPLASTIC RESINS

Resistance welding graphite-fiber composites
MSC-18534 B80-10264 08
Plastic welder
LANGLEY-12540 B80-10274 08

THERMOSIPHONS

Thermosiphon heat exchanger
M-FS-25389 B80-10053 03

THERMOSTATS

Energy-saving thermostat
LANGLEY-12450 B80-10040 03
Automatic thermal switches
GSFC-12553 B80-10214 06

THICKNESS

Electronic depth micrometer
KSC-11181 B80-10385 06

THIN FILMS

Models of MOS and SOS devices
M-FS-25153 B80-10141 08
'Pelled-film' solar cells
NPO-14734 B80-10151 01
Electrically conductive palladium-containing polyimide films
LANGLEY-12629 B80-10357 04
Film coatings for contoured surfaces
MSC-18784 B80-10425 08

THRESHOLD GATES

LSI logic for phase-control rectifiers
M-FS-25208 B80-10161 01

THRUST BEARINGS

Self-acting shaft seals
LEWIS-13229 B80-10109 07

TIDAL WAVES

Oceanic-wave-measurement system
M-FS-23862 B80-10224 06

TIGHTNESS

Bolt-tension indicator
M-FS-19324 B80-10105 07

TILES

'Densified' tiles form stronger bonds
MSC-18741 B80-10534 08
Tile densification with TEOS
MSC-18737 B80-10535 08
Repairing high-temperature glazed tiles
MSC-18736 B80-10536 08

TIME LAG

Improved code-tracking loop
MSC-18035 B80-10034 02
Portable zero-delay assembly
NPO-14671 B80-10316 02
Timing signal propagates without phase shift
MSC-18777 B80-10449 02

TIME MEASUREMENT

Multichannel coincidence circuit
LANGLEY-12531 B80-10005 01

TIME SHARING

Time-shaped RF brazing
MSC-18617 B80-10272 08
Common data buffer
KSC-11048 B80-10303 02
Time-sharing switch for vacuum brazing
MSC-18699 B80-10412 07

TIME SIGNALS

Timing signal propagates without phase shift
MSC-18777 B80-10449 02

Fiber optics transmit clock signal more reliably
NPO-14749 B80-10456 03

TIMING DEVICES

Camera add-on records time of exposure
LANGLEY-12635 B80-10183 03
Timing signal propagates without phase shift
MSC-18777 B80-10449 02
Fiber optics transmit clock signal more reliably
NPO-14749 B80-10456 03

TIRES

Chlorinolysis reclaims rubber of waste tires
NPO-14935 B80-10365 04

TITANIUM CARBIDES

Improved adherence of TiC coatings to steel
LEWIS-13169 B80-10207 04

TITANIUM OXIDES

Photoproduction of halogens using platinized TiO₂
LANGLEY-12713 B80-10491 04

TOOLS

Tubing cutter for tight spaces
MSC-18538 B80-10099 07
Aluminum-encased lead mallet
MSC-18529 B80-10100 07
Measuring ball-bearing loads
M-FS-19505 B80-10102 07
Zero-torque spanner wrench
MSC-14843 B80-10107 07
Wire harness twisting aid
MSC-18581 B80-10132 08
Adjustable base for centering staked bearings
MSC-19660 B80-10133 08
Tube flare inspection tool
MSC-19636 B80-10241 07
Locknut preload tool
MSC-16153 B80-10245 07
Handtool assists in bundling cables
MSC-18567 B80-10255 07
Sleeve puller salvages welded tubes
MSC-18686 B80-10256 07
Tube-welder aids
MSC-18687 B80-10277 08
Drilling at right angles in blind holes
M-FS-19535 B80-10403 07
Torque-wrench extension
MSC-18769 B80-10414 07
Wrench for smooth or damaged fasteners
MSC-18772 B80-10416 07
Cutting holes in fabric-faced panels
MSC-18786 B80-10427 08

TORQUE

Zero-torque spanner wrench
MSC-14843 B80-10107 07
Torque control for electric motors
MSC-18635 B80-10170 02
Locknut preload tool
MSC-16153 B80-10245 07

TORQUEMETERS

Eddy-current sensor measures bolt loading
M-FS-19486 B80-10079 06
Bolt-tension indicator
M-FS-19324 B80-10105 07
Torque-wrench extension
MSC-18769 B80-10414 07

TRACE CONTAMINANTS

Bulk lifetime indicates surface contamination
NPO-14966 B80-10511 06

TRACKING (POSITION)

Position monitor for mining machines
M-FS-25342 880-10157 01
Fresnel lens tracking solar collector
M-FS-25419 880-10190 03
Four-cell solar tracker
NPO-14811 880-10319 03

TRACKING FILTERS

Continuous control of phase-locked-loop bandwidth
MSC-16684 880-10008 01

TRACTION

High-performance, multiroller traction drive
LEWIS-13347 880-10244 07

TRAINING DEVICES

Learning high-quality soldering
NPO-14869 880-10539 08

TRAJECTORY OPTIMIZATION

Cost-minimized aircraft trajectories
ARC-11282 880-10396 06

TRANSDUCERS

Broadband electrostatic acoustic transducer for liquids
LANGLEY-12465 880-10078 06
Linearizing magnetic-amplifier dc transducer output
NPO-14617 880-10167 02
Compliant transducer measures artery profile
NPO-14899 880-10369 05
Fiber optic accelerometer
LEWIS-13219 880-10389 06
Transducer for extreme temperatures and pressures
MSC-18778 880-10510 06

TRANSFER TUNNELS

A versatile tunnel acts as a flexible duct
M-FS-22636 880-10242 07

TRANSFORMERS

LVDT gage for fracture-toughness tests in liquid hydrogen
LEWIS-13038 880-10075 06
Producing gapped-ferrite transformer cores
NPO-14715 880-10273 08
28-Channel rotary transformer
NPO-14861 880-10300 01
Improved magnetic material analyzer
LEWIS-13493 880-10384 06

TRANSIENT RESPONSE

Rotor transient analysis
LEWIS-13230 880-10259 07

TRANSISTOR LOGIC

A general logic structure for custom LSI's
NPO-14410 880-10118 08

TRANSISTORS

JANTX2N2060 dual transistor
M-FS-25251 880-10018 01
JANTX2N2219A dual transistor
M-FS-25252 880-10019 01
JANTX2N2369A transistor
M-FS-25254 880-10020 01
JANTX2N2432A transistor
M-FS-26255 880-10021 01
JANTX2N2484 transistor
M-FS-25253 880-10022 01
JANTX2N2605 transistor
M-FS-25150 880-10023 01
JANTX2N2905A transistor
M-FS-25256 880-10024 01
JANTX2N2920 Dual transistor
M-FS-25258 880-10025 01
JANTX2N2945A transistor
M-FS-25259 880-10026 01

JANTX2N3637 transistor
M-FS-25264 880-10027 01
JANTX2N3811 dual transistor
M-FS-25265 880-10028 01
JANTX2N4150 transistor
M-FS-25267 880-10029 01
JANTX2N4856 field-effect transistor
M-FS-25269 880-10030 01
Transistor package for high pressure applications
MSC-18743 880-10430 08

TRANSLATING

OCCULT-ORSER complete
conversational user-language translator
GSFC-12604 880-10556 09

TRANSMISSION EFFICIENCY

Efficient telemetry format
NPO-13679 880-10142 09

TRANSMITTERS

High-power solid-state microwave transmitter
NPO-14803 880-10296 01

TRANSONIC FLOW

Transonic airfoil design code
LANGLEY-12460 880-10085 06
Stream tube curvature analysis
LANGLEY-11535 880-10235 06
Inviscid transonic flow over axisymmetric bodies
LANGLEY-12499 880-10398 06
Transonic flow over wing/fuselage configurations
LANGLEY-12702 880-10525 06

TRANSPONDERS

Microprocessor control for phase-lock receiver
NPO-14438 880-10033 02
Microprocessor-based detector for PSK commands
NPO-14440 880-10036 02

TRANSPORT PROPERTIES

Thermodynamic and transport properties of air/water mixtures
LEWIS-13432 880-10519 06

TREES (MATHEMATICS)

Equations of motion for coupled n-body systems
GSFC-12407 880-10083 06

TUMORS

Temperature controller for hyperthermia devices
LANGLEY-12528 880-10072 05

TUNING

Ultrastable automatic frequency control
MSC-18679 880-10294 01

TURBINE BLADES

Analysis of a cooled, turbine blade or vane with an insert
LEWIS-13293 880-10400 06

TURBINE ENGINES

Composites for aeropropulsion
LEWIS-13438 880-10209 04

TURBINES

Regenerative superheated steam turbine cycles
LEWIS-13392 880-10234 06

TURBOFAN ENGINES

Suppressing buzz-saw noise in jet engines
LANGLEY-12645 880-10220 06

TURBULENCE

Extracting energy from natural flow
M-FS-23989 880-10045 03
Aeosol lasts up to six minutes
NPO-14947 880-10360 04

TURBULENT WAKES

Wakeflow analysis by cost
NPO-14705 880-10387 06

TWISTING

Wire harness twisting aid
MSC-18581 880-10132 08

U**ULTRASONIC RADIATION**

Acoustic lens is gas-filled
NPO-14757 880-10376 06

ULTRASONIC TESTS

Broadband electrostatic acoustic transducer for liquids
LANGLEY-12465 880-10078 06
Verifying root fusion in electron-beam welds
M-FS-19499 880-10110 08
Fresnel lenses for ultrasonic inspection
MSC-18469 880-10217 06
Ultrasonic frequency analysis
LANGLEY-12697 880-10377 06
Microprocessor-controlled ultrasonic plethysmograph
MSC-18759 880-10500 05
Beef grading by ultrasound
NPO-14812 880-10505 05

ULTRASONICS

Improved ureteral stone fragmentation catheter
NPO-14745 880-10370 05

ULTRAVIOLET PHOTOGRAPHY

Detecting contaminants by ultraviolet photography
M-FS-25296 880-10229 06

ULTRAVIOLET RADIATION

Miniature personal UV solar dosimeter
LANGLEY-12469 880-10321 03
Economical ultraviolet radiometer
NPO-14843 880-10322 03

ULTRAVIOLET SPECTROMETERS

Ultraviolet spectrometer/polarimeter
M-FS-25298 880-10042 03

ULTRAVIOLET SPECTROPHOTOMETERS

UV actinometer film
NPO-14479 880-10179 03

USER MANUALS (COMPUTER PROGRAMS)

User's guide to SFTRAN
LEWIS-13172 880-10143 09

USER REQUIREMENTS

Goddard mission analysis system
GSFC-12392 880-10144 09

V**VACUUM APPARATUS**

Knife-edge seal for vacuum bagging
M-FS-24049 880-10135 08
Time-sharing switch for vacuum brazing
MSC-18699 880-10412 07
Kilovolt vacuum feed through is less noisy
NPO-14802 880-10426 08

VACUUM TESTS

Integrated material-surface analyzer
NPO-14702 880-10388 06

VALVES

Automatic shutoff valve
MSC-19385 880-10097 07
Zero-torque spanner wrench
MSC-14843 880-10107 07

VAPOR DEPOSITION

- Automatic chemical vapor deposition
M-FS-25249 880-10431 08
Producing silicon continuously
NPO-14796 880-10537 08

VARIANCE

- Multiple linear regression analysis
M-FS-23764 880-10288 09

VEHICLE WHEELS

- Four-wheel dual braking for automobiles
LANGLEY-12687 880-10529 07

VELOCITY DISTRIBUTION

- The design and analysis of low-speed airfoils
LANGLEY-12727 880-10524 06

VENTS

- Automatic shutoff valve
MSC-19385 880-10097 07

VERSATILITY

- Versatile modular scaffolds
GSFC-12606 880-10406 07

VIBRATION DAMPING

- Foam-filled cushions for sliding trays
MSC-18565 880-10127 08

VIBRATION MEASUREMENT

- Transducer for extreme temperatures and pressures
MSC-18778 880-10510 06

VIBRATION MODE

- Vibration modes and frequencies of structures
LANGLEY-12647 880-10237 06

VIBRATORY LOADS

- Passive wing/store flutter suppression
LANGLEY-12468 880-10219 06

VIDEO EQUIPMENT

- Real-time film recording from stroke-written CRT's
LANGLEY-12529 880-10169 02
Imager displays free fall in stop action
NPO-14779 880-10509 06

VISCOPLASTICITY

- Reduced viscosity interpreted for fluid/gas mixtures
NPO-14976 880-10457 03

VISCOSITY

- Three-dimensional potential flow
LANGLEY-12623 880-10090 06
Reduced viscosity interpreted for fluid/gas mixtures
NPO-14976 880-10457 03

VISCOUS FLOW

- Viscous characteristics analysis
LANGLEY-12598 880-10084 06
Improved multielement airfoil analysis
LANGLEY-12489 880-10086 06
Reduced viscosity interpreted for fluid/gas mixtures
NPO-14976 880-10457 03

VISCOUS FLUIDS

- Transferring small samples of viscous liquid
MSC-18533 880-10069 04

VOLTAGE CONVERTERS (DC TO DC)

- Direct-current converter for gas-discharge lamps
MSC-18407 880-10156 01
Efficient, lightweight dc/dc switching converter
LEWIS-12809 880-10299 01

VOLTAGE REGULATORS

- Simple buck/boost voltage regulator
GSFC-12360 880-10003 01
Frequency-controlled voltage regulator
NPO-13633 880-10171 02

- A redundant regulator control with low standby losses
NPO-13165 880-10172 02

VOLUME

- An equation of state for liquids
NPO-14821 880-10174 03

VORTEX SHEETS

- A generalized vortex lattice method
LANGLEY-12636 880-10236 06

VORTICES

- Extracting energy from natural flow
M-FS-23989 880-10045 03

W**WAKES**

- Aerosol lasts up to six minutes
NPO-14947 880-10360 04

WARNING SYSTEMS

- Simple circuit monitors 'third wire' in ac lines
M-FS-19457 880-10002 01

WASTE ENERGY UTILIZATION

- Gas absorption/desorption temperature-differential engine
NPO-14528 880-10513 06

WASTE UTILIZATION

- Chlorinolysis reclaims rubber of waste tires
NPO-14935 880-10365 04

WASTES

- Recycling paper-pulp waste liquors
NPO-14797 880-10492 04

WATER

- Glycol/water evacuated-tube solar collector
M-FS-25337 880-10052 03

WATER POLLUTION

- Treating domestic wastewater with water hyacinths
M-FS-23964 880-10368 05

WATER QUALITY

- Measuring water properties from a moving boat
LANGLEY-12325 880-10073 05
Improved microbe detection in water samples
LANGLEY-12709 880-10502 05

WATER RECLAMATION

- Treating domestic wastewater with water hyacinths
M-FS-23964 880-10368 05

WATER TREATMENT

- Carbon scrubber
MSC-16531 880-10356 04
Treating domestic wastewater with water hyacinths
M-FS-23964 880-10368 05

WATER VAPOR

- Improved cell for water-vapor electrolysis
MSC-16394 880-10489 04
Thermodynamic and transport properties of air/water mixtures
LEWIS-13432 880-10519 06

WATER WAVES

- Oceanic-wave-measurement system
M-FS-23862 880-10224 06

WAVEGUIDES

- Verifying root fusion in electron-beam welds
M-FS-19499 880-10110 08

WEAR INHIBITORS

- Additive improves engine-oil performance
GSFC-12327 880-10065 04

WEAR TESTS

- Measuring ball-bearing loads
M-FS-19505 880-10102 07
A test program for solar collectors
M-FS-25433 880-10194 03

WEATHER DATA RECORDERS

- Microcomputer-based doppler systems for weather monitoring
GSFC-12448 880-10166 02

WEATHER FORECASTING

- Airborne meteorological data-collection system
LEWIS-13346 880-10314 02
Predicting and monitoring duststorms
NPO-14277 880-10323 03
Instrument measures cloud cover
NPO-14936 880-10514 06

WEIGHT REDUCTION

- Resizing structures for minimum weight
LANGLEY-12699 880-10394 06
Lightweight terminal board
MSC-18787 880-10429 08
Structural design with stress and displacement constraints
M-FS-25235 880-10521 06
Reflecting layers reduce weight of insulation
MSC-18785 880-10547 08

WEIGHTLESSNESS

- Containerless materials processing in the laboratory
M-FS-25242 880-10059 04

WELD TESTS

- 'Foreign material' to verify root fusion in welded joints
M-FS-19496 880-10276 08

WELDED JOINTS

- Sleeve puller salvages welded tubes
MSC-18686 880-10256 07
'Foreign material' to verify root fusion in welded joints
M-FS-19496 880-10276 08
Tube-welder aids
MSC-18687 880-10277 08

WELDING

- Verifying root fusion in electron-beam welds
M-FS-19499 880-10110 08
X-ray technique verifies weld-root fusion
M-FS-19468 880-10111 08
Etchant for incoloy-903 welds
M-FS-19378 880-10112 08
Eliminating underbead fissuring in superalloys
M-FS-19460 880-10114 08
A precoat prevents ceramic stopoffs from spalling
M-FS-19495 880-10136 08
Resistance welding graphite-fiber composites
MSC-18534 880-10264 08
Plastic welder
LANGLEY-12540 880-10274 08
Electron-beam welder circle generator
M-FS-19441 880-10275 08
Tube-welder aids
MSC-18687 880-10277 08
Reshaping tube ends for welding
MSC-18462 880-10407 07
Limiting current in electron-beam welders
M-FS-19503 880-10413 07

WELDING MACHINES

SUBJECT INDEX

WELDING MACHINES

Honing fixture for welded electrodes
M-FS-19537 B80-10278 08

WELLS

Downhole pressure sensor
NPO-14729 B80-10223 06

WHEATSTONE BRIDGES

Signal conditioner for nickel temperature sensors
MSC-18367 B80-10298 01

WHEEL BRAKES

Four-wheel dual braking for automobiles
LANGLEY-12687 B80-10529 07

WIND PRESSURE

Wind-simulation tester for solar modules
NPO-14837 B80-10517 06

WIND TUNNEL MODELS

A construction technique for wind tunnel models
LANGLEY-12710 B80-10381 06

WIND TUNNEL TESTS

Wakeflow analysis by cost
NPO-14705 B80-10387 06

WIND VELOCITY MEASUREMENT

Instrument remotely measures wind velocities
NPO-14524 B80-10176 03

WING LOADING

Transonic flow over wing/fuselage configurations
LANGLEY-12702 B80-10525 06

WINGS

Three-dimensional potential flow
LANGLEY-12623 B80-10090 06
Disturbance amplification rates
LANGLEY-12556 B80-10092 06
Passive wing/store flutter suppression
LANGLEY-12468 B80-10219 06
Solar-powered aircraft
LANGLEY-12615 B80-10404 07

WIRE WINDING

Wire harness twisting aid
MSC-18581 B80-10132 08

WIRING

Simple circuit monitors 'third wire' in ac lines
M-FS-19457 B80-10002 01
Learning high-quality soldering
NPO-14869 B80-10539 08

WRENCHES

Zero-torque spanner wrench
MSC-14843 B80-10107 07
Torque-wrench extension
MSC-18769 B80-10414 07
Wrench for smooth or damaged fasteners
MSC-18772 B80-10416 07

Y

YTTRIUM OXIDES

Oxide dispersion strengthened
superalloy
LEWIS-13589 B80-10351 04

Z

ZIRCONIUM OXIDES

Flashback-free combustor
LANGLEY-12666 B80-10226 06

X

X RAY INSPECTION

X-ray technique verifies weld-root fusion
M-FS-19468 B80-10111 08
Digital enhancement of X-rays for NDT
KSC-11118 B80-10232 06
X-ray beam pointer
MSC-18590 B80-10254 07

PERSONAL AUTHOR INDEX

Issue 22

Personal Author Index

This index is arranged alphabetically by author. The Tech Brief title is listed followed by the originating Center number, e.g., GSFC-12327. The Tech Brief number, e.g., B80-10065 is followed by a two-digit number, e.g., 04 which designates the subject category.

