(NASA-SP-5 21(14)) INDEX TO NASA THER BRIEFS, 1973 (NASA) 115 p HC \$5.25 CSCL 53 ท75 **-** 17 28 อิ

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# Index to NASA Tech Briefs

1973



February 1974

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# Introduction

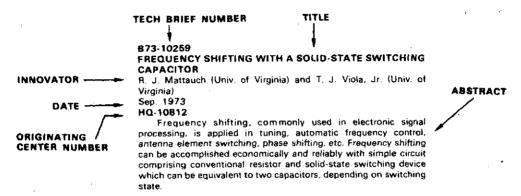
Tech Briefs are short announcements of new technology derived from the research and development activities of the National Aeronautics and Space Administration or the U.S. Atomic Energy Commission. These briefs emphasize information considered likely to be transferrable across industrial, regional, or 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 1973 Tech Briefs.

## Abstract Section

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

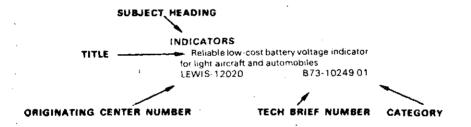
A typical abstract entry has these elements:



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

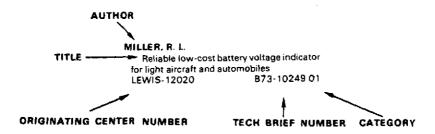
#### Indexes

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 preliminary edition of the NASA Thesaurus (December 1967) (NASA SP-7030) is used as the authority for the indexing vocabulary that appears in the subject index. The NASA Thesaurus should be consulted in examining the current indexing vocabulary, including associated cross-reference structure. Only the subject terms that have been selected to describe the documents abstracted in this issue appear in the subject index. Copies of the NASA Thesaurus may be obtained from the National Technical Information Service or the U.S. Government Printing Office at \$8.50 for the three-volume set. The first two volumes of this Thesaurus, consisting of the alphabetical listing of subject terms (A-Z), have been superseded by the following single-volume publication: NASA Thesaurus Alphabetical Update (September 1971) (NASA SP-7040), available from NTIS for \$6.00. (Volume III of the Preliminary Edition consists of the following ancillary aids to vocabulary selection: hierarchical display of index terms, category term listing, permuted index, and a listing of postable terms only.)

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

# NASA

ARC	Ames Research Center
GSFC	Goddard Space Flight Center
HQ	NASA Headquarters
JSC	Johnson Space Center (formerly Manned
	Spacecraft Center)
KSC	Kennedy Space Center
LANGLEY	Langley Research Center
LEWIS	Lewis Research Center
M-FS	Marshall Space Flight Center
NPO	NASA Pasadena Office
XAC	Ames Research Center
XGS	Goddard Space Flight Center
XLA	Langley Research Center

## **Atomic Energy Commission**

LRL Lawrence Radiation Laboratory

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# Index to NASA Tech Briefs

February 1974

## Abstract Section

## 01 ELECTRONICS/ELECTRICAL

B73.10004

IMPULSE COMMUTATING CIRCUIT WITH TRANSFORMER TO LIMIT REAPPLIED VOLTAGE

J. H. McConville (Martin Marietta Corp.)

Mar 1973

LEWIS-11849

Silicon controlled rectifier opens circuit with currents flowing up to values of 30 amperes. Switching concept halves both current and voltage in middle of commutating cycle thereby lowering size and weight requirements. Commutating circuit can be turned on or off by command and will remain on in absence of load due to continuous gate.

#### R73.10016 SIGNAL CONDITIONER FOR POTENTIOMETER TYPE

**TRANSDUCERS** E. C. Armentrout and E. Gross

Mar. 1973

LEWIS-11822

Low cost method is described for signal/conditioning of pot-type transducers utilizing printed circuitry. Conditioner fits into standard rack, accommodates 56 channels, and can be operated by one attendant.

#### B73-10035

DIGITAL DATA COMMAND BUS

G. C. Milligan Feb. 1973

NPO-11637

Command bus constructed from coaxial cable has short segments of its outer jacket and shield removed and replaced with small ferrite cores carrying multitum windings connected to decoder. Device reduces number of wire pairs required to communicate command data to systems and subsystems.

#### B73-10054

GLASS ENCAPSULATION PROVIDES EXTRA PROTECTION FOR IC SEMICONDUCTOR DEVICES

W. L. Doelp, Jr. (Philco-Ford Corp.)

Feb. 1903

M-FS-21310

Oxide-passivated semiconductor chip is given protective glass coating by means of vapor deposition over metallic substrate of integrated circuit (IC). Method provides more reliable oxidepassivation and hermetic sealing in current use. Chips and scratches incurred during dicing, testing, and assembly are markedly reduced.

#### B73-10055

FLAT CONDUCTOR CABLE SURVEY

C. R. Swanson (Hayes Intern. Corp.) and G. L. Walker (Hayes

Intern. Corp.) Feb. 1973

M-FS-22493

Design handbook contains data and illustrations concerned with commercial and Government flat-conductor-cable connecting and terminating hardware. Material was obtained from a NASA-sponsored industry-wide survey of approximately 150 companies and Government agencies.

#### B73-10096

FABRICATION OF MAGNETIC BUBBLE MEMORY OVERLAY

Mar. 1973 Innovator not given (IBM)

M.FS.22377

Self-contained magnetic bubble memory overlay is fabricated by process that employs epitaxial deposition to form multi-layered complex of magnetically active components on single chip. Overlay fabrication comprises three metal deposition steps followed by subtractive etch.

#### B73-10097

A PROPOSED ADJUSTABLE RF CABLE CONNECTOR

E. J. Stringer (Rockwell Intern. Corp.) and J. D. Doyle (Rockwell Intern Corn )

Mar. 1973 M-FS-24271

In system that requires negligible loss, it may be necessary to adjust cable length to exact multiple of transmitted wavelength. Adjustable cable connector saves time and cost by eliminating need to add to or cut from cable. Device was especially designed for use with high frequencies. For particular application, connector of suitable dimensions should be used.

A NEW PACKAGING AND TESTING CONCEPT FOR MICROELECTRONIC COMPONENTS

G. L. Filip and S. V. Caruso

May 1973

M-FS-20936

Parts are securely held on sealed, printed circuit board that is both package and test fixture. Parts can be handled, stored, and tested in sealed package.