A

- ACOSTA, A. J.**
Dynamics of cavitating cascades and inducer pumps
M-FS-25399 B80-10392 06
- ADAMS, R. R.**
Miniature personal UV solar dosimeter
LANGLEY-12469 B80-10321 03
- ADAMS, W. M., JR.**
Aircraft equilibrium spin characteristics
LANGLEY-12502 B80-10087 06
- ALKIRE, I. D.**
Flared tube attachment fitting
MSC-18416 B80-10240 07
- ALLAIRE, P. E.**
Rotor transient analysis
LEWIS-13230 B80-10259 07
- ALLCOCK, H. R.**
Heat resistant polyphosphazene polymers
ARC-11176 B80-10350 04
- ANDERSON, N. E.**
High-performance, multiroller traction drive
LEWIS-13347 B80-10244 07
- ANDERSON, S. G.**
Flashback-free combustor
LANGLEY-12666 B80-10226 06
- ANDERSON, T. O.**
Multipath star switch controller
NPO-13422 B80-10035 02
- ANDRAWES, F. F.**
Applying the helium ionization detector in chromatography
MSC-18835 B80-10490 04
- ANDRYCZYK, R. W.**
A redundant regulator control with low standby losses
NPO-13165 B80-10172 02
- ANSELMO, V. J.**
Wakeflow analysis by cost
NPO-14705 B80-10387 06
- APERLO, P. J. A.**
Ball-joint grounding ring
MSC-18824 B80-10405 07
- APPEL, M. A.**
Aeosol lasts up to six minutes
NPO-14947 B80-10360 04
- ARGOUD, M. J.**
Detecting surface faults on solar mirrors
NPO-14684 B80-10230 06
- ARNQUIST, J. L.**
Plastic deformation of engines and other nonlinear structures
M-FS-23814 B80-10399 06
- ARVANITIS, L. G.**
Evaluating computer-drawn ground-cover maps
KSC-11195 B80-10555 09
- ASH, R.**
Measuring the thermal conductivity of insulation
NPO-14871 B80-10382 06
- ATKINS, W. T.**
Coal conversion and synthetic-fuel production
M-FS-25330 B80-10070 04
- ATKINSON, R. E.**
Selecting optimum algorithms for image processing
M-FS-25367 B80-10557 09
- AUGUST, R. R.**
Fiber optic accelerometer
LEWIS-13219 B80-10389 06
- AULT, G. M.**
Composites for aeropropulsion
LEWIS-13438 B80-10209 04
- AUSTIN, K. L.**
Alining sleeve for optical fibers
MSC-18756 B80-10424 01
- AUSTIN, S.**
Structured FORTRAN preprocessor
M-FS-23813 B80-10289 09
- AYLWARD, J. R.**
Improved cell for water-vapor electrolysis
MSC-16394 B80-10489 04
- BAINBRIDGE, R. C.**
NASA PERT time II
LEWIS-13145 B80-10286 09
- BAKER, W. M.**
A generalized vortex lattice method
LANGLEY-12636 B80-10236 06
- BAKOWSKI, M.**
Measuring radiation effects on MOS capacitors
NPO-14700 B80-10227 06
- BALL, W. B.**
Rotatable prism for pan and tilt
LANGLEY-12388 B80-10041 03
- BALLOU, E. V.**
Reducing static charges in fluidized bed reactions
ARC-11245 B80-10068 04
- BANKS, B. A.**
Ion-beam etching enhances adhesive bonding
LEWIS-13028 B80-10128 08
- BARR, T. A.**
Measuring coal deposits by radar
M-FS-23922 B80-10060 04
- BASS, R. M.**
Coal conversion and synthetic-fuel production
M-FS-25330 B80-10070 04
- BATHKER, D. A.**
Antenna feed for linear and circular polarization
NPO-14810 B80-10297 01
- BATIUK, W.**
Chemical-milling solution for invar alloy
M-FS-25365 B80-10113 08
- BAUCOM, R. M.**
Hot forming graphite/polyimide structures
LANGLEY-12547 B80-10422 08
- BAUER, F.**
Transonic airfoil design code
LANGLEY-12460 B80-10085 06
- BECKER, F. L.**
Verifying root fusion in electron-beam welds
M-FS-19499 B80-10110 08
- BEJCZY, A. K.**
The 3-D guidance system with proximity sensors
NPO-14521 B80-10250 07
- BENEDICTO, J. S. J.**
Electromechanical slip sensor
NPO-14654 B80-10253 07
- BENEDICTO, J. S. J.**
Cleaving machine for hard crystals
GSFC-12584 B80-10401 07
- BERDAHL, C. M.**
Downhole pressure sensor
NPO-14729 B80-10223 06
- BERDAHL, C. M.**
Four-cell solar tracker
NPO-14811 B80-10319 03
- BERDAHL, C. M.**
Field limiter for solar radiometers
NPO-14781 B80-10454 03
- BERDAHL, C. M.**
Short-range self-pulsed optical radar
NPO-14901 B80-10459 03
- BABECKI, A. J.**
Additive improves engine-oil performance
GSFC-12327 B80-10065 04
- BAGSTAD, B.**
Cooling/grounding mount for hybrid circuits
MSC-18728 B80-10302 01
- BAGWELL, J. W.**
Airborne meteorological data-collection system
LEWIS-13346 B80-10314 02

B

- BERNARD, C. A.**
Torque control for electric motors
MSC-18635 B80-10170 02
- BERRY, R. F.**
Low-cost calibration of acoustic locators
LANGLEY-12632 B80-10185 03
- BERSON, L. A.**
Adjustable base for centering staked bearings
MSC-19660 B80-10133 08
- BETTS, R. D.**
Eliminating underbead fissuring in superalloys
M-FS-19460 B80-10114 08
- BEUYUKIAN, C. S.**
Alumina barrier for vacuum brazing
MSC-18528 B80-10125 08
- BHAGAT, P. K.**
Microprocessor-controlled ultrasonic plethysmograph
MSC-18759 B80-10500 05
- BINGE, D. S.**
Self-lubricating gearset
MSC-18801 B80-10546 08
- BISHOP, A. R.**
Flow field in supersonic mixed-compression inlets
LEWIS-13279 B80-10088 06
- BLAIS, P. D.**
Bulk lifetime indicates surface contamination
NPO-14966 B80-10511 06
- BONNER, E.**
Aerodynamic preliminary analysis
LANGLEY-12404 B80-10397 06
- BOPPE, C. W.**
Transonic flow over wing/fuselage configurations
LANGLEY-12702 B80-10525 06
- BOREHAM, J. D.**
High-power solid-state microwave transmitter
NPO-14803 B80-10296 01
- BOWLES, K. J.**
Resin char oxidation retardant for composites
LEWIS-13275 B80-10354 04
- BRADFORD, R.**
Coal conversion and synthetic-fuel production
M-FS-25330 B80-10070 04
- BRAINARD, W. A.**
Improved adherence of TiC coatings to steel
LEWIS-13169 B80-10207 04
- BRAZELL, R. S.**
Applying the helium ionization detector in chromatography
MSC-18835 B80-10490 04
- BREAZEALE, M. A.**
Broadband electrostatic acoustic transducer for liquids
LANGLEY-12465 B80-10078 06
- BRECKINRIDGE, J. B.**
High-resolution spectrometry/interferometer
NPO-14448 B80-10175 03
- BREMMER, H.**
NASA PERT time II
LEWIS-13145 B80-10286 09
- BRENNAN, A.**
A precoat prevents ceramic stopoffs from spalling
M-FS-19495 B80-10136 08
- BRENNEN, C. E.**
Dynamics of cavitating cascades and inducer pumps
M-FS-25399 B80-10392 06
- BROCKMAN, M. H.**
Receiver array for high-rate telemetry
NPO-14579 B80-10308 02
- Arrayed receivers for low-rate telemetry
NPO-14590 B80-10309 02
- BROOKS, C. W.**
Four-quadrant CCD analog multiplier
LANGLEY-12332 B80-10305 02
- BROOKS, J. L.**
Room-temperature adhesive for high-temperature use
MSC-16930 B80-10129 08
- BROUSSARD, P. H.**
Detecting a coal/shale interface
M-FS-23720 B80-10061 04
- BROWELL, E. V.**
Laser-fluorescence measurement of marine algae
LANGLEY-12282 B80-10213 05
- BROWER, J. R.**
'Grinding' cavities in polyurethane foam
MSC-18564 B80-10124 08
- BROWN, N. D.**
A versatile tunnel acts as a flexible duct
M-FS-22636 B80-10242 07
- BRUNE, G. W.**
Improved multielement airfoil analysis
LANGLEY-12489 B80-10086 06
- BRYAN, C. F., JR.**
Cap protects aircraft nose cone
LANGLEY-12367 B80-10362 04
- BRYAN, D. C.**
Cap protects aircraft nose cone
LANGLEY-12367 B80-10362 04
- BRYANT, N. A.**
Image-based information, communication, and retrieval
NPO-14893 B80-10293 09
- BUCK, P. A.**
Ball-joint grounding ring
MSC-18824 B80-10405 07
- BUCKLES, B.**
Structured FORTRAN preprocessor
M-FS-23813 B80-10289 09
- BUCKLEY, J. D.**
Plastic welder
LANGLEY-12540 B80-10274 08
- BURCH, J. L.**
Detecting a coal/shale interface
M-FS-23720 B80-10061 04
- BURLEY, R. K.**
Electron-beam welder circle generator
M-FS-19441 B80-10275 08
- BURR, M. E.**
Eddy-current sensor measures bolt loading
M-FS-19486 B80-10079 06
- BUSH, H. G.**
Mechanical end joint for structural columns
LANGLEY-12482 B80-10095 07
- Biaxial method for in-plane shear testing
LANGLEY-12680 B80-10512 06
- BUTLER, J. M.**
Plasticizer for polyimide composites
LANGLEY-12642 B80-10206 04
- BUTNER, M. F.**
Measuring ball-bearing loads
M-FS-19505 B80-10102 07
- BUTTERFIELD, R. L.**
Digital enhancement of X-rays for NDT
KSC-11118 B80-10232 06
- BYRNE, F.**
Common data buffer
KSC-11048 B80-10303 02
- BYVIK, C. E.**
Photoproduction of halogens using platinized TiO₂
LANGLEY-12713 B80-10491 04

C

- CALLAS, L.**
Selecting optimum algorithms for image processing
M-FS-25367 B80-10557 09
- CAMARDA, C. J.**
Heat pipes cool probe and sandwich panel
LANGLEY-12588; LANGLEY-12637 B80-10518 06
- CAMPBELL, R. A.**
Detecting a coal/shale interface
M-FS-23720 B80-10061 04
- CANTRELL, J. H., JR.**
Broadband electrostatic acoustic transducer for liquids
LANGLEY-12465 B80-10078 06
- Ultrasonic frequency analysis
LANGLEY-12697 B80-10377 06
- CARRILLO, R.**
Wrench for smooth or damaged fasteners
MSC-18772 B80-10416 07
- CARROLL, B.**
Placement technique for semicustom digital LSI circuits
M-FS-25324 B80-10117 08
- CARROLL, T. R.**
Low-cost concentrating mirrors
NPO-14962 B80-10542 08
- CARSON, L. M.**
Microprocessor control for phase-lock receiver
NPO-14438 B80-10033 02
- CASEY, E. J.**
Wire harness twisting aid
MSC-18581 B80-10132 08
- CASSIDY, J. J., III**
NASA charging analyzer program
LEWIS-12973 B80-10058 03
- CASTERLINE, C.**
Forming complex cavities in clear plastic
LEWIS-13412 B80-10267 08
- CASTLES, S. H.**
Heat switch has no moving parts
GSFC-12625 B80-10391 06
- CEBECH, T.**
Disturbance amplification rates
LANGLEY-12556 B80-10092 06
- CHAI, A. T.**
Multijunction high-voltage solar cell
LEWIS-13400 B80-10441 01
- CHAMIS, C. C.**
Efficient measurement of shear properties of fiber composites
LEWIS-13011 B80-10216 06
- NASTRAN modifications for recovering strains and curvatures
LEWIS-12592 B80-10395 06
- CHARTIER, E. N.**
Drill-motor holding fixture
MSC-18582 B80-10108 07

- CHASE, W. D.**
Rain, fog, and clouds for aircraft
simulators
ARC-11158 B80-10383 06
- CHHATPAR, C. K.**
Holes help control temperature
GSFC-12618 B80-10373 06
- CHIN, F.**
Aluminum-encased lead mallet
MSC-18529 B80-10100 07
- CHOW, E. Y.**
Offset paraboloidal solar concentrator
NPO-14846 B80-10320 03
- CHOY, K. C.**
Rotor transient analysis
LEWIS-13230 B80-10259 07
- CHRISTENSEN, D. L.**
Thermal stratification in liquid storage
tanks
M-FS-25416 B80-10188 03
- CLARK, K. H.**
Mechanical hand for gripping objects
M-FS-23692 B80-10243 07
- CLARK, R. K.**
Environmental testing under load
LANGLEY-12602 B80-10379 06
- CLARKE, S.**
Connector heat shield
MSC-16282 B80-10126 08
- CLEMMONS, J. I., JR.**
Multichannel coincidence circuit
LANGLEY-12531 B80-10005 01
- CLEVER, W.**
Aerodynamic preliminary analysis
LANGLEY-12404 B80-10397 06
- COCKRUM, R. H.**
Measuring radiation effects on MOS
capacitors
NPO-14700 B80-10227 06
Improving MOS minority-carrier lifetime
NPO-14738 B80-10301 01
- COLE, J. D.**
Reflecting layers reduce weight of
insulation
MSC-18785 B80-10547 08
- COLEMAN, A. E.**
Manual for physical fitness
MSC-18915 B80-10372 05
- COLLINS, E. R.**
Sidewall penetrator for oil wells
NPO-14306 B80-10528 07
- COLLINS, E. R., JR.**
An adjustable solar concentrator
NPO-14710 B80-10043 03
Drilling side holes from a borehole
NPO-14465 B80-10066 04
- COMMADORE, C. C.**
Wire harness twisting aid
MSC-18581 B80-10132 08
- COMPTON, E. C.**
Camera add-on records time of
exposure
LANGLEY-12635 B80-10183 03
- CONROY, B. L.**
High-power solid-state microwave
transmitter
NPO-14803 B80-10296 01
- COOK, K. B., JR.**
Optimizing costs of VLSI circuits
M-FS-25348 B80-10281 08
- COOPER, R. A.**
Predicting lifetime of cast parts
M-FS-19549 B80-10228 06
- COSTAKOS, N. C.**
A versatile tunnel acts as a flexible
duct
M-FS-22636 B80-10242 07
- COUCH, L. M.**
Heat pipes cool probe and sandwich
panel
LANGLEY-12588; LANGLEY-12637
B80-10518 06
- COUCH, R. H.**
Temperature controller for hyperthermia
devices
LANGLEY-12528 B80-10072 05
- COULBERT, C. D.**
UV actinometer film
NPO-14479 B80-10179 03
- COX, G. W.**
Placement technique for semicustom
digital LSI circuits
M-FS-25324 B80-10117 08
- COYLE, M. J.**
Simplified thermal analyzer
GSFC-12638 B80-10393 06
- CRAWFORD, D. W.**
Compliant transducer measures artery
profile
NPO-14899 B80-10369 05
- CREDEUR, K. R.**
Estimation of incomplete multinomial
data
LANGLEY-12593 B80-10146 09
- CROSIER, W. G.**
Testing EKG electrodes on-line
MSC-18696 B80-10212 05
Cardiopulmonary data-acquisition
system
MSC-18783 B80-10499 05
Microprocessor-based cardiometer
MSC-18775 B80-10501 05
- CUK, S.**
Efficient, lightweight dc/dc switching
converter
LEWIS-12809 B80-10299 01
- CULLER, V. H.**
Compliant transducer measures artery
profile
NPO-14899 B80-10369 05
- CULP, L. N.**
Drill-motor holding fixture
MSC-18582 B80-10108 07
- CUNNINGHAM, J. W.**
Automatic thermal switches
GSFC-12553 B80-10214 06
- CUPP, J. L.**
Shaping graphite/epoxy stiffeners
MSC-18494 B80-10120 08
- CURRIE, J. R.**
Multiplexed logic controls solar-heating
system
M-FS-25287 B80-10318 03
- CURWICK, L. R.**
Oxide dispersion strengthened
superalloy
LEWIS-13589 B80-10351 04
- CWIERTNY, A. J., JR.**
Composites with nearly zero thermal
expansion
MSC-18724 B80-10355 04
- D**
- DA SILVA, A. J.**
Photometer used for response time
measurement
MSC-18712 B80-10317 02
- DAEGES, J. J.**
Computer-controlled warmup circuit
NPO-14815 B80-10155 01
- DANZA, T. M.**
Heat conduction in three dimensions
MSC-18616 B80-10239 06
- DASCHER, R.**
Coal conversion and synthetic-fuel
production
M-FS-25330 B80-10070 04
- DAVEY, R. E.**
'Grinding' cavities in polyurethane foam
MSC-18564 B80-10124 08
- DAVIS, E. S.**
Benefit assessment of solar-augmented
natural gas systems
NPO-14568 B80-10048 03
- DAWSON, C. T.**
System time-domain simulation
MSC-18333 B80-10292 09
- DE YOUNG, R. J.**
Large-volume multiple-path
nuclear-pumped laser
LANGLEY-12592 B80-10044 03
- DEADMORE, D. L.**
Low cost high temperature, duplex
coating for superalloys
LEWIS-13497 B80-10352 04
- DEBOO, G. J.**
Detecting short circuits during
assembly
ARC-11116 B80-10007 01
- DELIONBACK, L. M.**
Extracting energy from natural flow
M-FS-23989 B80-10045 03
Determining manufacturing cost from
product complexity
M-FS-25371 B80-10439 09
- DELMER, T. N.**
Numerical tracing of electron
trajectories
GSFC-12535 B80-10057 03
- DELVIGS, P.**
High char yield epoxy curing agents
LEWIS-13226 B80-10361 04
- DERAMUS, G. E., JR.**
Inhibiting corrosion in solar-heating and
cooling systems
M-FS-25387 B80-10056 03
- DIVAN, P.**
Aerodynamic preliminary analysis
LANGLEY-12404 B80-10397 06
- DIXON, W. F.**
'Grinding' cavities in polyurethane foam
MSC-18564 B80-10124 08
- DOCTOR, S.**
Verifying root fusion in electron-beam
welds
M-FS-19499 B80-10110 08
- DOLLAND, C.**
LSI logic for phase-control rectifiers
M-FS-25208 B80-10161 01
- DONALDSON, J. A.**
Microprocessor-based cardiometer
MSC-18775 B80-10501 05
- DOTTS, R. L.**
'Densified' tiles form stronger bonds
MSC-18741 B80-10534 08
- DOWLER, W. L.**
Measuring the thermal conductivity of
insulation
NPO-14871 B80-10382 06
- DRECHSLER, J. D.**
Lightweight terminal board
MSC-187 B80-10429 08
- DRIGGERS, G. W.**
Should we industrialize space?
M-FS-23963 B80-10137 08

- DROST, E. J.**
Detecting a coal/shale interface
M-FS-23720 B80-10061 04
- DRUMMOND, W. E.**
Soft container for explosive nuts
MSC-18871 B80-10532 07
- DUCKETT, R. J.**
User chooses coating properties
LANGLEY-12719 B80-10493 04
- DUFRESNE, E. R.**
Chlorinolysis reclaims rubber of waste tires
NPO-14935 B80-10365 04
- DUNKIN, J.**
Coal conversion and synthetic-fuel production
M-FS-25330 B80-10070 04
- DUNLAP, D. E., JR.**
Quick mixing of epoxy components
MSC-18731 B80-10415 07
- DUNN, K.**
Aerodynamic preliminary analysis
LANGLEY-12404 B80-10397 06
- DUNN, S. A.**
Controlling the shape of glass microballoons
M-FS-25230 B80-10266 08
- DUNN, T. J.**
Composites with nearly zero thermal expansion
MSC-18724 B80-10355 04
- DURDEN, J.**
Microprocessor-based detector for PSK commands
NPO-14440 B80-10036 02
- DURLING, R. J.**
Vibration modes and frequencies of structures
LANGLEY-12647 B80-10237 06
- E**
- EASTERLING, M. F.**
Receiver array for high-rate telemetry
NPO-14579 B80-10308 02
Arrayed receivers for low-rate telemetry
NPO-14590 B80-10309 02
- EATON, H.**
Lightweight terminal board
MSC-187 B80-10429 08
- ECORD, G. M.**
Tile densification with TEOS
MSC-18737 B80-10535 08
Repairing high-temperature glazed tiles
MSC-18736 B80-10536 08
- EDWARDS, H. B.**
Four-wheel dual braking for automobiles
LANGLEY-12687 B80-10529 07
- EDWARDS, T. R.**
Multiple linear regression analysis
M-FS-23764 B80-10288 09
- EGGLESTON, T. W.**
System time-domain simulation
MSC-18333 B80-10292 09
- EHRlich, L. F.**
Online assessment of a distributed processor
KSC-11124 B80-10037 02
- ELLIOTT, R. D.**
A generalized vortex lattice method
LANGLEY-12636 B80-10236 06
- ELLIS, A. B.**
Photoelectrochemical cell with nondissolving anode
LANGLEY-12591 B80-10038 03
- ELLIS, H., JR.**
Cavity-backed spiral-slot antenna
MSC-18532 B80-10448 02
Trislot-cavity microstrip antenna
MSC-18793 B80-10450 02
- EMANUEL, W. H.**
Reshaping tube ends for welding
MSC-18462 B80-10407 07
- ENGEL, A.**
Universal odd-modulus frequency divider
NPO-13426 B80-10006 01
- EPPLER, R.**
The design and analysis of low-speed airfoils
LANGLEY-12727 B80-10524 06
- ERICKSON, J. J.**
Silicon nitride passivation of IC's
M-FS-25309 B80-10279 08
- ERZBERGER, H.**
Cost-minimized aircraft trajectories
ARC-11282 B80-10396 06
- ESTEY, R. S.**
Economical ultraviolet radiometer
NPO-14843 B80-10322 03
- ESTRADA, R.**
Cooling/grounding mount for hybrid circuits
MSC-18728 B80-10302 01
- EVANS, J. C., JR.**
Multijunction high-voltage solar cell
LEWIS-13400 B80-10441 01
Solar cell is housed in light-bulb enclosure
LEWIS-13418 B80-10442 01
- F**
- FARNSWORTH, D. L.**
Monolithic CCD-array readout
LANGLEY-12376 B80-10307 02
- FASHANO, M.**
System time-domain simulation
MSC-18333 B80-10292 09
- FAUST, N. L.**
Low-cost LANDSAT processing system
M-FS-25396 B80-10285 09
- FEDORS, R. F.**
An equation of state for liquids
NPO-14821 B80-10174 03
- FEINSTEIN, S. P.**
Automated holographic drop-size analyzer
B80-10181 03
- FELDSTEIN, C.**
Compliant transducer measures artery profile
NPO-14899 B80-10369 05
- FERGUSON, D. R.**
Stream tube curvature analysis
LANGLEY-11535 B80-10235 06
- FESLER, L. W.**
Heat conduction in three dimensions
MSC-18616 B80-10239 06
- FESSLER, T. E.**
User's guide to SFTRAN
LEWIS-13172 B80-10143 09
Thermodynamic and transport properties of air/water mixtures
LEWIS-13432 B80-10519 06
- FEWELL, L. L.**
Heat resistant polyphosphazene polymers
ARC-11176 B80-10350 04
- FITZPATRICK, J. B.**
Fast response cryogen level sensor
MSC-18697 B80-10374 06
- FLANERY, H. E.**
Film coatings for contoured surfaces
MSC-18784 B80-10425 08
- FLETCHER, H. C.**
Additive improves engine-oil performance
GSFC-12327 B80-10065 04
- FLEURY, C.**
Resizing structures for minimum weight
LANGLEY-12699 B80-10394 06
- FONTES, M. J.**
Contour-measuring tool for composite layups
ARC-11246 B80-10417 08
- FORD, W. F.**
User's guide to SFTRAN
LEWIS-13172 B80-10143 09
- FORTINI, A.**
Compact, super heat exchanger
LEWIS-12441 B80-10081 06
- FOUGHNER, J. T., JR.**
Passive wing/store flutter suppression
LANGLEY-12468 B80-10219 06
- FOX, R. L.**
Plastic welder
LANGLEY-12540 B80-10274 08
- FOX, S. C.**
Improved microbe detection in water samples
LANGLEY-12709 B80-10502 05
- FRANCO, M. M.**
Portable zero-delay assembly
NPO-14671 B80-10316 02
- FRANKE, J. M.**
Noise suppression in forward-scattering optical instruments
LANGLEY-12730 B80-10324 03
Fiber-optics couple arthroscope to TV
LANGLEY-12718 B80-10504 05
- FRANT, M. S.**
Carbon scrubber
MSC-16531 B80-10356 04
- FRAZER, R. E.**
Tracking falling objects
NPO-14813 B80-10328 03
Imager displays free fall in stop action
NPO-14779 B80-10509 06
- FRECHE, J. C.**
Composites for aeropropulsion
LEWIS-13438 B80-10209 04
- FREEMAN, V. L.**
Composites with nearly zero thermal expansion
MSC-18724 B80-10355 04
- FRENCH, R. L.**
Benefit assessment of solar-augmented natural gas systems
NPO-14568 B80-10048 03
- FRIEDEL, M. V.**
Zero-torque spanner wrench
MSC-14843 B80-10107 07
- FRISCH, H. P.**
Equations of motion for coupled n-body systems
GSFC-12407 B80-10083 06
- FROST, R. K.**
Film coatings for contoured surfaces
MSC-18784 B80-10425 08

- FULLER, L. C.**
Regenerative superheated steam turbine cycles
LEWIS-13392 880-10234 06
- FUNICELLI, F.**
NASA PERT time II
LEWIS-13145 880-10286 09
- FURIGA, A.**
Ultrastable automatic frequency control
MSC-18679 880-10294 01
- FURTSCH, T. A.**
Electrically conductive palladium-containing polyimide films
LANGLEY-12629 880-10357 04
- G**
- GAALEMA, S. D.**
Better-quality CCD-array images
NPO-14426 880-10168 02
- GAGGINI, B.**
Selecting optimum algorithms for image processing
M-FS-25367 880-10557 09
- GAGLIANI, J.**
A new family of fire-resistant foams
MSC-16921 880-10418 08
Modified fire-resistant foams for seat cushions
MSC-18704 880-10419 08
One-step microwave foaming and curing
MSC-18707 880-10420 08
Rigid fire-resistant foams for walls and floors
MSC-18708 880-10421 08
- GAMMELL, P. M.**
Improved ureteral stone fragmentation catheter
NPO-14745 880-10370 05
Beef grading by ultrasound
NPO-14812 880-10505 05
- GARABEDIAN, P.**
Transonic airfoil design code
LANGLEY-12460 880-10085 06
- GARDNER, M. R.**
Temperature controller adapts to fatigue tester
LANGLEY-12393 880-10378 06
- GARTRELL, L. R.**
Noise suppression in forward-scattering optical instruments
LANGLEY-12730 880-10324 03
- GASSAWAY, J. D.**
Models of MOS and SOS devices
M-FS-25153 880-10141 08
Progress in MOSFET double-layer metalization
M-FS-25239 880-10280 08
- GEBHART, F. L.**
Silicon nitride passivation of IC's
M-FS-25309 880-10279 08
- GERSTMAYER, J. A.**
Etchant for incoloy-903 welds
M-FS-19378 880-10112 08
- GEYSER, L. C.**
Linear stochastic optimal control and estimation problem
LEWIS-13206 880-10287 09
Calculating linear A, B, C, and D matrices from a nonlinear dynamic engine simulation
LEWIS-13250 880-10520 06
- GIBSON, E. K.**
Applying the helium ionization detector in chromatography
MSC-18835 880-10490 04
- GILLILAND, C. S.**
User chooses coating properties
LANGLEY-12719 880-10493 04
- GIOVANNETTI, A.**
Cable-splice detector
ARC-11291 880-10074 06
- GIRALA, A. S.**
Tubing cutter for tight spaces
MSC-18538 880-10099 07
- GIRARD, M. A.**
Automated holographic drop-size analyzer
880-10181 03
- GLASGOW, T. K.**
Oxide dispersion strengthened superalloy
LEWIS-13589 880-10351 04
- GLENN, D. C.**
Soft container for explosive nuts
MSC-18871 880-10532 07
- GLICKSMAN, M. E.**
A temperature fixed point near 58 C
M-FS-25304 880-10204 04
- GLUYAS, R. E.**
Resin char oxidation retardant for composites
LEWIS-13275 880-10354 04
- GONAS, V. S.**
Shell theory automated for rotational structures
M-FS-23027 880-10089 06
- GORADIA, C.**
Multijunction high-voltage solar cell
LEWIS-13400 880-10441 01
- GORIS, A. C.**
System time-domain simulation
MSC-18333 880-10292 09
- GOULD, C. L.**
Should we industrialize space?
M-FS-23963 880-10137 08
- GOULD, R. W.**
Eliminating gaps in split rings
MSC-18854 880-10540 08
- GRANA, D. C.**
Improved microbe detection in water samples
LANGLEY-12709 880-10502 05
- GREEN, W. S.**
Heat-shrinkable sleeve aids in insulating universal joints
MSC-18685 880-10270 08
- GREENBERG, E.**
Efficient telemetry format
NPO-13679 880-10142 09
- GREENWOOD, J. E.**
Locknut preload tool
MSC-16153 880-10245 07
- GREINER, H. F.**
Design considerations for mechanical face seals
LEWIS-13146 880-10233 06
- GREULE, W. N.**
Vise holds specimens for microscope
MSC-18690 880-10098 07
- GRIFFITH, J. S.**
Wind-simulation tester for solar modules
NPO-14837 880-10517 06
- GRUNTHANER, F. J.**
Integrated material-surface analyzer
NPO-14702 880-10388 06
- GRUNWALD, A. J.**
Real-time film recording from stroke-written CRT's
LANGLEY-12529 880-10169 02
- GUNTER, E. J.**
Rotor transient analysis
LEWIS-13230 880-10259 07
- GUNTER, S.**
Controlling the shape of glass microballoons
M-FS-25230 880-10266 08
- GUPTA, A.**
UV actinometer film
NPO-14479 880-10179 03
Changes in 'thermal lens' measure diffusivity
NPO-14657 880-10218 06
Compact infrared detector
NPO-14864 880-10515 06
- H**
- HAEHNER, C. L.**
Multiple-creep-test apparatus
GSFC-12561 880-10080 06
- HAGLER, R.**
Test fittings for dimensionally critical tubes
NPO-14399 880-10252 07
- HALL, T. C.**
Photonitride passivating coating for IC's
M-FS-25401 880-10260 08
Silicon nitride passivation of IC's
M-FS-25309 880-10279 08
- HALLBERG, F.**
Cleaving machine for hard crystals
GSFC-12584 880-10401 07
- HALSEY, N. D.**
Three-dimensional potential flow
LANGLEY-12623 880-10090 06
- HAN, S. M.**
Thermal stratification in liquid storage tanks
M-FS-25416 880-10188 03
- HANKINS, J. D.**
Thermosyphon heat exchanger
M-FS-25389 880-10053 03
Controller for solar-energy systems
M-FS-25386 880-10054 03
Controller and temperature monitor for solar heating
M-FS-25387 880-10055 03
Final report on development of a programmable controller
M-FS-25388 880-10189 03
- HARMAN, T. C.**
Flush-mounting technique for composite beams
LANGLEY-12389 880-10121 08
- HARRISON, D. C.**
Crossed-grid charge locator
M-FS-25170 880-10010 01
- HARTLEY, R. B.**
MBASIC processor
NPO-14245 880-10290 09
- HARVEY, J. M.**
NASA charging analyzer program
LEWIS-12973 880-10058 03
- HAWK, J. D.**
Potential flow in two-dimensional deflected nozzles
LEWIS-13461 880-10523 06
- HAWKINS, S. F.**
Automatic shutoff valve
MSC-19385 880-10097 07

- HEADLEY, C. A.**
Reshaping tube ends for welding
MSC-18462 B80-10407 07
- HEARN, C. P.**
Temperature controller for hyperthermia devices
LANGLEY-12528 B80-10072 05
- HEFLINGER, L. O.**
Recording fluid currents by holography
M-FS-25373 B80-10222 06
- HELBLE, D. R.**
Clamshell door system
MSC-18468 B80-10101 07
- HENNRICH, C. H.**
NASTRAN modifications for recovering strains and curvatures
LEWIS-12592 B80-10395 06
- HERREID, R.**
Developing experiment instrument packages
GSFC-12536 B80-10451 02
- HESLIN, T. M.**
All-inorganic spark-chamber frame
GSFC-12354 B80-10265 08
- HESS, J. L.**
Three-dimnsional potential flow
LANGLEY-12623 B80-10090 06
- HEWES, D. E.**
Electrofluidic accelerometer
LANGLEY-12493 B80-10225 06
- HEYMAN, J. S.**
Broadband electrostatic acoustic transducer for liquids
LANGLEY-12465 B80-10078 06
Ultrasonic frequency analysis
LANGLEY-12697 B80-10377 06
- HILBERT, E. E.**
Basic cluster compression algorithm
NPO-14816 B80-10291 09
Compressing TV-image data
NPO-14823 B80-10310 02
An image-data-compression algorithm
NPO-14496 B80-10438 09
- HILL, G. M.**
Underground Coal Mining
NPO-14704 B80-10071 04
- HILL, J. W.**
Remote manipulator with force feed-back
ARC-11272 B80-10408 07
- HILL, W. L.**
Room-temperature adhesive for high-temperature use
MSC-16930 B80-10129 08
- HIMMEL, R. P.**
Cost models and economical packaging of LSI's
M-FS-25359 B80-10138 08
- HINKLEY, E. D., JR.**
Laser beam methane detector
NPO-14929 B80-10363 04
- HIRSCH, D. J.**
NASA PERT time II
LEWIS-13145 B80-10286 09
- HODGE, P. E.**
Corrosion-resistant ceramic thermal barrier coating
LEWIS-13088 B80-10067 04
- HODGES, J.**
Selecting optimum algorithms for image processing
M-FS-25367 B80-10557 09
- HOFFMAN, A. R.**
Improved particulate-sampling filter
NPO-14801 B80-10271 08
- HOFFMAN, J. D.**
Flow field in supersonic mixed-compression inlets
LEWIS-13279 B80-10088 06
- HOHL, F.**
Large-volume multiple-path nuclear-pumped laser
LANGLEY-12592 B80-10044 03
- HOLMAN, E. V.**
Self-adjusting mechanical snubbing link
MSC-16134 B80-10246 07
- HOLMES, J. F.**
Oceanic-wave-measurement system
M-FS-23862 B80-10224 06
- HOLT, J. W.**
'Densified' tiles form stronger bonds
MSC-18741 B80-10534 08
Mobile glazing unit
KSC-11171 B80-10538 08
- HOLZMAN, R. E.**
MBASIC processor
NPO-14245 B80-10290 09
- HONG, S.**
Compact infrared detector
NPO-14864 B80-10515 06
- HONG, S. D.**
Changes in 'thermal lens' measure diffusivity
NPO-14657 B80-10218 06
- HOOKE, A. J.**
Efficient telemetry format
NPO-13679 B80-10142 09
- HOOPER, N. J.**
Low-cost LANDSAT processing system
M-FS-25396 B80-10285 09
- HOOPER, S. L.**
Compact positioning flange
MSC-14876 B80-10104 07
- HOUGE, J. C.**
Gage for evaluating rheumatoid hands
GSFC-12610 B80-10503 05
- HOUSTON, S. W.**
Microprocessor-controlled data synchronizer
MSC-18535 B80-10031 02
- HOVEL, H. J.**
Ohmic contact to GaAs semiconductor
LANGLEY-12466 B80-10263 08
- HOWELL, L. D.**
Kilovolt vacuum feed through is less noisy
NPO-14802 B80-10426 08
- HU, T.**
Predicting crack propagation
MSC-18718; MSC-18721 B80-10283 08
- HUDGINS, J. L.**
Detecting a coal/shale interface
M-FS-23720 B80-10061 04
- HUGHES, T. H.**
Applications of remote-sensing imagery
M-FS-25107 B80-10082 06
- HULL, G. G.**
Chlorinolysis reclaims rubber of waste tires
NPO-14935 B80-10365 04
- HULL, R. A.**
Gentle arrester for moving bodies
LANGLEY-12372 B80-10531 07
- HUMPHRIES, T. S.**
Inhibiting corrosion in solar-heating and cooling systems
M-FS-25387 B80-10056 03
Less-toxic corrosion inhibitors
M-FS-25496 B80-10497 04
- HUNT, R.**
Real-time film recording from stroke-written CRT's
LANGLEY-12529 B80-10169 02
- IMIG, L. A.**
Temperature controller adapts to fatigue tester
LANGLEY-12393 B80-10378 06
- INGLE, W. M.**
Producing silicon continuously
NPO-14796 B80-10537 08
- INGLES, M. E.**
Wire harness twisting aid
MSC-18581 B80-10132 08
- IRICK, S. C.**
Spiral-wound gasket forms low-temperature seal
LANGLEY-12315 B80-10543 08
- IUFER, E. J.**
Cable-splice detector
ARC-11291 B80-10074 06
- JACQUEMIN, G. G.**
Automatic connector joins structural columns
LANGLEY-12578 B80-10251 07
- JAROE, R. R.**
Selecting optimum algorithms for image processing
M-FS-25367 B80-10557 09
- JEFFERS, G. W.**
Two-headed bolt
M-FS-19619 B80-10410 07
- JENKINS, R. V.**
Viscous characteristics analysis
LANGLEY-12598 B80-10084 06
Removal of hydrogen bubbles from nuclear reactors
LANGLEY-12597 B80-10205 04
- JENNINGS, D. E.**
Optical calibrator for TDL spectrometers
GSFC-12562 B80-10178 03
- JENSEN, R. N.**
Energy-saving thermostat
LANGLEY-12450 B80-10040 03
- JEPPESEN, G. L.**
A versatile tunnel acts as a flexible duct
M-FS-22636 B80-10242 07
- JING, G. K.**
Testing panels in tension and flexure
M-FS-25421 B80-10380 06
- JOHNSON, R. W.**
Fast microwave switching power divider
GSFC-12420 B80-10295 01
- JOHNSON, R., JR.**
Composites with nearly zero thermal expansion
MSC-18724 B80-10355 04
- JOHNSTON, J. D.**
Mechanical 'hand' for gripping objects
M-FS-23692 B80-10243 07