#### B73-10135

LOW PHASE-NOISE DIGITAL FREQUENCY DIVIDER

G. F. Lutes

Mar. 1973

NPO-11569

Digitally generated countdown pulse at submultiple frequency is applied to one electrode of FET gate to establish threshold state; gate cannot function until desired portion of reference half-wave pulse which is to be passed appears on second electrode.

BRAID READ-ONLY MEMORY

J. F. McKenna (MIT) Mar. 1973

Transformer-type memory is fault-tolerant array of independent read-only memory units. Information pattern in each unit is written by weaving wires through array of linear (nonswitching) transformers. Presence or absence of a bit is determined by whether a given wire threads or bypasses given transformer.

#### B73-10139

## SIMULTANEOUS PROCESSING OF VIBRATION TEST DATA

E. E. Reddeman Mar. 1973 NPO-11616

Data from record tracks of all accelerometers is injected simultaneously into electronic circuits which convert inputs into single, composite graphical representation. Three adequate methods of processing data: peak acceleration at a frequency, average of all channels, and quad-mean of all channels.

#### A VACUUM CHAMBER FEEDTHROUGH

V. D. Brown (Memphis State Univ.)

Mar. 1973

M-FS-21133

Simple and inexpensive microwave feedthrough has been designed which transfers 130 ns. 5kV pulse into vacuum chamber. Feedthrough may be used over wide range and is adaptable to most coaxial cables, since either multistrand or single strand center conductor cable can be used.

#### B73-10160

#### SYNCHRO PHASE SELECTOR AID

F. H. Austin and G. C. Moen

May 1973

LANGLEY-11282

Phase selector permits multiple leads of synchro devices to be randomly connected while proper interconnections are determined by operating selector switches. Operation of these switches varies both phase and rotation relationship of synchro devices.

#### B73-10164

#### LIQUID METAL POROUS MATRIX SLIDING ELECTRICAL CONTACT: A CONCEPT

H. Ferguson

Jun. 1973

#### LEWIS-11735

Concept utilizes porous metal or nonmetal matrix containing liquid metal in porous structure and confines liquid metal to contact area between rotor and brush by capillary forces. System may also be used to lubricate bearing systems.

#### B73-10171

#### COMPACT 20-KILOAMPERE PULSE-FORMING-NETWORK CAPACITOR BANK

S. J. Posta and C. J. Michels

May 1973

LEWIS-12009

Bank uses commercially available high-energy-density capacitors for energy storage and silicon-controlled rectifiers for switching. Low voltage design employing solid-state switching is utilized in lieu of conventional gas discharge switching.

#### COMPLEMENTARY MOS FOUR-PHASE LOGIC CIRCUITS H. L. Petersen (Lockheed Missiles & Space Co.) and D. K. Kinell (Lockheed Missles & Space Co.)

Jun. 1973

JSC-14240

Technique can provide four-phase clock signal from singlephase clock and requires only one power supply voltage. This arrangement saves considerable power compared to circuits having load resistor between power supply and ground.

#### B73-10179

#### MICROSTRIP ANTENNAS

J. Q. Howell

#### Jun. 1973

#### LANGLEY-11284

It is possible to design and construct simple, efficient microwave antenna, either linearly or circularly polarized, which should be useful in phased arrays. Mounted on thin dielectric substrate, it extends slightly above ground plane. Space behind ground plane is required for feed line and mounting hardware.

#### PROPOSED ELECTROMAGNETIC WAVE ENERGY CON-VERTER

R. L. Bailey (Catholic Univ.)

Jun. 1973

GSFC-11394

Device converts wave energy into electric power through array of insulated absorber elements responsive to field of impinging electromagnetic radiation. Device could also serve as solar energy converter that is potentially less expensive and fragile than solar cells, yet substantially more efficient.

#### B73-10196

#### AN IMPROVED METHOD FOR OBTAINING A NORMALIZED JUNCTION TEMPERATURE FOR SEMICONDUCTORS: A CONCEPT

S. N. Trivedi (Martin Marietta Corp.)

Jun. 1973

JSC-14136

Failure rate for given semiconductor device is simply determined by reading value of normalized junction temperature from printout for any given combination of ambient temperature, stress ratio, and maximum rated junction temperature, and obtaining corresponding failure rate from graph,

#### 873-10197

#### P-CHANNEL SILICONE GATE FET

S. Ostis (Sperry Rand Corp.) and D. S. Woo (Sperry Rand Corp.) Jun. 1973

#### M-FS-22505

Modified fabrication technique for P-channel, MOSFET devices eliminates problems involving gate placement and gate overlap. Technique provides self-aligned gate, eliminating complexity of mask aligning. Devices produced by this process are considerably faster than conventional MOSFET's and process increases yield.

## B73-10199

#### SRC SEAL TESTING

E. D. Miller (McDonnell Douglas Corp.) and G. J. Kohout (McDonnell Douglas Corp.)

# Aug. 1973 M-FS-22426

Small venthole drilled in semisealed silicon-controlled rectifier: (SCR) cavity eliminates entrapped helium. Although these devices show slightly greater leak than those before lead installation, it is now possible to distinguish device with good hermetic seal from defective one.

#### MANUFACTURE AND QUALITY CONTROL OF INTERCON-NECTING WIRE HARNESSES

Jun. 1973

M-FS-22511

Four-volume series of documents has been prepared as standard reference. Each volume may be used separately and covers wire and cable preparation as well as harness fabrication and installation. Series should be useful addition to libraries of manufactures of electrical and electronic equipment.

#### B73-10237

#### BATTERY CELL THERMAL-CONDUCTIVE COATING **INCREASES EFFICIENCY**

H. M. Doyle (Martin Marietta Corp.)

Aug. 1973

#### LANGLEY-10963

Thin coating of high-temperature epoxy resin provides necessary electrical insulation, as well as good thermal conductivity between battery cells. Insulation increases efficiency of nickelcadmium battery, as it would any multicell battery assembly in which cell-to-cell thermal balance is critical.

#### B73-10249

RELIABLE LOW-COST BATTERY VOLTAGE INDICATOR FOR LIGHT AIRCRAFT AND AUTOMOBILES

Dec. 1973 LEWIS-12020

Voltage indicator fits into cigarette lighter socket and utilizes light emitting and Zener diodes to display three levels of battery voltage. Indicator is superior to typical conventional electrical system indicators in that it gives a positive discrete indication of battery voltage. It is simple, inexpensive, and rugged.