K

- KAISER, S. W.**
Photoelectrochemical cell with
nondissolving anode
LANGLEY-12591 880-10038 03
- KAMMERER, C. C.**
Fresnel lenses for ultrasonic inspection
MSC-18469 880-10217 06
- KANE, J. O.**
Thermal barrier and gas seal
MSC-18390 880-10269 08
- KANTAK, A. V.**
Timing signal propagates without phase
shift
MSC-18777 880-10449 02
- KANTSIOS, A. G.**
Detection of tanker defects with infrared
thermography
LANGLEY-12655 880-10221 06
- KASSEL, P. C., JR.**
Camera add-on records time of
exposure
LANGLEY-12635 880-10183 03
- KATTAMIS, T. Z.**
Reduced gravity favors columnar crystal
growth
M-FS-25205 880-10366 04
- KATZ, I.**
NASA charging analyzer program
LEWIS-12973 880-10058 03
- KAUPPI, J. F.**
Locknut preload tool
MSC-16153 880-10245 07
- KAUPS, K.**
Disturbance amplification rates
LANGLEY-12556 880-10092 06
- KAY, B. F.**
Flush-mounting technique for composite
beams
LANGLEY-12389 880-10121 08
- KAZAROFF, J. M.**
Compact, super heat exchanger
LEWIS-12441 880-10081 06
- KEITH, J. S.**
Stream tube curvature analysis
LANGLEY-11535 880-10235 06
- KELLER, J. D.**
Inviscid transonic flow over axisymmetric
bodies
LANGLEY-12499 880-10398 06
- KELLY, H. N.**
Heat pipes cool probe and sandwich
panel
LANGLEY-12588; LANGLEY-12637
880-10518 06
- KELLY, T. P.**
New pressure-sensitive silicone
adhesive
LANGLEY-12737 880-10495 04
- KENDALL, J. M., JR.**
Acoustic lens is gas-filled
NPO-14757 880-10376 06
Drop tower with no aerodynamic drag
NPO-14845 880-10549 08
- KENIGSBERG, I.**
Isolation and measurement of rotor
vibration forces
LANGLEY-12476 880-10507 06
- KENNEDY, B. W.**
Automated ion implantation for IC's
M-FS-25193 880-10139 08
An automated photolithography facility
for IC's
M-FS-25073 880-10140 08
- An automated oxide and diffusion facility
for IC's
M-FS-25357 880-10282 08
Automatic chemical vapor deposition
M-FS-25249 880-10431 08
- KERLEY, J.**
Versatile modular scaffolds
GSFC-12606 880-10406 07
- KERNS, D. V., JR.**
Optimizing costs of VLSI circuits
M-FS-25348 880-10281 08
- KEY, J.**
Shell theory automated for rotational
structures
M-FS-23027 880-10089 06
- KIDDER, P. W.**
Hot forming graphite/polyimide
structures
LANGLEY-12547 880-10422 08
- KIM, Y. G.**
Oxide dispersion strengthened
superalloy
LEWIS-13589 880-10351 04
- KING, J. P., JR.**
Flared tube attachment fitting
MSC-18416 880-10240 07
- KINSER, D. L.**
Coatings for hybrid microcircuits
M-FS-25292 880-10116 08
- KISSEL, R. R.**
Solar-site test module
M-FS-25543 880-10460 03
- KIUSALAAS, J.**
Structural design with stress and
displacement constraints
M-FS-25235 880-10521 06
- KLARE, S. W.**
Microprocessor-based detector for PSK
commands
NPO-14440 880-10036 02
- KLECKNER, R. J.**
Cylindrical bearing analysis
LEWIS-13393 880-10533 07
- KLEINBERG, L. L.**
Simple JFET oscillator
GSFC-12555 880-10443 01
- KLEINE, H.**
Software design and documentation
language
NPO-14610 880-10145 09
- KLEINT, R. E.**
Verifying root fusion in electron-beam
welds
M-FS-19499 880-10110 08
X-ray technique verifies weld-root
fusion
M-FS-19468 880-10111 08
'Foreign material' to verify root fusion
in welded joints
M-FS-19496 880-10276 08
- KLOPP, W. D.**
Reduced hydrogen permeability at high
temperatures
LEWIS-13485 880-10364 04
- KNIGHT, C. W.**
Camera add-on records time of
exposure
LANGLEY-12635 880-10183 03
- KOCH, A. J.**
Abrasive drill for resilient materials
LEWIS-13411 880-10402 07
- KOEPF, G.**
Diplexer for laser-beam heterodyne
receiver
GSFC-12589 880-10329 03
- KOJIMA, J.**
Aerodynamic preliminary analysis
LANGLEY-12404 880-10397 06
- KOJIMA, T. T.**
Simple circuit monitors 'third wire' in
ac lines
M-FS-19457 880-10002 01
- KORBELAK, K.**
Safely splicing glass optical fibers
KSC-11107 880-10134 08
- KORN, D.**
Transonic airfoil design code
LANGLEY-12460 880-10085 06
- KRAMER, R. C.**
Method for shaping polyethylene tubing
MSC-18771 880-10423 08
Pneumatic-power supply
MSC-18855 880-10527 07
- KUMMER, W. H.**
Dual-frequency bidirectional antenna
GSFC-12501 880-10154 01
- KVATERNIK, R. G.**
Vibration modes and frequencies of
structures
LANGLEY-12647 880-10237 06
- KVELTHAU, R. L.**
CADAT integrated circuit artwork
program
M-FS-25017 880-10552 08

L

- LACY, L. L.**
Containerless materials processing in the
laboratory
M-FS-25242 880-10059 04
- LAFLAME, D. T.**
Improved code-tracking loop
MSC-18035 880-10034 02
- LAMOUREUX, R. T.**
Resistance welding graphite-fiber
composites
MSC-18534 880-10264 08
- LAMPE, D. R.**
Four-quadrant CCD analog multiplier
LANGLEY-12332 880-10305 02
Monolithic four-quadrant multiplier
LANGLEY-12330A 880-10306 02
Monolithic CCD-array readout
LANGLEY-12376 880-10307 02
- LANDEL, R. F.**
An equation of state for liquids
NPO-14821 880-10174 03
- LASH, T. J.**
Far-field radiation pattern of tunable
diode lasers
LANGLEY-12631 880-10177 03
- LAUDENSLAGER, J. B.**
Pulse-shaping circuit for laser excitation
NPO-14556 880-10453 03
- LAUE, E. G.**
Instrument measures cloud cover
NPO-14936 880-10514 06
- LAWING, P. L.**
A construction technique for wind tunnel
models
LANGLEY-12710 880-10381 06
- LAWSON, A. G.**
Measuring water properties from a
moving boat
LANGLEY-12325 880-10073 05
- LEAR, W. M.**
Refraction corrections for surveying
MSC-18664 880-10231 06

- An approximation for inverse Laplace transforms
MSC-18867 B80-10553 09
- LEBLANC, L. P.**
An oven for many thermocouple reference junctions
FRC-10112 B80-10506 06
- LEE, H.**
Cost-minimized aircraft trajectories
ARC-11282 B80-10396 06
- LEE, J.**
Basic cluster compression algorithm
NPO-14816 B80-10291 09
Compressing TV-image data
NPO-14823 B80-10310 02
- LEE, J. F. L.**
Aliasing filter for multirate systems
MSC-18472 B80-10153 01
Converting a digital filter to its analog equivalent
MSC-18587 B80-10313 02
- LEE, R.**
Modified fire-resistant foams for seat cushions
MSC-18704 B80-10419 08
One-step microwave foaming and curing
MSC-18707 B80-10420 08
Rigid fire-resistant foams for walls and floors
MSC-18708 B80-10421 08
- LEE, R. D.**
Cable-splice detector
ARC-11291 B80-10074 06
- LEFEVER, A. E.**
Self-energized screw coupling
M-FS-25340 B80-10096 07
- LEHTINEN, F. K. B.**
Linear stochastic optimal control and estimation problem
LEWIS-13206 B80-10287 09
- LEIFFER, J. L.**
New pressure-sensitive silicone adhesive
LANGLEY-12737 B80-10495 04
- LESH, F. H.**
Microprocessor systems for industrial process control
NPO-14661 B80-10131 08
- LEVINE, F. E.**
Simultaneous disk storage and retrieval
KSC-11167 B80-10304 02
- LEVINE, S.**
Shell theory automated for rotational structures
M-FS-23027 B80-10089 06
- LEVINE, S. R.**
Corrosion-resistant ceramic thermal barrier coating
LEWIS-13088 B80-10067 04
- LEWIS, B. F.**
Integrated material-surface analyzer
NPO-14702 B80-10388 06
- LEWIS, D. H.**
Reduced viscosity interpreted for fluid/gas mixtures
NPO-14976 B80-10457 03
- LEWIS, J. C.**
Lightweight cryogenic vessel
NPO-14794 B80-10548 08
- LI, S. P.**
Model for MOS field-time-dependent breakdown
NPO-14701 B80-10162 01
Improving MOS minority-carrier lifetime
NPO-14738 B80-10301 01
- LINDMAYER, J.**
Arc spraying solderable tabs to glass
NPO-14853 B80-10544 08
- LINDOW, B. G.**
Airborne meteorological data-collection system
LEWIS-13346 B80-10314 02
- LINDSEY, W. C.**
Timing signal propagates without phase shift
MSC-18777 B80-10449 02
- LISAGOR, W. B.**
Environmental testing under load
LANGLEY-12602 B80-10379 06
- LISLE, R. V.**
Fast calibration of gas flowmeters
KSC-11076 B80-10516 06
- LONG, M. J.**
Interlocking wedge joint is easily assembled
LANGLEY-12729 B80-10526 07
- LOWENTHAL, S.**
High-performance, multiroller traction drive
LEWIS-13347 B80-10244 07
- LOWERY, J. R.**
Selective optical coatings for solar collectors
M-FS-23589 B80-10192 03
- LUBICH, J.**
Position monitor for mining machines
M-FS-25342 B80-10157 01
- LUCE, N.**
Coal conversion and synthetic-fuel production
M-FS-25330 B80-10070 04
- LUDWIG, L. P.**
Self-acting shaft seals
LEWIS-13229 B80-10109 07
Design considerations for mechanical face seals
LEWIS-13146 B80-10233 06
- LUTES, G. F., JR.**
Fiber optics transmit clock signal more reliably
NPO-14749 B80-10456 03
- LUTUS, P.**
Direct-current converter for gas-discharge lamps
MSC-18407 B80-10156 01
- LYNN, J. J.**
Microcomputer-based doppler systems for weather monitoring
GSFC-12448 B80-10166 02
- M**
- MACCONOCHIE, I. O.**
Miniature personal UV solar dosimeter
LANGLEY-12469 B80-10321 03
- MADDEN, J. F.**
Isolation and measurement of rotor vibration forces
LANGLEY-12476 B80-10507 06
- MAESTRELLO, L.**
Suppressing buzz-saw noise in jet engines
LANGLEY-12645 B80-10220 06
- MAHMOOD, Q.**
Models of MOS and SOS devices
M-FS-25153 B80-10141 08
- MAIER, L. C.**
Fast response cryogen level sensor
MSC-18697 B80-10374 06
- MAJOR, R. K.**
Electronic depth micrometer
KSC-11181 B80-10385 06
- MANDEL, H.**
Cooling/grounding mount for hybrid circuits
MSC-18728 B80-10302 01
- MANDELL, M. J.**
NASA charging analyzer program
LEWIS-12973 B80-10058 03
- MANKE, J. W.**
Improved multielement airfoil analysis
LANGLEY-12489 B80-10086 06
- MARGOLIS, J. S.**
Instrument remotely measures wind velocities
NPO-14524 B80-10176 03
- MARKATOS, N. C.**
Methane/air flames in a concentric tube combustor
LEWIS-13388 B80-10211 04
- MARQUARDT, S.**
Back contacts for silicon-on-ceramic solar cells
NPO-14809 B80-10545 08
- MARSHBURN, J. P.**
Heat-pipe sensor for remote leveling
GSFC-12095 B80-10248 07
- MARTIN, D. R.**
Microprocessor-controlled data synchronizer
MSC-18535 B80-10031 02
- MASERJIAN, J.**
Model for MOS field-time-dependent breakdown
NPO-14701 B80-10162 01
Measuring radiation effects on MOS capacitors
NPO-14700 B80-10227 06
- MATTOX, D. M.**
Driving bubbles out of glass
M-FS-25414 B80-10496 04
- MATUSIK, G.**
Forming complex cavities in clear plastic
LEWIS-13412 B80-10267 08
- MCCLEESE, D. J.**
Instrument remotely measures wind velocities
NPO-14524 B80-10176 03
- MCDONALD, R. C.**
Treating domestic wastewater with water hyacinths
M-FS-23964 B80-10368 05
- MCGARRY, F. E.**
Goddard mission analysis system
GSFC-12392 B80-10144 09
- MCHATTON, A. D.**
Precision filament cutter
LANGLEY-12564 B80-10093 07
- MCLYMAN, W. T.**
Frequency-controlled voltage regulator
NPO-13633 B80-10171 02
Producing gapped-ferrite transformer cores
NPO-14715 B80-10273 08
28-Channel rotary transformer
NPO-14861 B80-10300 01
- MENAMARA, J. W.**
Interchangeable spring modules for inertia measurements
LANGLEY-12402 B80-10386 06
- MEGIE, G. J.**
Tunable pulsed carbon dioxide laser
NPO-14984 B80-10458 03

MEITNER, P. L.

Full-coverage film cooling
LEWIS-13249 B80-10091 06

MENZIES, R. T.

Tunable pulsed carbon dioxide laser
NPO-14984 B80-10458 03

MERRICK, H. F.

Oxide dispersion strengthened
superalloy
LEWIS-13589 B80-10351 04

MERSERAU, G. A.

Sealing micropores in thin castings
MSC-18623 B80-10428 08

MEUNIER, G. E.

Tube flare inspection tool
MSC-19636 B80-10241 07

MIDDLEBROOK, R. D.

Efficient, lightweight dc/dc switching
converter
LEWIS-12809 B80-10299 01

MILES, R. T.

Oceanic-wave-measurement system
M-FS-23862 B80-10224 06

MILLER, B. W.

Transferring small samples of viscous
liquid
MSC-18533 B80-10069 04

MILLER, C. G.

Gas absorption/desorption
temperature-differential engine
NPO-14528 B80-10513 06

MILLER, G.

Soft container for explosive nuts
MSC-18871 B80-10532 07

MILLER, R. A.

Corrosion-resistant ceramic thermal
barrier coating
LEWIS-13088 B80-10067 04

MILLER, W. E.

Photocapacitive image converter
LANGLEY-12513 B80-10009 01

MILLER, W. N.

11-Line to 512-line decoder
MSC-19751 B80-10158 01

MINOTT, P. O.

Multibeam collimator uses prism stack
GSFC-12608 B80-10452 03

MIRANDA, L. R.

A generalized vortex lattice method
LANGLEY-12636 B80-10236 06

MIRTICH, M. J.

Ion-beam etching enhances adhesive
bonding
LEWIS-13028 B80-10128 08

MISENICK, J. A.

Reduced hydrogen permeability at high
temperatures
LEWIS-13485 B80-10364 04

MITCHELL, C. L.

CADAT logic simulation program
M-F-25183 B80-10432 08

MITCHELL, F. R.

Compact table-tilting mechanism
NPO-14800 B80-10411 07

MITCHELL, S. M.

Transferring small samples of viscous
liquid
MSC-18533 B80-10069 04
Removing freon gas from hydraulic
fluid
MSC-18740 B80-10494 04

MOACANIN, J.

An equation of state for liquids
NPO-14821 B80-10174 03
Changes in 'thermal lens' measure
diffusivity
NPO-14657 B80-10218 06

Compact infrared detector

NPO-14864 B80-10515 06

MONGAN, R. D.

Heat conduction in three dimensions
MSC-18616 B80-10239 06

MORRIS, P. W.

Detecting a coal/shale interface
M-FS-23720 B80-10061 04

MOSHEY, E. A.

Cryogenic machining of polyurethane
foam
MSC-18572 B80-10123 08

MOTAL, G. W.

Continuous control of phase-locked-loop
bandwidth
MSC-16684 B80-10008 01

N**NADLER, H.**

Transducer for extreme temperatures and
pressures
MSC-18778 B80-10510 06

NAGANO, S.

Linearizing magnetic-amplifier dc
transducer output
NPO-14617 B80-10167 02

NAHIN, S. B.

Foam-filled cushions for sliding trays
MSC-18565 B80-10127 08

NASVYTIS, A.

High-performance, multiroller traction
drive
LEWIS-13347 B80-10244 07

NEISWANDER, D. W.

Detecting contaminants by ultraviolet
photography
M-FS-25296 B80-10229 06

NELSON, C. W.

X-ray beam pointer
MSC-18590 B80-10254 07

NEWBURNE, R.

Evaluating computer-drawn
ground-cover maps
KSC-11195 B80-10555 09

NEWCOMB, A. L., JR.

Precision filament cutter
LANGLEY-12564 B80-10093 07

NICHOLAS, R. F.

Honing fixture for welded electrodes
M-FS-19537 B80-10278 08

NISEN, D. B.

Containerless materials processing in the
laboratory
M-FS-25242 B80-10059 04

NISWANDER, J. K.

RAM-Based frame synchronizer
GSFC-12430 B80-10164 02

RAM-Based parallel-output controller
GSFC-12447 B80-10165 02

NITZSCHKE, G. O.

Sealing micropores in thin castings
MSC-18623 B80-10428 08

NOLA, F. J.

Improved power factor controller
M-FS-25323 B80-10149 01
Energy saving in ac generators
M-FS-25302 B80-10150 01

NORTON, R. H.

High-resolution spectrometry/inter-
ferometer
NPO-14448 B80-10175 03

O**OAKLEY, J. W.**

Interchangeable spring modules for
inertia measurements
LANGLEY-12402 B80-10386 06

OBRIEN, J. P.

Heat resistant polyphosphazene
polymers
ARC-11176 B80-10350 04

OCHS, H. L.

Sealing micropores in thin castings
MSC-18623 B80-10428 08

OGILVIE, P.

Shell theory automated for rotational
structures
M-FS-23027 B80-10089 06

OHLSON, J. E.

Receiving signals of any polarization
NPO-14836 B80-10315 02

OLNEY, J. N.

Transferring small samples of viscous
liquid
MSC-18533 B80-10069 04

OLSON, A. J.

Film coatings for contoured surfaces
MSC-18784 B80-10425 08

ONESTY, J. P.

Safety analysis for complex systems
MSC-18745 B80-10554 09

ORSZAG, S. A.

Disturbance amplification rates
LANGLEY-12556 B80-10092 06

OTOSHI, T. Y.

Portable zero-delay assembly
NPO-14671 B80-10316 02

High-power dual-directional coupler
NPO-14713 B80-10447 02

OVERBEY, C. W.

Automatic shutoff valve
MSC-19385 B80-10097 07

OZYAZICI, E. M.

Input/output interface module
MSC-18180 B80-10159 01

P**PACALA, T. J.**

Pulse-shaping circuit for laser excitation
NPO-14556 B80-10453 03

PACKARD, H.

Speed control for synchronous motors
MSC-18680 B80-10444 01

PALLAT, E. A.

NASA PERT time II
LEWIS-13145 B80-10286 09

PAPAZIAN, J. M.

Reduced gravity favors columnar crystal
growth
M-FS-25205 B80-10366 04

PARDUE, I. F.

Aluminum-encased lead mallet
MSC-18529 B80-10100 07

PARK, S.

Electromechanical slip sensor
NPO-14654 B80-10253 07

PAULKOVICH, J.

Simple buck/boost voltage regulator
GSFC-12360 B80-10003 01

PAYNTER, D.

System time-domain simulation
MSC-18333 B80-10292 09

- PECK, S. R.**
A redundant regulator control with low standby losses
NPO-13165 B80-10172 02
- PEERCY, R. L. JR.**
Safety analysis for complex systems
MSC-18745 B80-10554 09
- PESSIN, R.**
Retaining a sleeve on a shaft
M-FS-19518 B80-10103 07
Drilling at right angles in blind holes
M-FS-19535 B80-10403 07
- PETERS, J. W.**
Photonitride passivating coating for IC's
M-FS-25401 B80-10260 08
Silicon nitride passivation of IC's
M-FS-25309 B80-10279 08
- PETERSON, D. H.**
Torque-wrench extension
MSC-18769 B80-10414 07
- PETERSON, J.**
Selecting optimum algorithms for image processing
M-FS-25367 B80-10557 09
- PETERSON, S. A.**
Cutting holes in fabric-faced panels
MSC-18786 B80-10427 08
- PHILLIPS, W. H.**
Solar-powered aircraft
LANGLEY-12615 B80-10404 07
- PIERCE, W. S.**
LVDT gage for fracture-toughness tests in liquid hydrogen
LEWIS-13038 B80-10075 06
Tension-mode loading for bend specimens in cryogenics
LEWIS-13040 B80-10076 06
Modified displacement gage for cryogenic testing
LEWIS-13039 B80-10077 06
- PIRVICS, J.**
Cylindrical bearing analysis
LEWIS-13393 B80-10533 07
- PITTS, E. R.**
CADAT network translator
M-FS-25055 B80-10551 08
- PITTS, J.**
UV actinometer film
NPO-14479 B80-10179 03
- PIVIROTTI, T. J.**
Powerful copper chloride laser
NPO-14782 B80-10330 03
- PIZZECK, D. E.**
Easily-assembled helical heater
LANGLEY-11712 B80-10130 08
- PLAUTZ, K. A.**
Gage for evaluating rheumatoid hands
GSFC-12610 B80-10503 05
- POOLE, B. D., JR.**
Miniature personal UV solar dosimeter
LANGLEY-12469 B80-10321 03
- PORTNOY, W. M.**
Miniaturized physiological data telemetry system
MSC-18804 B80-10371 05
- POSTAL, R. B.**
High-power solid-state microwave transmitter
NPO-14803 B80-10296 01
- PRASTHOFER, W. P.**
Spraying suspensions uniformly
M-FS-25139 B80-10409 07
- PRUSSIN, S.**
Model for MOS field-time-dependent breakdown
NPO-14701 B80-10162 01
- Improving MOS minority-carrier lifetime
NPO-14738 B80-10301 01
- PRYCHKA, P.**
Cryogenic machining of polyurethane foam
MSC-18572 B80-10123 08
- PURVES, L.**
An all-FORTRAN version of NASTRAN for the VAX
GSFC-12600 B80-10522 06
- PUTNAM, L. E.**
Predicting propulsion system drag
LANGLEY-12619 B80-10238 06
- ## R
- RAMAPRIYAN, H. K.**
OCCULT-ORSER complete conversational user-language translator
GSFC-12604 B80-10556 09
- RATHZ, T. J.**
Containerless materials processing in the laboratory
M-FS-25242 B80-10059 04
- RAUSCHL, J. A.**
Knife-edge seal for vacuum bagging
M-FS-24049 B80-10135 08
- RAVETTI, R. G.**
Cost models and economical packaging of LSI's
M-FS-25359 B80-10138 08
- RAYBORN, G. H.**
Improved LEEM ranges over four decades
LANGLEY-12706 B80-10508 06
- READ, W. S.**
Learning high-quality soldering
NPO-14869 B80-10539 08
- REASONER, R. B.**
Low-resistance continuity tester
NPO-14881 B80-10445 01
- REDDY, G. B.**
Structural design with stress and displacement constraints
M-FS-25235 B80-10521 06
- REDMANN, J. J.**
Improved multispectral solar cell array
HQN-10937 B80-10184 03
- REED, R. A.**
Cardiopulmonary data-acquisition system
MSC-18783 B80-10499 05
- REED, W. H., III**
Passive wing/store flutter suppression
LANGLEY-12468 B80-10219 06
- REICH, R.**
Evaluating computer-drawn ground-cover maps
KSC-11195 B80-10555 09
- REICHMAN, B.**
Photoproduction of halogens using platinized TiO₂
LANGLEY-12713 B80-10491 04
- REID, H., JR.**
Detecting a coal/shale interface
M-FS-23720 B80-10061 04
- REINHARDT, V. S.**
Integral storage-bulb and microwave cavity for masers
GSFC-12542 B80-10186 03
- REMBAUM, A.**
Hybrid polymer microspheres
NPO-14462 B80-10208 04
- RHODES, D. B.**
Fiber-optics couple arthroscope to TV
LANGLEY-12718 B80-10504 05
- RICE, R. F.**
Compressing TV-image data
NPO-14823 B80-10310 02
An image-data-compression algorithm
NPO-14496 B80-10438 09
- RICK, S. C.**
Dual mode actuator
LANGLEY-12412 B80-10106 07
- RILEY, T.**
Forming complex cavities in clear plastic
LEWIS-13412 B80-10267 08
- RIPPEL, W. E.**
Improved battery charger for electric vehicles
NPO-14964 B80-10440 01
- ROBB, P. H.**
'Grinding' cavities in polyurethane foam
MSC-18564 B80-10124 08
Foam-filled cushions for sliding trays
MSC-18565 B80-10127 08
- ROBINSON, M. B.**
Containerless materials processing in the laboratory
M-FS-25242 B80-10059 04
- ROCKOFF, H. J.**
Reflecting layers reduce weight of insulation
MSC-18785 B80-10547 08
- RODRIGUEZ, G. E.**
Simple buck/boost voltage regulator
GSFC-12360 B80-10003 01
- ROHN, D. A.**
High-performance, multiroller traction drive
LEWIS-13347 B80-10244 07
- ROSNER, R. S.**
Producing silicon continuously
NPO-14796 B80-10537 08
- ROTHROCK, C. W.**
Cost models and economical packaging of LSI's
M-FS-25359 B80-10138 08
- ROUSSEAU, C. R.**
Room-temperature adhesive for high-temperature use
MSC-16930 B80-10129 08
- RUIZ, W. V.**
Shrinking plastic tubing and nonstandard diameters
MSC-18430 B80-10268 08
- RUMMLER, D. R.**
An approximation to student's t-distribution
LANGLEY-12238 B80-10284 09
- RUNYAN, H. L., JR.**
Passive wing/store flutter suppression
LANGLEY-12468 B80-10219 06
- RUSS, C. E., JR.**
Gas-laser power monitor
LANGLEY-12682 B80-10455 03
- RUTT, G. S.**
Testing EKG electrodes on-line
MSC-18696 B80-10212 05
- RYAN, E.**
NASA PERT time II
LEWIS-13145 B80-10286 09
- RYAN, J. P.**
Structured FORTRAN preprocessor
M-FS-23813 B80-10289 09

S

- SABOURIN, D. J.**
Ultrastable automatic frequency control
MSC-18679 B80-10294 01
- SALAMA, A. M.**
Nickel-doped silicon for solar cells
NPO-14780 B80-10550 08
- SALISBURY, J. K., JR.**
Remote manipulator with force
feed-back
ARC-11272 B80-10408 07
- SANDEFUR, P. G., JR.**
A construction technique for wind tunnel
models
LANGLEY-12710 B80-10381 06
- SANDERS, R. E.**
Examining graphite reinforcement in
composites
MSC-19594 B80-10122 08
- SARBOLOUKI, M. N.**
Recycling paper-pulp waste liquors
NPO-14797 B80-10492 04
- SAUGLER, R. E.**
Analysis of a cooled, turbine blade or
vane with an insert
LEWIS-13293 B80-10400 06
- SCHARMACK, D. K.**
Frequency response for multiple-sampling
rate systems
MSC-18473 B80-10173 02
- SCHINDLER, R. A.**
High-resolution spectrometry/inter-
ferometer
NPO-14448 B80-10175 03
- SCHLESSINGER, E. D.**
Reflecting layers reduce weight of
insulation
MSC-18785 B80-10547 08
- SCHLUFE, G.**
Precision filament cutter
LANGLEY-12564 B80-10093 07
- SCHLUTSMAYER, A. P.**
Compressing TV-image data
NPO-14823 B80-10310 02
- SCHMID, P. E.**
Microcomputer-based doppler systems
for weather monitoring
GSFC-12448 B80-10166 02
- SCHMIT, L. A.**
Resizing structures for minimum weight
LANGLEY-12699 B80-10394 06
- SCHNEIDER, H. W.**
Improved particulate-sampling filter
NPO-14801 B80-10271 08
- SCHOMBURG, C.**
Tile densification with TEOS
MSC-18737 B80-10535 08
Repairing high-temperature glazed tiles
MSC-18736 B80-10536 08
- SCHOTT, J.**
Speed control for synchronous motors
MSC-18680 B80-10444 01
- SCHUBERT, W. H.**
Honing fixture for welded electrodes
M-FS-19537 B80-10278 08
- SCHULLER, T. L.**
Back contacts for silicon-on-ceramic
solar cells
NPO-14809 B80-10545 08
- SCOPELIANOS, A. G.**
Heat resistant polyphosphazene
polymers
ARC-11176 B80-10350 04
- SCOTT, D. R.**
Solar-site test module
M-FS-25543 B80-10460 03
- SEAMAN, C. H.**
Instrument remotely measures wind
velocities
NPO-14524 B80-10176 03
Economical ultraviolet radiometer
NPO-14843 B80-10322 03
- SEBACHER, D. I.**
Fast-response atmospheric-pollutant
monitor
LANGLEY-12317 B80-10062 04
- SEIDEL, B. L.**
Antenna feed for linear and circular
polarization
NPO-14810 B80-10297 01
Receiving signals of any polarization
NPO-14836 B80-10315 02
- SEIDEL, H. F.**
Automatic 35 mm slide duplicator
LEWIS-13399 B80-10249 07
- SERAFINI, T. T.**
High char yield epoxy curing agents
LEWIS-13226 B80-10361 04
- SERHAL, E. J., JR.**
Portable zero-delay assembly
NPO-14671 B80-10316 02
- SEWARD, W.**
Coal conversion and synthetic-fuel
production
M-FS-25330 B80-10070 04
- SHANER, J. R.**
Microprocessor control for phase-lock
receiver
NPO-14438 B80-10033 02
- SHANNON, J. L., JR.**
LVDT gage for fracture-toughness tests
in liquid hydrogen
LEWIS-13038 B80-10075 06
Tension-mode loading for bend
specimens in cryogenics
LEWIS-13040 B80-10076 06
- SHARMA, M.**
Fiber optic level sensor for cryogenics
MSC-18674 B80-10375 06
- SHEPARD, N. F., JR.**
New mounting improves solar-cell
efficiency
NPO-14467 B80-10039 03
- SHER, A.**
Photocapacitive image converter
LANGLEY-12513 B80-10009 01
- SHIVAL, S. G.**
DDL: Digital systems design language
M-FS-25352 B80-10163 01
- SHUMATE, M. S.**
Instrument remotely measures wind
velocities
NPO-14524 B80-10176 03
Detecting surface faults on solar
mirrors
NPO-14684 B80-10230 06
- SHUTT, T. J.**
Monolithic CCD-array readout
LANGLEY-12376 B80-10307 02
- SIEVERS, M. W.**
A general logic structure for custom
LSI's
NPO-14410 B80-10118 08
- SINCLAIR, J. H.**
Efficient measurement of shear
properties of fiber composites
LEWIS-13011 B80-10216 06
- SINGH, J. J.**
Improved LEEM ranges over four
decades
LANGLEY-12706 B80-10508 06
- SINHA, M. P.**
Simultaneous measurement of three
atmospheric pollutants
NPO-14828 B80-10359 04
- SKLAR, E.**
Acoustically-tuned optical spectrometer
HQN-10924 B80-10326 03
- SLATER, B. L.**
Ion-beam cleaning for cold welds
LEWIS-12982 B80-10115 08
- SOHN, R. L.**
Benefit assessment of solar-augmented
natural gas systems
NPO-14568 B80-10048 03
- SOMERS, D. M.**
The design and analysis of low-speed
airfoils
LANGLEY-12727 B80-10524 06
- SORATHIA, U. A. K.**
Modified fire-resistant foams for seat
cushions
MSC-18704 B80-10419 08
One-step microwave foaming and
curing
MSC-18707 B80-10420 08
Rigid fire-resistant foams for walls and
floors
MSC-18708 B80-10421 08
- SOUTH, J. C., JR.**
Inviscid transonic flow over axisymmetric
bodies
LANGLEY-12499 B80-10398 06
- SOVEY, J. S.**
Ion-beam etching enhances adhesive
bonding
LEWIS-13028 B80-10128 08
- SPALDING, D. B.**
Methane/air flames in a concentric tube
combustor
LEWIS-13388 B80-10211 04
- SPANN, G. W.**
Low-cost LANDSAT processing system
M-FS-25396 B80-10285 09
- SPEARS, J. R.**
Compliant transducer measures artery
profile
NPO-14899 B80-10369 05
- SPIEGEL, K. W.**
Limiting current in electron-beam
welders
M-FS-19503 B80-10413 07
- SPITZE, L. A.**
Reducing static charges in fluidized bed
reactions
ARC-11245 B80-10068 04
- SROKOWSKI, A. J.**
Disturbance amplification rates
LANGLEY-12556 B80-10092 06
- SRTVATSA, S. K.**
Methane/air flames in a concentric tube
combustor
LEWIS-13388 B80-10211 04
- ST. CLAIR, A. K.**
Electrically conductive
palladium-containing polyimide films
LANGLEY-12629 B80-10357 04
Aluminum ions enhance polyimide
adhesive
LANGLEY-12640 B80-10358 04
- ST. CLAIR, T. L.**
Plasticizer for polyimide composites
LANGLEY-12642 B80-10206 04