#### B73-10259

#### FREQUENCY SHIFTING WITH A SOUD-STATE SWITCHING CAPACITOR

R. J. Mattauch (Univ. of Virginia) and T. J. Viola, Jr. (Univ. of

Sep. 1973

HQ-10812

Frequency shifting, commonly used in electronic signal processing, is applied in tuning, automatic frequency control, antenna element switching, phase shifting, etc. Frequency shifting can be accomplished economically and reliably with simple circuit comprising conventional resistor and solid-state switching device which can be equivalent to two capacitors, depending on switching state.

#### 873-10264

#### MULTILAYER FLAT ELECTRICAL CABLE

P. G. Silverman (TRW Systems Group)

Jun. 1973

ARC-10734

Flat electrical cable is lightweight, flexible over wide temperature range, withstands continuous exposure to high levels of nuclear radiation, and can carry high currents with minimum of temperature rise. Its magnetic cleanliness is equal to or better than twisted pair of wires, and it can be terminated in conventional electrical connector.

#### B73-10278

## EVENT-SEQUENCE DETECTOR

M. F. Hanna Jun. 1973 NPO-11703

Detector consists of matrix of storage elements which are activated by coincidence of failure-voltage pulses and clock pulses. Clock frequency used for event sequence detector can be selected to provide time resolution demanded by test at hand.

#### A NEW METHOD FOR THE DETERMINATION OF THIN FILM POROSITY

T. R. Beck (Boeing Co.), C. J. Bishop (Boeing Co.), and W. F. Springgate (Boeing Co.)

Sep. 1973

HQ-10673

internal reflection spectroscopy may be used to determine presence of water in thin film pores. Presence of water in such pores is function of relative humidity and pore size. Thus, one can determine pore size by controlling humidity. Fluids with surface tension different from that of water can be used to detect pores.

#### MINIMAL HARDWARE, BINARY SEQUENCE PSEUDO-NOISE GENERATOR AND DETECTOR

M. Perlman

Jul. 1973 See also JPL-TR-32-1432

NPO-11406

General purpose sequence generator which includes 35-stage field shift register determines mathematical properties of polynomials such as divisibility, period, order of roots, and other parameters that effect desirability of various sequences for specific applications; for example, irreducible polynomials which characterize sequences with randomness properties.

#### B73-10295

#### SILICON SWITCHING TRANSISTOR WITH HIGH POWER AND LOW SATURATION VOLTAGE

E. Stonebraker (Westinghouse Elec. Corp.), D. Stoneburner (Westinghouse Elec. Corp.), and H. Ferree (Westinghouse Elec. Corp.)

Jul. 1973 See also NASA-CR-112870

NPO-11565

Assembly of two individually encapsulated silicon-chip transistors produces silicon power-transistor that has low electrical resistance and low thermal impedance. Electrical resistance and thermal impedance are low because of short lead lengths, and external contact surfaces are plated to reduce resistance at interfaces.

#### B73-10304

#### AN ELECTRIC MOTOR WITH MAGNETIC BEARINGS: A CONCEPT

P. A. Studer Aug. 1973 XGS-07805

Because same magnetic flux is used to control rotor as to drive it, size, weight, and power required are minimized. Constant total current keeps motor torque invarient, and absence of mechanical bearings eliminates wear and reduces frictional power

#### 873-10333

#### MILLIMETER-WAVE ANTENNA SYSTEM

J. Evans and W. I. Gould, Jr.

Sep. 1973

GSFC-10949

Parabolic reflectors fabricated from Carbon Fiber Reinforced Plastic (CFRP) composite material will not distort their shape by more than 3 percent of millimeter wavelength, despite large temperature differences on reflector surfaces. CFRP has zero thermal expansion. It is derived from charred polyacrylonitrite plastic filaments that are combined with epoxy resin.

#### B73-10346 OPERATIONAL SLOPE-LIMITING CIRCUIT

A. Engel

Aug. 1973

NPO-11773

Circuit limits slope of arbitrary waveform to avoid exceeding rate limit of subsequent amplifier, or to form trapezoidal wave with adjustable rise and fall rates from square wave of arbitrary frequency. Integrator provides delay needed to develop output waveform. DC coupling is used to preserve original dc offset.

## B73-10350

#### ALL DIGITAL PHASE LOCK LOOPS FOR NOISE-FREE SIGNALS

T. O. Anderson

Aug. 1973 NPO-11914

Bit-synchronizers utilize all-digital phase-lock loops that are referenced to a high frequency digital clock. Phase-lock loop of first design acquires frequency within nominal range and tracks phase; second design is modified for random binary data by addition of simple transition detector; and third design acquires frequency over wide dynamic range.

#### B73-10351

#### FREQUENCY CONTROL CIRCUIT FOR ALL-DIGITAL PHASE-LOCK LOOPS

T. O. Anderson

Aug. 1973 See also B73-10350

NPO-11936

Phase-lock loop references all its operations to fixed high-frequency service clock operating at highest speed which digital circuits permit. Wide-range control circuit provides linear control of frequency of reference signal. It requires only two counters in combination with control circuit consisting only of flip-flop and gate.

#### B73-10356

## DATA-AIDED CARRIER TRACKING LOOPS

W. C. Lindsey and M. K. Simon

Aug. 1973 NPO-11282

Power in composite signal sidebands is used to enhance signal-to-noise ratio in carrier tracking loop, thereby reducing radio loss and decreasing probability of receiver error. By adding quadrature channel to phase-lock-loop detector circuit of receiver, do component can be fed back into carrier tracking loop.

#### B73-10366

## SAFE ELECTRICAL RECEPTACLE AND MODIFIED PLUG

L. W. Rabb (Boeing Co.)

Oct. 1973

KSC-10817

Recently-developed electrical receptacle has internal sliding protective cover that prevents accidental contact with live terminals. Sliding protective cover is used in combination with modified male plug. Design provides excellent protector against electrical shock and should interest manufacturers of electrical connectors.

#### B73-10368

#### A HIGH-SPEED SPECTROGRAPH SHUTTER

M. H. Miller (Maryland Univ.) and S. M. Wood, Jr. (Maryland Univ.)

Oct. 1973 See also NASA-CR-72660

HQ-10635

Device can operate in close-open-close mode. Beam splitter placed behind static-slit assembly allows use of more than one camera. Each frame in particular series may be conveniently varied in exposure time and spacing. This can be done independent of other frames in the series. In "open" position, shutter transmits light over wide wavelength range.