- Aluminum ions enhance polyimide adhesive
 LANGLEY-12640 B80-10358 04
- New pressure-sensitive silicone adhesive
 LANGLEY-12737 B80-10495 04
- STATE, T. S.**
 Removing freon gas from hydraulic fluid
 MSC-18740 B80-10494 04
- STATTEL, R. J.**
 RAM-Based frame synchronizer
 GSFC-12430 B80-10164 02
 RAM-Based parallel-output controller
 GSFC-12447 B80-10165 02
- STECURA, S.**
 Improved metallic and thermal barrier coatings
 LEWIS-13324 B80-10353 04
- STEIN, J. A.**
 Time-shaped RF brazing
 MSC-18617 B80-10272 08
 Time-sharing switch for vacuum brazing
 MSC-18699 B80-10412 07
- STEIN, R. J.**
 Detecting a coal/shale interface
 M-FS-23720 B80-10061 04
- STELZRIED, C. H.**
 Receiving signals of any polarization
 NPC-14836 B80-10315 02
- STEPHENS, J. R.**
 Reduced hydrogen permeability at high temperatures
 LEWIS-13485 B80-10364 04
- STEPHENS, T. C.**
 Numerical tracing of electron trajectories
 GSFC-12535 B80-10057 03
- STEVENS, M. L.**
 Heat/pressure seal for moving parts
 MSC-18422 B80-10390 06
- STIFFLER, J. J.**
 Independent synchronizer for digital decoders
 MSC-16723 B80-10004 01
- STINE, L. R.**
 Microprocessor-controlled data synchronizer
 MSC-18535 B80-10031 02
- STIRN, R. J.**
 'Pelled-film' solar cells
 NPO-14734 B80-10151 01
 Passivation layer for steel substrate of solar cell
 NPO-14961 B80-10541 08
- STOCKMAN, N. O.**
 Potential flow in two-dimensional deflected nozzles
 LEWIS-13461 B80-10523 06
- STOCKTON, R. J.**
 Fast microwave switching power divider
 GSFC-12420 B80-10295 01
- STOOPS, W. E., JR.**
 New pressure-sensitive silicone adhesive
 LANGLEY-12737 B80-10495 04
- STOTTS, L. J.**
 Miniaturized physiological data telemetry system
 MSC-18804 B80-10371 05
- STOUD, C. W.**
 An approximation to student's t-distribution
 LANGLEY-12238 B80-10284 09
- STOVALL, T. K.**
 Regenerative superheated steam turbine cycles
 LEWIS-13392 B80-10234 06
- STRINGER, E. J.**
 Handtool assists in bundling cables
 MSC-18567 B80-10255 07
- STUCK, D. E.**
 Simple circuit monitors 'third wire' in ac lines
 M-FS-19457 B80-10002 01
- STUDER, P. A.**
 A linear magnetic motor and generator
 GSFC-12518 B80-10257 07
- STUHLBARG, S. M.**
 Cost models and economical packaging of LSI's
 M-FS-25359 B80-10138 08
- STULTZ, J. W.**
 Combined photovoltaic and thermal-storage module
 NPO-14591 B80-10327 03
- SURBAT, M.**
 Thermal barrier and gas seal
 MSC-18390 B80-10269 08
- SUTCH, F. S.**
 Sealing micropores in thin castings
 MSC-18623 B80-10428 08
- SWAIN, R. J.**
 Plastic welder
 LANGLEY-12540 B80-10274 08
- T**
- TAYLOR, J. F.**
 CADAT logic simulation program
 M-FS-25183 B80-10432 08
- TAYLOR, L. T.**
 Electrically conductive palladium-containing polyimide films
 LANGLEY-12629 B80-10357 04
 Aluminum ions enhance polyimide adhesive
 LANGLEY-12640 B80-10358 04
- TENNEY, D. R.**
 Diffusion in single-phase binary alloys
 LANGLEY-12665 B80-10498 04
- TERVET, J. H.**
 Chlorinolysis reclaims rubber of waste tires
 NPO-14935 B80-10365 04
- TEXLER, R. E.**
 Automatic 35 mm slide duplicator
 LEWIS-13399 B80-10249 07
- THALLER, L. H.**
 REDOX electrochemical energy storage
 LEWIS-13398 B80-10064 04
- THATCHER, C. S.**
 Shrinking plastic tubing and nonstandard diameters
 MSC-18430 B80-10268 08
- THOMAS, H. M.**
 Temperature-compensating dc restorer
 LANGLEY-12549 B80-10152 01
- THOMPSON, F. W.**
 Heat-shrinkable sleeve aids in insulating universal joints
 MSC-18685 B80-10270 08
- THOMPSON, S.**
 Producing silicon continuously
 NPO-14796 B80-10537 08
- TORBETT, M. A.**
 Broadband electrostatic acoustic transducer for liquids
 LANGLEY-12465 B80-10078 06
- TOTAH, R. S.**
 Self-energized screw coupling
 M-FS-25340 B80-10096 07
- TRANter, W. H.**
 System time-domain simulation
 MSC-18333 B80-10292 09
- TRINER, J. E.**
 Improved magnetic material analyzer
 LEWIS-13493 B80-10384 06
- TROTTER, J. D.**
 Models of MOS and SOS devices
 M-FS-25153 B80-10141 08
 Double metalization for VLSI
 M-FS-25149 B80-10261 08
 Progress in MOSFET double-layer metalization
 M-FS-25239 B80-10280 08
- TSUO, Y. H.**
 Photocapacitive image converter
 LANGLEY-12513 B80-10009 01
- TUSTIN, E. A.**
 Fire tests for airplane interior materials
 MSC-18478 B80-10063 04
- U**
- UNNAM, J.**
 Diffusion in single-phase binary alloys
 LANGLEY-12665 B80-10498 04
- V**
- VADYAK, J.**
 Flow field in supersonic mixed-compression inlets
 LEWIS-13279 B80-10088 06
- VANELLI, J. C.**
 Continuous control of phase-locked-loop bandwidth
 MSC-16684 B80-10008 01
- VANNASSE, M. A.**
 Time-shaped RF brazing
 MSC-18617 B80-10272 08
- VANUCCI, R. D.**
 High char yield epoxy curing agents
 LEWIS-13226 B80-10361 04
- VIEMANN, W.**
 Fluorescent radiation converter
 GSFC-12528 B80-10180 03
- VON TIESSEHAUSEN, G. F.**
 Automatic connector for structural beams
 M-FS-25134 B80-10094 07
- VORHABEN, K. H.**
 Energy-reduction concept for incandescent lamps
 MSC-18757 B80-10325 03
- VOS, R. G.**
 Plastic deformation of engines and other nonlinear structures
 M-FS-23814 B80-10399 06
- W**
- WADE, T. E.**
 Double metalization for VLSI
 M-FS-25149 B80-10261 08
 Progress in MOSFET double-layer metalization
 M-FS-25239 B80-10280 08

- WAGNER, C.**
Smoothing the output from a DAC
FRC-11025 B80-10160 01
- WAKELYN, N. T.**
Flashback-free combustor
LANGLEY-12666 B80-10226 06
- WALKER, J. D.**
NASA PERT time II
LEWIS-13145 B80-10286 09
- WALKER, R. R.**
Signal conditioner for nickel temperature sensors
MSC-18367 B80-10298 01
- WALKER, W. L.**
Detecting surface faults on solar mirrors
NPO-14684 B80-10230 06
- WALLACE, K. B.**
High-power dual-directional coupler
NPO-14713 B80-10447 02
- WALLSOM, R. E.**
Mechanical end joint for structural columns
LANGLEY-12482 B80-10095 07
- WALSH, M. J.**
Grooves reduce aircraft drag
LANGLEY-12599 B80-10215 06
- WARREN, D.**
Coal conversion and synthetic-fuel production
M-FS-25330 B80-10070 04
- WATKINS, V. E., JR.**
New pressure-sensitive silicone adhesive
LANGLEY-12737 B80-10495 04
- WATTS, J. T.**
Jig for assembling large composite panels
LANGLEY-12394 B80-10119 08
- WEAVER, J. F.**
Sleeve puller salvages welded tubes
MSC-18686 B80-10256 07
Tube-welder aids
MSC-18687 B80-10277 08
- WELDON, V. A.**
Ball-joint grounding ring
MSC-18824 B80-10405 07
- WELLER, T.**
Biaxial method for in-plane shear testing
LANGLEY-12680 B80-10512 06
- WHEELER, D. R.**
Improved adherence of T1C coatings to steel
LEWIS-13169 B80-10207 04
- WHITE, F. A.**
Improved LEEM ranges over four decades
LANGLEY-12706 B80-10508 06
- WILCOXSON, A. L.**
Modified fire-resistant foams for seat cushions
MSC-18704 B80-10419 08
One-step microwave foaming and curing
MSC-18707 B80-10420 08
Rigid fire-resistant foams for walls and floors
MSC-18708 B80-10421 08
- WILHOLD, G. A.**
Extracting energy from natural flow
M-FS-23989 B80-10045 03
- WILKINS, C. A.**
Measuring the thermal conductivity of insulation
NPO-14871 B80-10382 06
- WILKINS, J. R.**
Improved microbe detection in water samples
LANGLEY-12709 B80-10502 05
- WILLIAMS, B. B.**
Removing freon gas from hydraulic fluid
MSC-18740 B80-10494 04
- WILLIAMS, J. B.**
Temperature controller for hyperthermia devices
LANGLEY-12528 B80-10072 05
- WILSON, K. L.**
Bolt-tension indicator
M-FS-19324 B80-10105 07
- WILSON, T. L.**
Fast calibration of gas flowmeters
KSC-11076 B80-10516 06
- WING, L. D.**
Automatic thermal switches
GSFC-12553 B80-10214 06
- WINKLER, H. E.**
Flow sensor for biomedical fluids
MSC-18761 B80-10367 05
- WISDOM, G. H.**
Cryogenic-storage-tank support
MSC-14848 B80-10258 07
- WOICESHYN, P. M.**
Predicting and monitoring duststorms
NPO-14277 B80-10323 03
- WOLVERTON, B. C.**
Treating domestic wastewater with water hyacinths
M-FS-23964 B80-10368 05
- WONG, V. S.**
Real-time image enhancement
NPO-14281 B80-10311 02
- WOO, D. S.**
More-reliable SOS ion implantations
M-FS-25322 B80-10262 08
- WOOD, G. M., JR.**
Improved LEEM ranges over four decades
LANGLEY-12706 B80-10508 06
- WOOD, K. E.**
Bayonet plug with ramp-activated lock
MSC-18526 B80-10247 07
- WOOD, P. C.**
Reducing static charges in fluidized bed reactions
ARC-11245 B80-10068 04
- WOOD, R. H.**
Lock for hydraulic actuators
MSC-18853 B80-10530 07
- WOOD, W. H.**
A construction technique for wind tunnel models
LANGLEY-12710 B80-10381 06
- WOODALL, J. M.**
Ohmic contact to GaAs semiconductor
LANGLEY-12466 B80-10263 08
- WOODFORD, W.**
Automated flow-chart system
GSFC-12514 B80-10147 09
- WRIGHTON, M. S.**
Photoelectrochemical cell with nondissolving anode
LANGLEY-12591 B80-10038 03
- WU, T. T.**
Voltage controller/current limiter for ac
NPO-13061 B80-10032 02
- WU, V. C.**
Microprocessor-controlled ultrasonic plethysmograph
MSC-18759 B80-10500 05
- WUERKER, R. F.**
Recording fluid currents by holography
M-FS-25373 B80-10222 06
- WYDEVEN, T.**
Reducing static charges in fluidized bed reactions
ARC-11245 B80-10068 04
- WYLLIE, C. E.**
Toggled signal for prevention of control errors
MSC-18779 B80-10312 02

Y

- YAGER, W. C.**
Photographic measurement of droplet density
M-FS-25326 B80-10182 03
- YATES, C. I.**
Examining graphite reinforcement in composites
MSC-19594 B80-10122 08
- YEH, Y. M.**
Passivation layer for steel substrate of solar cell
NPO-14961 B80-10541 08
- YEN, H. C.**
Superconducting gyrocon would be very efficient
NPO-14975 B80-10446 02
- YENCHE, D. G.**
High-power solid-state microwave transmitter
NPO-14803 B80-10296 01
- YOST, W. T.**
Broadband electrostatic acoustic transducer for liquids
LANGLEY-12465 B80-10078 06
- YOUNG, K.**
OCCULT-ORSER complete conversational user-language translator
GSFC-12604 B80-10556 09
- YOUNG, S. G.**
Low cost high temperature, duplex coating for superalloys
LEWIS-13497 B80-10352 04
- YU, I.**
Multiband microstrip antenna
MSC-18334 B80-10001 01

Z

- ZAMANI, N.**
Measuring radiation effects on MOS capacitors
NPO-14700 B80-10227 06
- ZANTESON, R. A.**
Detecting surface faults on solar mirrors
NPO-14684 B80-10230 06
- ZANTOS, P. J.**
Transistor package for high pressure applications
MSC-18743 B80-10430 08
- ZARETSKY, E.**
High-performance, multiroller traction drive
LEWIS-13347 B80-10244 07
- ZEBUS, P. P.**
'Grinding' cavities in polyurethane foam
MSC-18564 B80-10124 08
- ZIMMERMAN, J. E.**
Detecting a coal/shale interface
M-FS-23720 B80-10061 04

ZOBRIST, A. L.

PERSONAL AUTHOR INDEX

ZOBRIST, A. L.

Image-based information,
communication, and retrieval
NPO-14893 B80-10293 09

ZULUETA, P. J.

Cost models and economical packaging
of LSI's
M-FS-25359 B80-10138 0f

ORIGINATING CENTER/TECH BRIEF NUMBER INDEX

Index to NASA Tech Briefs

Issue 22

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., B80-10248, followed by a two-digit number, e.g., 07, which identifies the subject category containing the entire citation.

		HQN-10924	B80-10326 03	LANGLEY-12599	B80-10215 06
		HQN-10937	B80-10184 03	LANGLEY-12602	B80-10379 06
				LANGLEY-12615	B80-10404 07
				LANGLEY-12619	B80-10238 06
		KSC-11048	B80-10303 02	LANGLEY-12623	B80-10090 06
		KSC-11076	B80-10516 06	LANGLEY-12629	B80-10357 04
		KSC-11107	B80-10134 08	LANGLEY-12631	B80-10177 03
		KSC-11118	B80-10232 06	LANGLEY-12632	B80-10185 03
		KSC-11124	B80-10037 02	LANGLEY-12635	B80-10183 03
		KSC-11167	B80-10304 02	LANGLEY-12636	B80-10236 06
		KSC-11171	B80-10538 08	LANGLEY-12640	B80-10358 04
		KSC-11181	B80-10385 06	LANGLEY-12642	B80-10206 04
		KSC-11195	B80-10555 09	LANGLEY-12645	B80-10220 06
				LANGLEY-12647	B80-10237 06
				LANGLEY-12655	B80-10221 06
				LANGLEY-12665	B80-10498 04
				LANGLEY-12666	B80-10226 06
				LANGLEY-12680	B80-10512 06
		LANGLEY-11535	B80-10235 06	LANGLEY-12682	B80-10455 03
		LANGLEY-11712	B80-10130 08	LANGLEY-12687	B80-10529 07
		LANGLEY-12238	B80-10284 09	LANGLEY-12697	B80-10377 06
		LANGLEY-12282	B80-10213 05	LANGLEY-12699	B80-10394 06
		LANGLEY-12315	B80-10543 08	LANGLEY-12702	B80-10525 06
		LANGLEY-12317	B80-10062 04	LANGLEY-12706	B80-10508 06
		LANGLEY-12325	B80-10073 05	LANGLEY-12709	B80-10502 05
		LANGLEY-12330A	B80-10306 02	LANGLEY-12710	B80-10381 06
		LANGLEY-12332	B80-10305 02	LANGLEY-12713	B80-10491 04
		LANGLEY-12367	B80-10362 04	LANGLEY-12718	B80-10504 05
		LANGLEY-12372	B80-10531 07	LANGLEY-12719	B80-10493 04
		LANGLEY-12376	B80-10307 02	LANGLEY-12727	B80-10524 06
		LANGLEY-12388	B80-10041 03	LANGLEY-12729	B80-10526 07
		LANGLEY-12389	B80-10121 08	LANGLEY-12730	B80-10324 03
		LANGLEY-12393	B80-10378 06	LANGLEY-12737	B80-10495 04
		LANGLEY-12394	B80-10119 08		
		LANGLEY-12402	B80-10386 06		
		LANGLEY-12404	B80-10397 06	LEWIS-12441	B80-10081 06
		LANGLEY-12412	B80-10106 07	LEWIS-12592	B80-10395 06
		LANGLEY-12450	B80-10040 03	LEWIS-12809	B80-10299 01
		LANGLEY-12460	B80-10085 06	LEWIS-12973	B80-10058 03
		LANGLEY-12465	B80-10078 06	LEWIS-12982	B80-10115 08
		LANGLEY-12466	B80-10263 08	LEWIS-13011	B80-10216 06
		LANGLEY-12468	B80-10219 06	LEWIS-13028	B80-10128 08
		LANGLEY-12469	B80-10321 03	LEWIS-13038	B80-10075 06
		LANGLEY-12476	B80-10507 06	LEWIS-13039	B80-10077 06
		LANGLEY-12482	B80-10095 07	LEWIS-13040	B80-10076 06
		LANGLEY-12489	B80-10086 06	LEWIS-13088	B80-10067 04
		LANGLEY-12493	B80-10225 06	LEWIS-13145	B80-10286 09
		LANGLEY-12499	B80-10398 06	LEWIS-13146	B80-10233 06
		LANGLEY-12502	B80-10087 06	LEWIS-13169	B80-10207 04
		LANGLEY-12513	B80-10009 01	LEWIS-13172	B80-10143 09
		LANGLEY-12528	B80-10072 05	LEWIS-13206	B80-10287 09
		LANGLEY-12529	B80-10169 02	LEWIS-13219	B80-10389 06
		LANGLEY-12531	B80-10005 01	LEWIS-13226	B80-10361 04
		LANGLEY-12540	B80-10274 08	LEWIS-13229	B80-10109 07
		LANGLEY-12547	B80-10422 08	LEWIS-13230	B80-10259 07
		LANGLEY-12548	B80-10558 09	LEWIS-13249	B80-10091 06
		LANGLEY-12549	B80-10152 01	LEWIS-13250	B80-10520 06
		LANGLEY-12556	B80-10092 06	LEWIS-13275	B80-10354 04
		LANGLEY-12564	B80-10093 07	LEWIS-13279	B80-10088 06
		LANGLEY-12578	B80-10251 07	LEWIS-13293	B80-10400 06
		LANGLEY-12588	B80-10518 06	LEWIS-13324	B80-10353 04
		LANGLEY-12591	B80-10038 03	LEWIS-13346	B80-10314 02
		LANGLEY-12592	B80-10044 03	LEWIS-13347	B80-10244 07
		LANGLEY-12593	B80-10146 09	LEWIS-13388	B80-10211 04
		LANGLEY-12597	B80-10205 04	LEWIS-13392	B80-10234 06
		LANGLEY-12598	B80-10084 06	LEWIS-13393	B80-10533 07
ARC-11116	B80-10007 01				
ARC-11158	B80-10383 06				
ARC-11176	B80-10350 04				
ARC-11245	B80-10068 04				
ARC-11246	B80-10417 08				
ARC-11272	B80-10408 07				
ARC-11282	B80-10396 06				
ARC-11291	B80-10074 06				
FRC-10112	B80-10506 06				
FRC-11025	B80-10160 01				
GSFC-12095	B80-10248 07				
GSFC-12327	B80-10065 04				
GSFC-12354	B80-10265 08				
GSFC-12360	B80-10003 01				
GSFC-12392	B80-10144 09				
GSFC-12407	B80-10083 06				
GSFC-12420	B80-10295 01				
GSFC-12430	B80-10164 02				
GSFC-12447	B80-10165 02				
GSFC-12448	B80-10166 02				
GSFC-12501	B80-10154 01				
GSFC-12514	B80-10147 09				
GSFC-12518	B80-10257 07				
GSFC-12528	B80-10180 03				
GSFC-12535	B80-10057 03				
GSFC-12536	B80-10451 02				
GSFC-12542	B80-10186 03				
GSFC-12553	B80-10214 06				
GSFC-12555	B80-10443 01				
GSFC-12561	B80-10080 06				
GSFC-12562	B80-10178 03				
GSFC-12584	B80-10401 07				
GSFC-12589	B80-10329 03				
GSFC-12600	B80-10522 06				
GSFC-12604	B80-10556 09				
GSFC-12606	B80-10406 07				
GSFC-12608	B80-10452 03				
GSFC-12610	B80-10503 05				
GSFC-12618	B80-10373 06				
GSFC-12625	B80-10391 06				
GSFC-12638	B80-10393 06				

ORIGINATING CENTER/TECH BRIEF NUMBER INDEX

LEWIS-13398	B80-10064 04	M-FS-25258	B80-10025 01	M-FS-25478	B80-10340 03
LEWIS-13399	B80-10249 07	M-FS-25259	B80-10026 01	M-FS-25479	B80-10339 03
LEWIS-13400	B80-10441 01	M-FS-25260	B80-10012 01	M-FS-25480	B80-10344 03
LEWIS-13411	B80-10402 07	M-FS-25261	B80-10013 01	M-FS-25481	B80-10343 03
LEWIS-13412	B80-10267 08	M-FS-25262	B80-10014 01	M-FS-25490	B80-10346 03
LEWIS-13418	B80-10442 01	M-FS-25263	B80-10015 01	M-FS-25496	B80-10497 04
LEWIS-13432	B80-10519 06	M-FS-25264	B80-10027 01	M-FS-25499	B80-10348 03
LEWIS-13438	B80-10209 04	M-FS-25265	B80-10028 01	M-FS-25502	B80-10467 03
LEWIS-13461	B80-10523 06	M-FS-25267	B80-10029 01	M-FS-25504	B80-10347 03
LEWIS-13485	B80-10364 04	M-FS-25269	B80-10030 01	M-FS-25514	B80-10349 03
LEWIS-13493	B80-10384 06	M-FS-25280	B80-10016 01	M-FS-25520	B80-10468 03
LEWIS-13497	B80-10352 04	M-FS-25281	B80-10017 01	M-FS-25521	B80-10462 03
LEWIS-13589	B80-10351 04	M-FS-25287	B80-10318 03	M-FS-25524	B80-10469 03
		M-FS-25292	B80-10116 08	M-FS-25525	B80-10470 03
		M-FS-25296	B80-10229 06	M-FS-25526	B80-10471 03
		M-FS-25298	B80-10042 03	M-FS-25527	B80-10472 03
		M-FS-25302	B80-10150 01	M-FS-25528	B80-10473 03
		M-FS-25304	B80-10204 04	M-FS-25529	B80-10464 03
M-FS-19324	B80-10105 07	M-FS-25309	B80-10279 08	M-FS-25530	B80-10481 03
M-FS-19378	B80-10112 08	M-FS-25322	B80-10262 08	M-FS-25532	B80-10463 03
M-FS-19441	B80-10275 08	M-FS-25323	B80-10149 01	M-FS-25536	B80-10480 03
M-FS-19457	B80-10002 01	M-FS-25324	B80-10117 08	M-FS-25537	B80-10479 03
M-FS-19460	B80-10114 08	M-FS-25326	B80-10182 03	M-FS-25538	B80-10478 03
M-FS-19468	B80-10111 08	M-FS-25329	B80-10011 01	M-FS-25539	B80-10477 03
M-FS-19486	B80-10079 06	M-FS-25330	B80-10070 04	M-FS-25540	B80-10476 03
M-FS-19495	B80-10136 08	M-FS-25336	B80-10049 03	M-FS-25543	B80-10460 03
M-FS-19496	B80-10276 08	M-FS-25337	B80-10052 03	M-FS-25548	B80-10475 03
M-FS-19499	B80-10110 08	M-FS-25339	B80-10051 03	M-FS-25552	B80-10474 03
M-FS-19503	B80-10413 07	M-FS-25340	B80-10096 07	M-FS-25553	B80-10482 03
M-FS-19505	B80-10102 07	M-FS-25342	B80-10157 01	M-FS-25558	B80-10466 03
M-FS-19518	B80-10103 07	M-FS-25348	B80-10281 08	M-FS-25559	B80-10488 03
M-FS-19535	B80-10403 07	M-FS-25352	B80-10163 01	M-FS-25564	B80-10487 03
M-FS-19537	B80-10278 08	M-FS-25357	B80-10282 08	M-FS-25567	B80-10465 03
M-FS-19549	B80-10228 06	M-FS-25358	B80-10046 03	M-FS-25568	B80-10486 03
M-FS-19619	B80-10410 07	M-FS-25359	B80-10138 08	M-FS-25569	B80-10484 03
M-FS-22636	B80-10242 07	M-FS-25365	B80-10113 08	M-FS-25572	B80-10485 03
M-FS-23027	B80-10089 06	M-FS-25367	B80-10557 09	M-FS-25575	B80-10483 03
M-FS-23589	B80-10192 03	M-FS-25371	B80-10439 09	M-FS-26255	B80-10021 01
M-FS-23692	B80-10243 07	M-FS-25373	B80-10222 06		
M-FS-23720	B80-10061 04	M-FS-25385	B80-10193 03		
M-FS-23764	B80-10288 09	M-FS-25386	B80-10054 03		
M-FS-23813	B80-10289 09	M-FS-25387	B80-10055 03	MSC-18787	B80-10429 08
M-FS-23814	B80-10399 06	M-FS-25387	B80-10056 03	MSC-14843	B80-10107 07
M-FS-23862	B80-10224 06	M-FS-25388	B80-10189 03	MSC-14848	B80-10258 07
M-FS-23922	B80-10060 04	M-FS-25389	B80-10053 03	MSC-14876	B80-10104 07
M-FS-23963	B80-10137 08	M-FS-25390	B80-10050 03	MSC-16134	B80-10246 07
M-FS-23964	B80-10368 05	M-FS-25393	B80-10047 03	MSC-16153	B80-10245 07
M-FS-23989	B80-10045 03	M-FS-25396	B80-10285 09	MSC-16282	B80-10126 08
M-FS-24049	B80-10135 08	M-FS-25397	B80-10187 03	MSC-16394	B80-10489 04
M-FS-25017	B80-10552 08	M-FS-25398	B80-10191 03	MSC-16531	B80-10356 04
M-FS-25054	B80-10437 08	M-FS-25399	B80-10392 06	MSC-16684	B80-10008 01
M-FS-25055	B80-10551 08	M-FS-25401	B80-10260 08	MSC-16723	B80-10004 01
M-FS-25058	B80-10435 08	M-FS-25414	B80-10496 04	MSC-16921	B80-10418 08
M-FS-25065	B80-10436 08	M-FS-25416	B80-10188 03	MSC-16930	B80-10129 08
M-FS-25066	B80-10433 08	M-FS-25419	B80-10190 03	MSC-18035	B80-10034 02
M-FS-25067	B80-10434 08	M-FS-25420	B80-10195 03	MSC-18180	B80-10159 01
M-FS-25073	B80-10140 08	M-FS-25421	B80-10380 06	MSC-18333	B80-10292 09
M-FS-25107	B80-10082 06	M-FS-25423	B80-10196 03	MSC-18334	B80-10001 01
M-FS-25134	B80-10094 07	M-FS-25424	B80-10198 03	MSC-18367	B80-10298 01
M-FS-25139	B80-10409 07	M-FS-25427	B80-10197 03	MSC-18390	B80-10269 08
M-FS-25149	B80-10261 08	M-FS-25428	B80-10199 03	MSC-18407	B80-10156 01
M-FS-25150	B80-10023 01	M-FS-25431	B80-10202 03	MSC-18416	B80-10240 07
M-FS-25153	B80-10141 08	M-FS-25433	B80-10194 03	MSC-18422	B80-10390 06
M-FS-25158	B80-10210 04	M-FS-25434	B80-10200 03	MSC-18430	B80-10268 08
M-FS-25170	B80-10010 01	M-FS-25435	B80-10201 03	MSC-18462	B80-10407 07
M-FS-25183	B80-10432 08	M-FS-25443	B80-10203 03	MSC-18468	B80-10101 07
M-FS-25193	B80-10139 08	M-FS-25444	B80-10331 03	MSC-18469	B80-10217 06
M-FS-25205	B80-10366 04	M-FS-25450	B80-10461 03	MSC-18472	B80-10153 01
M-FS-25208	B80-10161 01	M-FS-25451	B80-10335 03	MSC-18473	B80-10173 02
M-FS-25230	B80-10266 08	M-FS-25452	B80-10332 03	MSC-18478	B80-10063 04
M-FS-25235	B80-10521 06	M-FS-25453	B80-10336 03	MSC-18494	B80-10120 08
M-FS-25239	B80-10280 08	M-FS-25454	B80-10341 03	MSC-18526	B80-10247 07
M-FS-25242	B80-10059 04	M-FS-25458	B80-10342 03	MSC-18528	B80-10125 08
M-FS-25249	B80-10431 08	M-FS-25468	B80-10334 03	MSC-18529	B80-10100 07
M-FS-25251	B80-10018 01	M-FS-25469	B80-10337 03	MSC-18532	B80-10448 02
M-FS-25252	B80-10019 01	M-FS-25471	B80-10333 03	MSC-18533	B80-10069 04
M-FS-25253	B80-10022 01	M-FS-25472	B80-10338 03	MSC-18534	B80-10264 08
M-FS-25254	B80-10020 01	M-FS-25473	B80-10345 03	MSC-18535	B80-10031 02
M-FS-25256	B80-10024 01			MSC-18538	B80-10099 07

ORIGINATING CENTER/TECH BRIEF NUMBER INDEX

MSC-18564	B80-10124 08	NPO-14277	B80-10323 03	NPO-14929	B80-10363 04
MSC-18565	B80-10127 08	NPO-14281	B80-10311 02	NPO-14935	B80-10365 04
MSC-18567	B80-10255 07	NPO-14306	B80-10528 07	NPO-14936	B80-10514 06
MSC-18572	B80-10123 08	NPO-14399	B80-10252 07	NPO-14947	B80-10360 04
MSC-18581	B80-10132 08	NPO-14410	B80-10118 08	NPO-14961	B80-10541 08
MSC-18582	B80-10108 07	NPO-14426	B80-10168 02	NPO-14962	B80-10542 08
MSC-18587	B80-10313 02	NPO-14438	B80-10033 02	NPO-14964	B80-10440 01
MSC-18590	B80-10254 07	NPO-14440	B80-10036 02	NPO-14966	B80-10511 06
MSC-18597	B80-10148 09	NPO-14448	B80-10175 03	NPO-14975	B80-10446 02
MSC-18616	B80-10239 06	NPO-14462	B80-10208 04	NPO-14976	B80-10457 03
MSC-18617	B80-10272 08	NPO-14465	B80-10066 04	NPO-14984	B80-10458 03
MSC-18623	B80-10428 08	NPO-14467	B80-10039 03		
MSC-18635	B80-10170 02	NPO-14479	B80-10179 03		
MSC-18664	B80-10231 06	NPO-14496	B80-10438 09		
MSC-18674	B80-10294 01	NPO-14521	B80-10250 07		
MSC-18679	B80-10444 01	NPO-14524	B80-10176 03		
MSC-18680	B80-10270 08	NPO-14528	B80-10513 06		
MSC-18685	B80-10256 07	NPO-14556	B80-10453 03		
MSC-18686	B80-10277 08	NPO-14568	B80-10048 03		
MSC-18687	B80-10098 07	NPO-14579	B80-10308 02		
MSC-18690	B80-10212 05	NPO-14590	B80-10309 02		
MSC-18696	B80-10374 06	NPO-14591	B80-10327 03		
MSC-18697	B80-10412 07	NPO-14610	B80-10145 09		
MSC-18699	B80-10419 08	NPO-14617	B80-10167 02		
MSC-18704	B80-10420 08	NPO-14654	B80-10253 07		
MSC-18707	B80-10421 08	NPO-14657	B80-10218 06		
MSC-18708	B80-10317 02	NPO-14661	B80-10131 08		
MSC-18712	B80-10283 08	NPO-14671	B80-10316 02		
MSC-18718	B80-10355 04	NPO-14684	B80-10230 06		
MSC-18724	B80-10302 01	NPO-14700	B80-10227 06		
MSC-18728	B80-10415 07	NPO-14701	B80-10162 01		
MSC-18731	B80-10536 08	NPO-14702	B80-10388 06		
MSC-18736	B80-10535 08	NPO-14704	B80-10071 04		
MSC-18737	B80-10494 04	NPO-14705	B80-10387 06		
MSC-18740	B80-10534 08	NPO-14710	B80-10043 03		
MSC-18741	B80-10430 08	NPO-14713	B80-10447 02		
MSC-18743	B80-10554 09	NPO-14715	B80-10273 08		
MSC-18745	B80-10424 01	NPO-14729	B80-10223 06		
MSC-18756	B80-10325 03	NPO-14734	B80-10151 01		
MSC-18757	B80-10500 05	NPO-14738	B80-10301 01		
MSC-18759	B80-10367 05	NPO-14745	B80-10370 05		
MSC-18761	B80-10414 07	NPO-14749	B80-10456 03		
MSC-18769	B80-10423 08	NPO-14757	B80-10376 06		
MSC-18771	B80-10416 07	NPO-14779	B80-10509 06		
MSC-18772	B80-10501 05	NPO-14780	B80-10550 08		
MSC-18777	B80-10449 02	NPO-14781	B80-10454 03		
MSC-18778	B80-10510 06	NPO-14782	B80-10330 03		
MSC-18779	B80-10312 02	NPO-14794	B80-10548 08		
MSC-18783	B80-10499 05	NPO-14796	B80-10537 08		
MSC-18784	B80-10425 08	NPO-14797	B80-10492 04		
MSC-18785	B80-10547 08	NPO-14800	B80-10411 07		
MSC-18786	B80-10427 08	NPO-14801	B80-10271 08		
MSC-18793	B80-10450 02	NPO-14802	B80-10426 08		
MSC-18801	B80-10546 08	NPO-14803	B80-10296 01		
MSC-18804	B80-10371 05	NPO-14809	B80-10545 08		
MSC-18824	B80-10405 07	NPO-14810	B80-10297 01		
MSC-18835	B80-10490 04	NPO-14811	B80-10319 03		
MSC-18853	B80-10530 07	NPO-14812	B80-10505 05		
MSC-18854	B80-10540 08	NPO-14813	B80-10328 03		
MSC-18855	B80-10527 07	NPO-14815	B80-10155 01		
MSC-18867	B80-10553 09	NPO-14816	B80-10291 09		
MSC-18871	B80-10532 07	NPO-14821	B80-10174 03		
MSC-18915	B80-10372 05	NPO-14823	B80-10310 02		
MSC-19385	B80-10097 07	NPO-14828	B80-10359 04		
MSC-19594	B80-10122 08	NPO-14836	B80-10315 02		
MSC-19636	B80-10241 07	NPO-14837	B80-10517 06		
MSC-19660	B80-10133 08	NPO-14843	B80-10322 03		
MSC-19751	B80-10158 01	NPO-14845	B80-10549 08		
		NPO-14846	B80-10320 03		
		NPO-14853	B80-10544 08		
NPO-13061	B80-10032 02	NPO-14861	B80-10300 01		
NPO-13165	B80-10172 02	NPO-14864	B80-10515 06		
NPO-13422	B80-10035 02	NPO-14869	B80-10539 08		
NPO-13426	B80-10006 01	NPO-14871	B80-10382 06		
NPO-13633	B80-10171 02	NPO-14881	B80-10445 01		
NPO-13679	B80-10142 09	NPO-14893	B80-10293 09		
NPO-14245	B80-10290 09	NPO-14899	B80-10369 05		
		NPO-14901	B80-10459 03		

Page intentionally left blank

Page intentionally left blank

TECH BRIEF/ORIGINATING CENTER NUMBER INDEX

Index to NASA Tech Briefs

Issue 22

Tech Brief/Originating Center Number Index

The left hand column identifies the Tech Brief number, e.g., B80-10062, followed by a two-digit number, e.g., 04, which identifies the subject category containing the entire citation. Following the subject category number is the originating Center number.