#### B73-10374

## SILICON-FIBER BLANKET SOLAR-CELL ARRAY CONCEPT

J. T. Eliason (Sperry Rand Corp.)

Oct. 1973

M-FS-22458

Proposed economical manufacture of solar-cell arrays involves parallel, planar weaving of filaments made of doped silicon fibers with diffused radial junction. Each filament is a solar cell connected either in series or parallel with others to form a blanket of deposited grids or attached electrode wire mesh screens.

#### B73-10386

# NOMOGRAPH FOR PREDICTION OF RF-BREAKDOWN VOLTAGES

F. S. Hickernell (Motorola, Inc.) and B. E. Mathes (Motorola, Inc.)

Sep. 1973

NPO-11819

Information in nomograph is derived from data obtained from RF-breakdown tests on components of uniform and nonuniform geometry. Nomograph also can be used in design work to predict breakdown margins; if operational minimum pressure is established giving minimum value on nomograph, minimum breakdown voltage consistent with allowed value can be predicted.

#### B73-10387

# GATED COMPRESSOR, DISTORTIONLESS SIGNAL LIMITER

R. C. Woodbury

Sep. 1973

NPO-11820

Comparator/multiplier arrangement is capable of limiting input power to voice coil so that desired maximum current level is never exceeded. Overall test system consists of signal source which produces frequency spectrum required for acoustic test, gated compressor circuit, and power amplifier feeding transducer.

#### B73-10390

## SAMPLING COMMAND GENERATOR CORRECTS FOR

#### NOISE AND DROPOUTS IN RECORDED DATA

T. O. Anderson Sep. 1973 NPO-11886

Generator measures period between zero crossings of reference signal and accepts as correct timing points only those zero crossings which occur acceptably close to nominal time predicted from last accepted command. Undirectional crossover points are used exclusively so errors from analog nonsymmetry of crossover detector are avoided.

#### B73-10393

#### WELDED PRINTED CIRCUIT (PC) STICK

F. Kreis Oct. 1973

GSFC-11773

Printed-circuit stick module has reduced comb technique to six steps, cutting process time by approximately 50%. Method incorporates all type of components into one assembly, it reduces design and fabrication time for 14-lead flat pack to less than four hours and for the 22-lead flat pack to four hours. Average weight of each flat pack is also reduced to 2 g.

#### B73-10427

#### HERMETIC-COAXIAL PACKAGE DESIGN FOR MI-CROWAVE TRANSISTORS

D. S. Jacobson (RCA)

Dec. 1973

GSFC-10791

Semiconductor package has been developed for high power semiconductor devices that operate in the GHz-frequency range at several watts. Package includes stud, insulating ring, electrically conductive washer, insulating washer, braze ring, and cap. It is mechanically strong and can be used with variety of circuits.

#### B73-10442

# GAAS TRANSISTORS FORMED BY BOOR Mg ION IMPLANTATION

R. G. Hunsperger (Hughes Aircraft Co.) and O. J. Marsh (Hughes Aircraft Co.)

Feb. 1974

#### LANGLEY-11204

N-p-n transistor structures have been formed in GaAs by implanting n-type substrates with Be ions to form base regions and then implanting them with 20-keV Si ions to form emitters. P-type layers have been produced in GaAs by implantation of either Mg or Be ions, with substrate at room temperature, followed by annealing at higher temperatures.

#### B73-10459

# DESIGN PARAMETERS FOR TOROIDAL AND BOBBIN MAGNETICS

W. T. McLyman

Feb. 1974 See also JPL-TM-33-651

NPO-13441

Handbook has been published to facilitate conversion to metric system. Conversion data makes it possible for transformer designers to obtain fast and close approximation of significant parameters. For greater convenience, derivations of some transformer and inductor parameters are also presented.

#### B73-10476

## PLUG-IN INTEGRATED/HYBRID CIRCUIT

E. J. Stringer (Rockwell Intern. Corp.)

Mar. 1974

M-F8-24470

Hybrid circuitry can be installed into standard round bayonet connectors, to eliminate wiring from connector to circuit. Circuits can be connected directly into either section of connector pair, eliminating need for hard wiring to that section.

#### B73-10509

#### RF SHIELDED CONNECTORS

A. Fisher and C. Clatterbuck

Mar. 1974

GSFC-11215

Gap, where cable joins connector housing, is shielded effectively by composite RF shielding made from suitable potting resin material (furned silica, thixotropic prepolymer composition), conductive coating (silver-filled, flexible, polyurethane resin), and protective jacket (wax coated housing formed around another wax form having contours shaped to match configuration).

B73-10512

NEW STANDOFFS PROVIDE HIGH-RELIABILITY COMPO-NENT MOUNTING FOR PRINTED WIRING BOARDS

W. H. McCandliss (Martin Marietta Corp.)

Mar. 1974

LANGLEY-11176

Designs providé such advantages as inspectable solder joints from both sides of boards; stress relief in lead wires; lowimpedance thermal paths; matched coefficients of lead wire thermal expansion; minimum webbing of conformal coatings to lead wires; positive mounting of part bodies to boards; and conductive mass for transient heat sink requirements.

B73-10515

CORRUGATED BATTERY ELECTRODE

J. McCallum (Battelle Mem. Inst.) Mar. 1974 See also 873-10519

GSFC-11368

Performance of porous electrodes in batteries and other electrochemical cells is greatly improved when supports for active material have pores of uniform size, extending completely through electrodes, from side to side, with no interconnections between

873-10519

HONEYCOMB BATTERY PLAQUE

G. R. Schaer (Battelle Mem. Inst.) Mar. 1974 See also B73-10515 GSFC-11367

Performance of porous electrodes in batteries and other electrochemical cells is greatly improved when supports for active material have pores of uniform size, extending completely through electrodes, from side to side, with no interconnections between pores.

B73-10520

DESIGN METHOD FOR MINIMIZING RF VOLTAGE BREAKDOWN

R. T. Woo

Mar. 1974 See also JPL-TR-32-1500

NPO-13408

Research study was conducted and results were published. Using principles of similarity and minimum of experimental data, a number of universal curves have been constructed covering wide range of experimental parameters. Gases other than air. such as argon and carbon dioxide, also are included in study.

## 02 ELECTRONIC/ELECTRICAL SYSTEMS

B73-10006

A REMOTE TEST PARAMETER PROFILE DISPLAY

J. L. Harrold and J. E. Dudenhoefer Mar. 1973

LEWIS-11872

Multiplexed digital recording system with simple interface between it and standard commercially available oscilloscopes was developed. System included: rapid set-up, minimum input cabling, low cost, display expansion capability, and portability.

B73-10010

REMOTE MEASUREMENTS BY TELEPHONE

R. L. Miller Mar. 1973 LEWIS-11704

Inexpensive device permits measurement and remote interrogation of variables such as voltage, temperature, pressure, or humidity by standard telephone equipment. Remote interrogation of wind direction and velocity, humidity, or water levels on flood-prone river are other possible representative uses for this

B73-10011

LOW COST UNIFORM HEAT SOURCE

R. B. Smith and G. M. Prok Mar. 1973 See also NASA-TM-X-2374

LEWIS-11903

Electrically powered heat source was developed for ground simulation of isotope heat-source assembly in Brayton power system. Heat source, which operates on ordinary 110 vac power, consists of tungsten filament heating element wound onto a spirally grooved boron nitride core and inserted in a hollowed-out graphite hexahedron.

B73-10043

AN AUTOMATIC LIGHTNING DETECTION AND PHOTO-GRAPHIC SYSTEM

R. J. Wojtasinski, L. Holley, J. L. Gray, and R. B. Hoover Feb. 1973

KSC-10728

Conventional 35-mm camera is activated by an electronic signal every time lightning strikes in general vicinity. Electronic circuit detects lightning by means of antenna which picks up atmospheric radio disturbances. Camera is equipped with fish-eye lense, automatic shutter advance, and small 24-hour clock to indicate time when exposures are made.

B73-10051

PROTOTYPE ULTRASONIC INSTRUMENT FOR QUANTITA-TIVE TESTING

L. C. Lynworth (Panametrics, Inc.), J. L. Dubois (Panametrics, Inc.), and P. R. Kranz (Panametrics, Inc.) Feb. 1973

M-FS-22350

Ultrasonic instrument has been developed for use in quantitative nondestructive evaluation of material defects such as cracks, voids, inclusions, and unbonds, Instrument is provided with standard pulse source and transducer for each frequency range selected and includes integral aids that allow calibration to prescribed standards.

B73-10052

OVEN TEMPERATURE CONTROLLER FOR ELECTRONIC COMPONENTS

S. W. Billingsley Feb. 1973

GSFC-11466

Simple, inexpensive circuit has been developed which provides active temperature control to certain precision electronic components such as crystal oscillators and Zener diodes.

B73-10074

MEASURING THE ELECTRIC FIELD OF A CLOUD

R. J. Wojtasinski and D. D. Lovall

Mar. 1973

KSC-10731

Network of electric field measuring stations has been developed to assess lightning hazard of charged clouds. Sensor data are digitized and transmitted to central processing area for.

873-10093

FOUR-PHASE DIFFERENTIAL PHASE SHIFT RESOLVER P. M. Hopkins (Lockheed Electronics Co.) and W. M. Wallingford (Lockheed Electronics Co.)

Jun. 1973 JSC-14065; JSC-14066

Two systems have been developed to resolve phase uncer-

tainty without transmitting reference signals. In both methods signal is impressed on carrier as differential, rather than absolute, phase shift. At the receiver four-phase demodulation and logic process unambiguously resolves differential phase shift of input

#### B73-10094

#### CARRIER EXTRACTION CIRCUIT

K. Solomon (RCA), J.R. Allen (RCA), A. Jackson (RCA), and R. W. Allen (RCA)

Mar. 1973 JSC-14262

Feedback loop extracts demodulated reference signals from IF input and feeds signal back to demodulator. Since reference signal is extracted directly from carrier, no separate reference need be transmitted. Circuit obtains coherent carrier from balanced or unbalanced four-phase signal of varying characteristics.

#### 873-10100

#### AUTOMATIC SPEED CONTROL OF HIGHWAY TRAFFIC

E. E. Klingman Feb. 1973 M-FS-21791

Vehicle control system monitors all vehicles in its range. and automatically slows down speeding vehicles by activating governor in vehicle. System determines only maximum speed; speeds below maximum are controlled by vehicle operator. Loss of transmitted signal or activation of emergency over-ride will open fuel line and return control to operator.

#### B73-10106

#### A TECHNIQUE TO ELIMINATE FALSE LOCK IN PCM DEMODULATION

H. S. Kobayashi

May 1973 See also B73-10107

JSC-12494

One loop provides error signal which adjusts voltage controlled oscillator. Second loop multiplies input signal with generated in-phase signal. Both signals are integrated over bit period. First loop detects null which indicates lockup, and second loop emphasizes impact signal information.

#### 873-10107

#### PHASE SHIFT KEYED, PULSE CODE MODULATED SIGNAL SYNCHRONIZER

H. S. Kobayashi

May 1973 See also B73-10106

JSC-12462

Signal is demodulated and synchronized by three loop circuits: "O" loop uses quadrature signal to stabilize frequency; "B" loop acts on baseboard signal to stabilize phase; and decoding " loop acts on in-phase signal. Synchronizer may be used to eliminate false-lock.

## B73-10112

#### DIGITAL NOTCH FILTER

B. Z. Meers, Jr.

Aug. 1973

KSC-10182

Filter determines whether time period of incoming signal matches time preset in filter. When signals do not match, high or low frequency deviation reading is displayed digitally.

#### B73-10118

#### AN AMPERE-HOUR METER FOR BATTERIES

B. D. Eklund (McDonnell Douglas Corp.)

Jun. 1973

M-FS-22067

Up-down counter records charge as well as discharge in tests of rechargeable batteries. System uses reversible counter preset to represent 100% charge. As battery discharges, total count decreases; as battery is recharged, counter moves back to 100% indication.

#### B73-10119

## NEW MOTOR SHAFT ANGULAR ACCELEROMETER

#### CONCEPT

F. O. Smetana (North Carolina Univ.)

Mar. 1973

#### LANGLEY-11030

Concept permits measurement of the acceleration of continuously rotating shafts without use of slip rings or telemetry and with little additional inertial load. Concept has application in servomotor control circuits and easy-to-fly airplane controls.

#### B73-10122

#### LEAPS (LASER ELECTRO-OPT) CAL ALIGNMENT POLE FOR SURVEYING)

L. Caudill May 1973

GSFC-11262

Azimuthal bearing between two obscured points is measured by placing laser beam at one of the points. Beam is directed straight up into the air so that some part of it may be detected from any position a reasonable distance away.