B80-10001 01	MSC-18334	B80-10045 03	M-FS-23989	B80-10110 08	M-FS-19499
B80-10002 01	M-FS-19457	B80-10046 03	M-FS-25358	B80-10111 08	M-FS-19468
B80-10003 01	GSFC-12360	B80-10047 03	M-FS-25393	B80-10112 08	M-FS-19378
B80-10004 01	MSC-16723	B80-10048 03	NPO-14568	B80-10113 08	M-FS-25365
B80-10005 01	LANGLEY-12531	B80-10049 03	M-FS-25336	B80-10114 08	M-FS-19460
B80-10006 01	NPO-13426	B80-10050 03	M-FS-25390	B80-10115 08	LEWIS-12982
B80-10007 01	ARC-11116	B80-10051 03	M-FS-25339	B80-10116 08	M-FS-25292
B80-10008 01	MSC-16684	B80-10052 03	M-FS-25337	B80-10117 08	M-FS-25324
B80-10009 01	LANGLEY-12513	B80-10053 03	M-FS-25389	B80-10118 08	NPO-14410
B80-10010 01	M-FS-25170	B80-10054 03	M-FS-25386	B80-10119 08	LANGLEY-12394
B80-10011 01	M-FS-25329	B80-10055 03	M-FS-25387	B80-10120 08	MSC-18494
B80-10012 01	M-FS-25260	B80-10056 03	M-FS-25387	B80-10121 08	LANGLEY-12389
B80-10013 01	M-FS-25261	B80-10057 03	GSFC-12535	B80-10122 08	MSC-19594
B80-10014 01	M-FS-25262	B80-10058 03	LEWIS-12973	B80-10123 08	MSC-18572
B80-10015 01	M-FS-25263	B80-10059 04	M-FS-25242	B80-10124 08	MSC-18564
B80-10016 01	M-FS-25280	B80-10060 04	M-FS-23922	B80-10125 08	MSC-18528
B80-10017 01	M-FS-25281	B80-10061 04	M-FS-23720	B80-10126 08	MSC-16282
B80-10018 01	M-FS-25251	B80-10062 04	LANGLEY-12317	B80-10127 08	MSC-18565
B80-10019 01	M-FS-25252	B80-10063 04	MSC-18478	B80-10128 08	LEWIS-13028
B80-10020 01	M-FS-25254	B80-10064 04	LEWIS-13398	B80-10129 08	MSC-16930
B80-10021 01	M-FS-25255	B80-10065 04	GSFC-12327	B80-10130 08	LANGLEY-11712
B80-10022 01	M-FS-25253	B80-10066 04	NPO-14465	B80-10131 08	NPO-14661
B80-10023 01	M-FS-25150	B80-10067 04	LEWIS-13088	B80-10132 08	MSC-18581
B80-10024 01	M-FS-25256	B80-10068 04	ARC-11245	B80-10133 08	MSC-19660
B80-10025 01	M-FS-25258	B80-10069 04	MSC-18533	B80-10134 08	KSC-11107
B80-10026 01	M-FS-25259	B80-10070 04	M-FS-25330	B80-10135 08	M-FS-24049
B80-10027 01	M-FS-25264	B80-10071 04	NPO-14704	B80-10136 08	M-FS-19495
B80-10028 01	M-FS-25265	B80-10072 05	LANGLEY-12528	B80-10137 08	M-FS-23963
B80-10029 01	M-FS-25267	B80-10073 05	LANGLEY-12325	B80-10138 08	M-FS-25359
B80-10030 01	M-FS-25269	B80-10074 06	ARC-11291	B80-10139 08	M-FS-25193
B80-10031 02	MSC-18535	B80-10075 06	LEWIS-13038	B80-10140 08	M-FS-25073
B80-10032 02	NPO-13061	B80-10076 06	LEWIS-13040	B80-10141 08	M-FS-25153
B80-10033 02	NPO-14438	B80-10077 06	LEWIS-13039	B80-10142 09	NPO-13679
B80-10034 02	MSC-18035	B80-10078 06	LANGLEY-12465	B80-10143 09	LEWIS-13172
B80-10035 02	NPO-13422	B80-10079 06	M-FS-19486	B80-10144 09	GSFC-12392
B80-10036 02	NPO-14440	B80-10080 06	GSFC-12561	B80-10145 09	NPO-14610
B80-10037 02	KSC-11124	B80-10081 06	LEWIS-12441	B80-10146 09	LANGLEY-12593
B80-10038 03	LANGLEY-12591	B80-10082 06	M-FS-25107	B80-10147 09	GSFC-12514
B80-10039 03	NPO-14467	B80-10083 06	GSFC-12407	B80-10148 09	MSC-18597
B80-10040 03	LANGLEY-12450	B80-10084 06	LANGLEY-12598	B80-10149 01	M-FS-25323
B80-10041 03	LANGLEY-12388	B80-10085 06	LANGLEY-12460	B80-10150 01	M-FS-25302
B80-10042 03	M-FS-25298	B80-10086 06	LANGLEY-12489	B80-10151 01	NPO-14734
B80-10043 03	NPO-14710	B80-10087 06	LANGLEY-12502	B80-10152 01	LANGLEY-12549
B80-10044 03	LANGLEY-12592	B80-10088 06	LEWIS-13279	B80-10153 01	MSC-18472
		B80-10089 06	M-FS-23027	B80-10154 01	GSFC-12501
		B80-10090 06	LANGLEY-12623	B80-10155 01	NPO-14815
		B80-10091 06	LEWIS-13249	B80-10156 01	MSC-18407
		B80-10092 06	LANGLEY-12556	B80-10157 01	M-FS-25342
		B80-10093 07	LANGLEY-12564	B80-10158 01	MSC-19751
		B80-10094 07	M-FS-25134	B80-10159 01	MSC-18180
		B80-10095 07	LANGLEY-12482	B80-10160 01	FRC-11025
		B80-10096 07	M-FS-25340	B80-10161 01	M-FS-25208
		B80-10097 07	MSC-19385	B80-10162 01	NPO-14701
		B80-10098 07	MSC-18690	B80-10163 01	M-FS-25352
		B80-10099 07	MSC-18538	B80-10164 02	GSFC-12430
		B80-10100 07	MSC-18529	B80-10165 02	GSFC-12447
		B80-10101 07	MSC-18468	B80-10166 02	GSFC-12448
		B80-10102 07	M-FS-19505	B80-10167 02	NPO-14617
		B80-10103 07	M-FS-19518	B80-10168 02	NPO-14426
		B80-10104 07	MSC-14876	B80-10169 02	LANGLEY-12529
		B80-10105 07	M-FS-19324	B80-10170 02	MSC-18635
		B80-10106 07	LANGLEY-12412	B80-10171 02	NPO-13633
		B80-10107 07	MSC-14843	B80-10172 02	NPO-13165
		B80-10108 07	MSC-18582	B80-10173 02	MSC-18473
		B80-10109 07	LEWIS-13229	B80-10174 03	NPO-14821

TECH BRIEF/ORIGINATING CENTER NUMBER INDEX

880-10175 03	NPO-14448	880-10252 07	NPO-14399	880-10329 03	GSFC-12589
880-10176 03	NPO-14524	880-10253 07	NPO-14654	880-10330 03	NPO-14782
880-10177 03	LANGLEY-12631	880-10254 07	MSC-18590	880-10331 03	M-FS-25444
880-10178 03	GSFC-12562	880-10255 07	MSC-18567	880-10332 03	M-FS-25452
880-10179 03	NPO-14479	880-10256 07	MSC-18686	880-10333 03	M-FS-25471
880-10180 03	GSFC-12528	880-10257 07	GSFC-12518	880-10334 03	M-FS-25468
880-10181 03	NPO-14676	880-10258 07	MSC-14848	880-10335 03	M-FS-25451
880-10182 03	M-FS-25326	880-10259 07	LEWIS-13230	880-10336 03	M-FS-25453
880-10183 03	LANGLEY-12635	880-10260 08	M-FS-25401	880-10337 03	M-FS-25469
880-10184 03	HQN-10937	880-10261 08	M-FS-25149	880-10338 03	M-FS-25472
880-10185 03	LANGLEY-12632	880-10262 08	M-FS-25322	880-10339 03	M-FS-25479
880-10186 03	GSFC-12542	880-10263 08	LANGLEY-12466	880-10340 03	M-FS-25478
880-10187 03	M-FS-25397	880-10264 08	MSC-18534	880-10341 03	M-FS-25454
880-10188 03	M-FS-25416	880-10265 08	GSFC-12354	880-10342 03	M-FS-25458
880-10189 03	M-FS-25388	880-10266 08	M-FS-25230	880-10343 03	M-FS-25481
880-10190 03	M-FS-25419	880-10267 08	LEWIS-13412	880-10344 03	M-FS-25480
880-10191 03	M-FS-25398	880-10268 08	MSC-18430	880-10345 03	M-FS-25473
880-10192 03	M-FS-23589	880-10269 08	MSC-18390	880-10346 03	M-FS-25490
880-10193 03	M-FS-25385	880-10270 08	MSC-18685	880-10347 03	M-FS-25504
880-10194 03	M-FS-25433	880-10271 08	NPO-14801	880-10348 03	M-FS-25499
880-10195 03	M-FS-25420	880-10272 08	MSC-18617	880-10349 03	M-FS-25514
880-10196 03	M-FS-25423	880-10273 08	NPO-14715	880-10350 04	ARC-11176
880-10197 03	M-FS-25427	880-10274 08	LANGLEY-12540	880-10351 04	LEWIS-13589
880-10198 03	M-FS-25424	880-10275 08	M-FS-19441	880-10352 04	LEWIS-13497
880-10199 03	M-FS-25428	880-10276 08	M-FS-19496	880-10353 04	LEWIS-13324
880-10200 03	M-FS-25434	880-10277 08	MSC-18687	880-10354 04	LEWIS-13275
880-10201 03	M-FS-25435	880-10278 08	M-FS-19537	880-10355 04	MSC-18724
880-10202 03	M-FS-25431	880-10279 08	M-FS-25309	880-10356 04	MSC-16531
880-10203 03	M-FS-25443	880-10280 08	M-FS-25239	880-10357 04	LANGLEY-12629
880-10204 04	M-FS-25304	880-10281 08	M-FS-25348	880-10358 04	LANGLEY-12640
880-10205 04	LANGLEY-12597	880-10282 08	M-FS-25357	880-10359 04	NPO-14828
880-10206 04	LANGLEY-12642	880-10283 08	MSC-18718	880-10360 04	NPO-14947
880-10207 04	LEWIS-13169	880-10284 09	LANGLEY-12238	880-10361 04	LEWIS-13226
880-10208 04	NPO-14462	880-10285 09	M-FS-25396	880-10362 04	LANGLEY-12367
880-10209 04	LEWIS-13438	880-10286 09	LEWIS-13145	880-10363 04	NPO-14929
880-10210 04	M-FS-25158	880-10287 09	LEWIS-13206	880-10364 04	LEWIS-13485
880-10211 04	LEWIS-13388	880-10288 09	M-FS-23764	880-10365 04	NPO-14935
880-10212 05	MSC-18696	880-10289 09	M-FS-23813	880-10366 04	M-FS-25205
880-10213 05	LANGLEY-12282	880-10290 09	NPO-14245	880-10367 05	MSC-18761
880-10214 06	GSFC-12553	880-10291 09	NPO-14816	880-10368 05	M-FS-23964
880-10215 06	LANGLEY-12599	880-10292 09	MSC-18333	880-10369 05	NPO-14899
880-10216 06	LEWIS-13011	880-10293 09	NPO-14893	880-10370 05	NPO-14745
880-10217 06	MSC-18469	880-10294 01	MSC-18679	880-10371 05	MSC-18804
880-10218 06	NPO-14657	880-10295 01	GSFC-12420	880-10372 05	MSC-18915
880-10219 06	LANGLEY-12468	880-10296 01	NPO-14803	880-10373 06	GSFC-12618
880-10220 06	LANGLEY-12645	880-10297 01	NPO-14810	880-10374 06	MSC-18697
880-10221 06	LANGLEY-12655	880-10298 01	MSC-18367	880-10375 06	MSC-18674
880-10222 06	M-FS-25373	880-10299 01	LEWIS-12809	880-10376 06	NPO-14757
880-10223 06	NPO-14729	880-10300 01	NPO-14861	880-10377 06	LANGLEY-12697
880-10224 06	M-FS-23862	880-10301 01	NPO-14738	880-10378 06	LANGLEY-12393
880-10225 06	LANGLEY-12493	880-10302 01	MSC-18728	880-10379 06	LANGLEY-12602
880-10226 06	LANGLEY-12666	880-10303 02	KSC-11048	880-10380 06	M-FS-25421
880-10227 06	NPO-14700	880-10304 02	KSC-11167	880-10381 06	LANGLEY-12710
880-10228 06	M-FS-19549	880-10305 02	LANGLEY-12332	880-10382 06	NPO-14871
880-10229 06	M-FS-25296	880-10306 02	LANGLEY-12330A	880-10383 06	ARC-11158
880-10230 06	NPO-14684	880-10307 02	LANGLEY-12376	880-10384 06	LEWIS-13493
880-10231 06	MSC-18664	880-10308 02	NPO-14579	880-10385 06	KSC-11181
880-10232 06	KSC-11118	880-10309 02	NPO-14590	880-10386 06	LANGLEY-12402
880-10233 06	LEWIS-13146	880-10310 02	NPO-14823	880-10387 06	NPO-14705
880-10234 06	LEWIS-13392	880-10311 02	NPO-14281	880-10388 06	NPO-14702
880-10235 06	LANGLEY-11535	880-10312 02	MSC-18779	880-10389 06	LEWIS-13219
880-10236 06	LANGLEY-12636	880-10313 02	MSC-18587	880-10390 06	MSC-18422
880-10237 06	LANGLEY-12647	880-10314 02	LEWIS-13346	880-10391 06	GSFC-12625
880-10238 06	LANGLEY-12619	880-10315 02	NPO-14836	880-10392 06	M-FS-25399
880-10239 06	MSC-18616	880-10316 02	NPO-14671	880-10393 06	GSFC-12638
880-10240 07	MSC-18416	880-10317 02	MSC-18712	880-10394 06	LANGLEY-12699
880-10241 07	MSC-19636	880-10318 03	M-FS-25287	880-10395 06	LEWIS-12592
880-10242 07	M-FS-22636	880-10319 03	NPO-14811	880-10396 06	ARC-11282
880-10243 07	M-FS-23692	880-10320 03	NPO-14846	880-10397 06	LANGLEY-12404
880-10244 07	LEWIS-13347	880-10321 03	LANGLEY-12469	880-10398 06	LANGLEY-12499
880-10245 07	MSC-16153	880-10322 03	NPO-14843	880-10399 06	M-FS-23814
880-10246 07	MSC-16134	880-10323 03	NPO-14277	880-10400 06	LEWIS-13293
880-10247 07	MSC-18526	880-10324 03	LANGLEY-12730	880-10401 07	GSFC-12584
880-10248 07	GSFC-12095	880-10325 03	MSC-18757	880-10402 07	LEWIS-13411
880-10249 07	LEWIS-13399	880-10326 03	HQN-10924	880-10403 07	M-FS-19535
880-10250 07	NPO-14521	880-10327 03	NPO-14591	880-10404 07	LANGLEY-12615
880-10251 07	LANGLEY-12578	880-10328 03	NPO-14813	880-10405 07	MSC-18824

TECH BRIEF/ORIGINATING CENTER NUMBER INDEX

880-10406 07	GSFC-12606	880-10483 03	M-FS-25575
880-10407 07	MSC-18462	880-10484 03	M-FS-25569
880-10408 07	ARC-11272	880-10485 03	M-FS-25572
880-10409 07	M-FS-25139	880-10486 03	M-FS-25568
880-10410 07	M-FS-19619	880-10487 03	M-FS-25564
880-10411 07	NPO-14800	880-10488 03	M-FS-25559
880-10412 07	MSC-18699	880-10489 04	MSC-16394
880-10413 07	M-FS-19503	880-10490 04	MSC-18835
880-10414 07	MSC-18769	880-10491 04	LANGLEY-12713
880-10415 07	MSC-18731	880-10492 04	NPO-14797
880-10416 07	MSC-18772	880-10493 04	LANGLEY-12719
880-10417 08	ARC-11246	880-10494 04	MSC-18740
880-10418 08	MSC-16921	880-10495 04	LANGLEY-12737
880-10419 08	MSC-18704	880-10496 04	M-FS-25414
880-10420 08	MSC-18707	880-10497 04	M-FS-25496
880-10421 08	MSC-18708	880-10498 04	LANGLEY-12665
880-10422 08	LANGLEY-12547	880-10499 05	MSC-18783
880-10423 08	MSC-18771	880-10500 05	MSC-18759
880-10424 01	MSC-18756	880-10501 05	MSC-18775
880-10425 08	MSC-18784	880-10502 05	LANGLEY-12709
880-10426 08	NPO-14802	880-10503 05	GSFC-12610
880-10427 08	MSC-18786	880-10504 05	LANGLEY-12718
880-10428 08	MSC-18623	880-10505 05	NPO-14812
880-10429 08	MSC-18787	880-10506 06	FRC-10112
880-10430 08	MSC-18743	880-10507 06	LANGLEY-12476
880-10431 08	M-FS-25249	880-10508 06	LANGLEY-12706
880-10432 08	M-FS-25183	880-10509 06	NPO-14779
880-10433 08	M-FS-25066	880-10510 06	MSC-18778
880-10434 08	M-FS-25067	880-10511 06	NPO-14966
880-10435 08	M-FS-25058	880-10512 06	LANGLEY-12680
880-10436 08	M-FS-25065	880-10513 06	NPO-14528
880-10437 08	M-FS-25054	880-10514 06	NPO-14936
880-10438 09	NPO-14496	880-10515 06	NPO-14864
880-10439 09	M-FS-25371	880-10516 06	KSC-11076
880-10440 01	NPO-14964	880-10517 06	NPO-14837
880-10441 01	LEWIS-13400	880-10518 06	LANGLEY-12588
880-10442 01	LEWIS-13418	880-10519 06	LEWIS-13432
880-10443 01	GSFC-12555	880-10520 06	LEWIS-13250
880-10444 01	MSC-18680	880-10521 06	M-FS-25235
880-10445 01	NPO-14881	880-10522 06	GSFC-12600
880-10446 02	NPO-14975	880-10523 06	LEWIS-13461
880-10447 02	NPO-14713	880-10524 06	LANGLEY-12727
880-10448 02	MSC-18532	880-10525 06	LANGLEY-12702
880-10449 02	MSC-18777	880-10526 07	LANGLEY-12729
880-10450 02	MSC-18793	880-10527 07	MSC-18855
880-10451 02	GSFC-12536	880-10528 07	NPO-14306
880-10452 03	GSFC-12608	880-10529 07	LANGLEY-12687
880-10453 03	NPO-14556	880-10530 07	MSC-18853
880-10454 03	NPO-14781	880-10531 07	LANGLEY-12372
880-10455 03	LANGLEY-12682	880-10532 07	MSC-18871
880-10456 03	NPO-14749	880-10533 07	LEWIS-13393
880-10457 03	NPO-14976	880-10534 08	MSC-18741
880-10458 03	NPO-14984	880-10535 08	MSC-18737
880-10459 03	NPO-14901	880-10536 08	MSC-18736
880-10460 03	M-FS-25543	880-10537 08	NPO-14796
880-10461 03	M-FS-25450	880-10538 08	KSC-11171
880-10462 03	M-FS-25521	880-10539 08	NPO-14869
880-10463 03	M-FS-25532	880-10540 08	MSC-18854
880-10464 03	M-FS-25529	880-10541 08	NPO-14961
880-10465 03	M-FS-25567	880-10542 08	NPO-14962
880-10466 03	M-FS-25558	880-10543 08	LANGLEY-12315
880-10467 03	M-FS-25502	880-10544 08	NPO-14853
880-10468 03	M-FS-25520	880-10545 08	NPO-14809
880-10469 03	M-FS-25524	880-10546 08	MSC-18801
880-10470 03	M-FS-25525	880-10547 08	MSC-18785
880-10471 03	M-FS-25526	880-10548 08	NPO-14794
880-10472 03	M-FS-25527	880-10549 08	NPO-14845
880-10473 03	M-FS-25528	880-10550 08	NPO-14780
880-10474 03	M-FS-25552	880-10551 08	M-FS-25055
880-10475 03	M-FS-25548	880-10552 08	M-FS-25017
880-10476 03	M-FS-25540	880-10553 09	MSC-18867
880-10477 03	M-FS-25539	880-10554 09	MSC-18745
880-10478 03	M-FS-25538	880-10555 09	KSC-11195
880-10479 03	M-FS-25537	880-10556 09	GSFC-12604
880-10480 03	M-FS-25536	880-10557 09	M-FS-25367
880-10481 03	M-FS-25530	880-10558 09	LANGLEY-12548
880-10482 03	M-FS-25553		

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business
Penalty for Private Use \$300

**SPECIAL FOURTH-CLASS RATE
BOOK**

POSTAGE AND FEES PAID
NATIONAL AERONAUTICS AND
SPACE ADMINISTRATION
NASA-451



NASA