## BRAKE WEAR WARNING DEVICE: A CONCEPT

S. F. Hawkins (Rockwell Intern. Corp.)

May 1973

JSC-19157

Heat-insulated wire is introduced through brake shoe and partially into brake lining. Wire is connected to positive terminal and light bulb. When brakes wear to critical point, contact between wire and wheel drum grounds circuit and turns on warning light.

#### INTENSIVE CARE ALARM SYSTEM

J. L. Christensen (George Washington Univ.) and A. L. Herbert (George Washington Univ.)

May 1973

GSFC-11377

inductive loop has been added to commercially available call system fitted with earphone receiver. System transmits high frequency signals to nurse's receiver to announce patient's need for help without disturbing others.

#### B73-10127

#### AUTOMATIC QUADRATURE CONTROL AND MEASURING SYSTEM

J. F. Hamlet

May 1973

M-FS-21660

Quadrature is separated from amplified signal by use of phase detector, with phase shifter providing appropriate reference. Output of phase detector is further amplified and filtered by dc amplifier. Output of dc amplifier provides signal to neutralize quadrature component of transducer signal.

#### B73-10129

#### SOLAR ASPECT DETERMINATION SYSTEM

W. H. Farthing and H. F. Frisbie

May 1973

GSFC-11444

Sensor containing commercially available solid-state positionsensitive light detector provides complete space-vehicle sun or moon vector information.

#### B73-10132

#### DIGITAL VIDEO DISPLAY SYSTEM

A. J. Zygielbaum, W. L. Martin, and A. Engle

Mar. 1973

NPO-11342

System displays image data in real time on 120,000-element raster scan with 2, 4, or 8 shades of grey. Designed for displaying planetary range Doppler data, system can be used for X-Y plotting, displaying alphanumerics, and providing image animation.

#### B73-10134

#### LOW-NOISE MICROWAVE POLARIMETER

G. S. Levy, D. A. Bathker, and F. E. McCrea

Mar. 1973

#### NPO-11512

Two quarterwave-plate polarizers inserted between rotary waveguide joints transform received signals from arbitrary linear to circular polarizations and then from circular to fixed linear polarizations. Fixed linear polarizations are applied to amplifiers and filters in usual fashion.

## B73-10138

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#### COMPUTER-CONTROLLED VIBRATION TESTING

C. P. Chapman and B. Sotomayor

100gg

Mar 1973

#### NPD-11612

System features quickly achieved steady state, increased accuracy of spectrum definition, and true Gaussian amplitude distribution of resulting signals. Controlled shock-tests might also bestried with this system.

#### าง หน่า กระบบ พระชาการการ - B73-10141= <sup>(2)</sup>

#### CODE-REGENERATIVE CLEAN-UP LOOP FOR A RANGING TRANSPONDER

W. J. Hurd Mar. 1973

NPO-11707

Digital processing system phase locks on received ranging signal and creates clean replica of received ranging code. System is broadly applicable to variety of terrestrial ranging problems, including oceanic navigation.

#### 1 873.1014A

## A NONLINEAR-COHERENCE RECEIVER

M. K. Simon and W. C. Lindsey (Univ. of Southern Calif.)

Mar. 1973

NPO-11921

Mathematical analysis and detailed study of generic model for coherent receiver has demonstrated that nonlinear coherence between given biphase-modulated input signal and supplied reference signal can be used in receivers to improve telecommunication systems.

#### B73-10145

#### POSITIVE CONTACT RESISTANCE SOLDERING UNIT

R. D. Banta (Boeing Co.)

Mar. 1973

KSC-10242

Ohmmeter is used to indicate positive contact between electrodes and workpiece. This permits good soldering and prevents damage to electronic devices.

#### B73-10146

## A NEW DRY BIOMEDICAL ELECTRODE

R. S. Luce (Lockheed Missiles & Space Co.) and G. J. Cleveland (Lockheed Missiles & Space Co.)

May 1973

JSC-14321

Electronic circuitry contains new operational amplifier which incorporates monolithic super-gain transistors. Electrode does not provide voltage amplification; instead, it acts as current amplifier to make it possible to pick up electrical potentials from surface of highly resistant dry skin.

#### R73-10154

#### TIME-BASED PRIORITY SELECTION FOR ANALOG CIRCUITS

J. D. Fageol (Rockwell Intern. Corp.)

Jun. 1973

M-FS-24242

Unlimited channel capacity multiplexing circuit is hierarchially structured toSachieve priority encoding. Circuit could be used for automatic patient monitoring systems and diagnostic test systems in automotive and communications industry.

#### B73-10157

AN INEXPENSIVE VEHICLE SPEED DETECTOR

P. H. Broussard

May 1973

M-FS-22601

Low-nower minicomputer can plug into automobile cigarette lighter. It measures time it takes observed car to travel premeasured distance and provides immediate readout of speed. Potentially, detector could be manufactured for less than \$200 per unit and would have very low maintenance cost.

#### B73-10159

#### INTEGRABLE POWER GYRATOR ASSAULT AND A LINE

E. Hochmair (NAS)

May 1973

M-FS-22342

Further study of Y-matrix and Z-matrix configuration has led to development of efficient, dependable high-quality gyrators. Efficiency of new gyrators may approach theoretical limit of 78.5% with further improvements. Both designs are comparatively easy to integrate by implementing technology used with conventional operational amplifiers.

## GYRATOR CIRCUIT USING FIELD EFFECT TRANSISTORS

E. S. Hochmair (NAS)

May 1973

M-FS-21433

Gyrator circuit is especially useful in integrated circuits for such purposes as simulating inductors with capacitors. Circuit is adaptable to semifloating and full floating configurations. It has excellent response low power consumption, and high energy storage capacity.

#### B73-10167

#### BIPOTENTIAL MONITORING WITH INEXPENSIVE OFFICE-TYPE CASSETTE RECORDERS

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R. L. Wilbur (Southwest Res. Inst.)

Jun. 1973

M-FS-22566

Low-cost, modified cassette is part-of system that accepts biomedical data for storage. System accepts wide range of data and is compactly packaged for portability. Standard office recorder with automatic level control, multiple inputs, radio, and battery operation may be used for recording stage.

#### 873-10169

## REAL TIME OPTICAL FIGURE SENSOR

H. J. Robertson (Perkin-Elmer Corp.)

Jun. 1973

M-FS-22123 Mirrors produced for various optical systems require precise surface finishing. Sensor, developed for measuring mirror surface.

is compensated for interferences from temperature and air disturbances and is capable of measuring mirrors with diameters of up to 2 meters.

#### PRE-EMPHASIS DETERMINATION FOR AN S-BAND CONSTANT BANDWIDTH FM/FM STATION

G. R. Wallace (Sperry Rand Corp.) and W. E. Salter (Sperry Rand Corp.)

May 1973

M-FS-22135

Telemetry bands are being reassigned to UHF at 1500 and 2200 MHz. Conversion primarily requires changes in equipment used in RF link, while many of same subcarrier oscillators, mixer amplifiers, and frequency discriminators can be used.

#### B73-10173

#### RECOVERY OF RECORDINGS FROM HEAT DAMAGED MAGNETIC TAPES

J. F. Melugin and D. E. OBrien, III.

Jun. 1973

JSC-14219

Damaged tapes can now be repaired at home as long as damage does not extend to layer-to-layer adhesion within tape roll. Splice repaired section into good roll or cassette for copying. Every effort should be made to complete copying on first run, because fidelity in repaired section deteriorates with each repetition.

#### B73-10178

#### DETERMINING DISTANCE TO LIGHTNING STROKES FROM A SINGLE STATION

L. H. Ruhnke (NOAA)

Jun. 1973 KSC-10698

Electronic system can rapidly determine location of lightning strikes occurring within 30 km range. Longer distances are also determined, but with reduced accuracy. Studies have shown that lightning bolt emits electromagnetic wavefront; distance to lightning is determined from ratio of magnetic to electric field.

#### B73-10189

#### SIGNAL CONDITIONER TEST SET

W. H. Houck and J. D. Stiberg

Jun. 1973

KSC-10750

Compact, light-weight, solid-state test set can be used to check signal conditioning modules while they are installed in system. Test sets may also be used to cycle ground computer, if it is suspected of malfunctioning, rather than using signal conditioners.

#### **B73-10191** JUNCTION RANGE FINDER

S. Morissette (Illinois Inst. of Tech.), R. G. Sea (Illinois Inst. of Tech.), and M. J. Frazier (Illinois Inst. of Tech.)

Jun. 1973

KSC-1010B

Electronic system locates interferences in radar reception. System utilizes well known frequency-modulated continuous-wave technique to locate objects with nonlinear impedances. FM transmitter generates signal through bandpass filter which eliminates higher order harmonics around carrier frequency.

#### **B73-10195**

#### **AUTOMATED OPERATION OF AN INSTRUMENTATION FM** TAPE RECORDER

A. S. Asadourian and D. A. Perz

Nov. 1973

**LEWIS-11941** 

Recorder did not possess erase head nor was it capable of automatically rewinding reel of tape for reuse. Test results show that FM carrier recording signal with sufficient intensity will by itself erase previously recorded data as new data are being recorded. Automatic rewinding was accomplished by adding conventional metal leaders and appropriate circuitry.

#### TETRAD BUBBLE DOMAIN CHIP ARRANGEMENT FOR MULTIPLEXING

G. S. Almasi (IBM)

Jun. 1973

M-FS-22296

Rotating magnetic field of bubble domain memory is used to obtain time-division multiplexing of bubble domain circuits into quadrants. Memory bits are assigned on bit-per-chip rather than bit-per-module basis; power is reduced by circulating only portion of bubbles at a time.

#### B73-10217

## INTEGRATED P-CHANNEL MOS GYRATOR

E. Hochmair (NAS)

Aug. 1973

M-FS-22343

Several circuits can be integrated into one chip for applications which require more than one gyrator. They can also be integrated with other p-channel MOS circuits to eliminate need for external connections. Devices can operate at economical low-power levels, because they use FET amplifiers that do not degrade with decreases in supply.

#### B73-10223

#### HIGH-SENSITIVITY RECEIVER FOR CO2 LASER COM-MUNICATIONS

B. Peyton (Cutler Hammer Corp.), A. Dinardo (Cutler Hammer

Corp.) (Cutter Hammer Corp.), G. Kanischak, R. Lange (Cutter Hammer Corp.), and F. R. Arams (Cutler Hammer Corp.) Aug. 1973 GSFC-11455

Wideband heterodyne receiver provides detection and demodulation of incident frequency modulated laser signal; search and acquisition circuitry to align two stations; tracking circuitry to maintain spatial alignment; and laser frequency monitor to frequency lock the transmit and local oscillator lasers.

#### B73-10225

#### IMPROVED DESIGN OF ELECTROPHORETIC EQUIPMENT FOR RAPID SICKLE-CELL-ANEMIA SCREENING

J. M. Reddick (Howard Univ.) and I. Hirsch (Howard Univ.) Feb. 1974

GSFC-11794

Effective mass screening may be accomplished by modifying existing electrophoretic equipment in conjunction with multisample applicator used with cellulose-acetate-matrix test paper. Using this method, approximately 20 to 25 samples can undergo electrophoresis in 5 to 6 minutes.

#### B73-10226

#### A CLOSED, DIGITAL TELEPHONE SYSTEM.

L. G. Monford, Jr.

Aug. 1973

JSČ-13912

Digital system can accommodate sixteen or more telephone or data units and eight, simultaneous two-way conversations through only four interconnecting wires. It uses fewer circuit components, is not bulky or complex, and requires no central exchange control.

#### B73-10235

#### FLAMMABILITY CONTROL FOR ELECTRICAL CABLES AND CONNECTORS

W. O. Wick (McDonnell Douglas Corp.) and D. L. Buckey (McDonnell Douglas Corp.)

Aug. 1973

M-FS-21584

Technique of covering fire-hazardous sections of electrical wiring with fireproof materials prevents fires from spreading in oxygen-enriched atmospheres and eliminates use of heavy metal enclosures. Materials used to cover potting on connectors and ground terminals are made from Teflon-coated Beta cloth and Fluorel, a nonflammable fully-saturated polymer.

#### B73-10236

#### MICROMINIATURIZED, BIOPOTENTIAL CONDITIONING SYSTEM (MBCS)

N. Belasco, S. L. Pool, G. J. Cleveland (Lockheed Missiles & Space Co.), G. M. Loh (Lockheed Missiles & Space Co.), R. S. Luce (Lockheed Missiles & Space Co.), M. I. Lipanovich (Lockheed Missiles & Space Co.), H. L. Petersen (Lockheed Missiles & Space Co.), and D. W. Mangold (Boeing Co.)

Aug. 1973

JSC-14180

Multichannel, medical monitoring system allows almost complete freedom of movement for subject during monitoring periods. System comprises monitoring unit (biobelt), transmission line, and data acquisition unit. Belt, made of polybenzimidazole fabric, is wrapped around individual's waist and held in place by overlapping sections of Velcro closure material.

#### B73-10243

#### LASER SYSTEM DETECTS TOWER DEFLECTIONS

R. H. Fabik Nov. 1973

LEWIS-11870

Continuously measure and record deflection of facility during testing. Facility deflections are then subtracted from shroud deflections during data reduction on computer. System is based on tracking light beam by using two-axis photo detector and feeding signals into X and Y servo system.

B73-10255

# A MAGNETICALLY FOCUSED IMAGE TUBE EMPLOYING AN OPAQUE PHOTOCATHODE

C. B. Johnson (Bendix Corp.) and K. L. Hallam (Bendix Corp.) Aug. 1973

GSFC-11602

Image converter has been developed which uses opaque photocathode for improved efficiency. Device is easier to fabricate than previous semi-transparent photocathode converters and uses compounds from Groups 3-5 that are responsive to wave-lengths between ultraviolet (approximately 100 nm) and near infrared region (approximately 1000 nm).

B73-10257.

# FAST RECHARGE CIRCUIT FOR Q-SWITCHED LASERS R. L. Hansen (GTE Sylvania Inc.) Aug. 1973

GSFC-11510

Cavity-dumped lasers employ electrooptic-effect cell to alternately block and release laser pulse. Cell requires high-speed switching circuit that can apply and remove high voltage. Solid-state circuit employs complementary transistor switches which can switch at rates greater than 5 kHz, eliminate warmup time, provide variable voltage wave-form, and allow polarity reversal.

B73-10261

#### ELECTROSHOCK PROTECTION CIRCUIT

H. Heskett (Martin Marietta Corp.), J. Meincer (Martin Marietta Corp.), and A. L. Inglis Aug. 1973

JSC-14222

Circuit was developed to prevent accidental shock through electrodes used to test subjects as part of Skylab program. This circuit is placed between electrical apparatus and electrode that is attached to patient's body. Thus, patient is effectively protected from dangerous electrical shock that might be caused by failure in electrical apparatus.

B73-10267

#### LASER VELOCIMETER FOR SIMULTANEOUS TWO-DIMENSIONAL VELOCITY MEASUREMENTS

K. L. Orloff, G. R. Grant, and W. D. Gunter, Jr. Jul. 1973

ARC-10637

Laser velocimeter provides simultaneous orthogonal measurements in manner which minimizes many problems attending prior systems, and allows spatial traversing of flowfield in order to obtain velocity profiles. Velocimeter permits rapid interrogation of unsteady flows where area of interest is of the order of one meter in extent and flow does not vary appreciably over time of about one second.

#### B73-10273

## TWO-CARRIER COMMAND MODULATION SYSTEM

M. F. Easterling Jun. 1973

NPO-11548

Two carriers transmit two high-power signals from single transmitter, each phase-modulated by subcarrier which, in turn, is modulated by data bits; switching between two carriers is alternated at high rate. Resulting composite signal is multiplied up to desired frequency and used to drive power emplifier which feeds transmitting antenns.

B73-10275

# TIME-SYNCHRONIZED VLF PHASE-TRACKING RECEIVER S. C. Ward

Jun. 1973

NPO-11600

Coded signals transmitted at very low frequencies by National Bureau of Standards via its radio facility WWVL contain both primary time and frequency information. Synchronization of local time with WWVL signal standard requires comparison of phase differences between transmitted signal and output of traveling atomic clock such as rubidium frequency standard.

R73-10277

#### IMAGE DATA RATE CONVERTER: A CONCEPT

F. C. Billingsley

NPO-11659

Establish data tracks on periphery of rotating drum and axially displace entire drum to place given track in alignment with either fixed or rotating read/record head. Accurate control of speed drum and rotating head can be accomplished by using separate synchronous motors driven by digitally-set oscillators to provide required difference in speed.

B73-10280

#### PRESSURIZED LIGHTING SYSTEM

G. A. Phlieger

Aug. 1973 KSC-10644

Safe lighting assembly has been constructed for hostile environments. Assembly is ventilated by inert gas to prolong life of lamps. Lighting assembly contains control box, number of lamps connected in parallel, several pilot lights, and ventilating circuit. Control box is provided with components for monitoring and controlling flow of ventilating gas through lamp assemblies.

B73-10281

#### HIGH SPEED DIRECT-BINARY TO BINARY-CODED-DECIMAL CONVERTER AND SCALER

P. C. Toole

Aug. 1973

KSC-10326

Telemetry (pulse code modulated) digital system usually sends binary numbers representing some parameter that is not value of binary number. Received binary number must be scaled and converted to binary coded decimal to operate readout device to display true value. Group of adders speed up binary number conversion and scaling in one operation.

B73-10282

# COSMIC DUST OR OTHER SIMILAR OUTER SPACE PARTICLES LOCATION DETECTOR

S. Aver Aug. 1973.

Aug. 1973. GSFC-11291

Cosmic dust may be serious radiation hazard to man and electronic equipment caught in its path. Dust detector uses two operational amplifiers and offers narrower areas for collection of cosmic dust. Detector provides excellent resolution as result of which recording of particle velocities as well as positions of their impact are more accurately determined.

873-10285

#### DIGITAL TV IMAGE ENHANCEMENT SYSTEM

G. A. Biernson (GTE Sylvania)

Aug. 1973

GSFC-11256

Efficient, digital image-enhancement process has been developed for high-resolution slow-scan TV images. Scan converter is no longer subject to registration errors, which become more serious as resolution increases. To implement feedback image enhancement system, digital processing is used; otherwise there is excessive loss of image information, particularly in video delay lines.

B73-10288

# CIRCULARLY-POLARIZED MULTIBAND TELEMETRY TRACKING ANTENNA

K. E. Woo

Jul. 1973

NPO-11284

Utilize coaxial horn feed to illuminate reflector; feed has inner horn for X-band, and outer horn for S-band. Tracking error signals for servo correction are derived from measurements of relative phase and relative amplitude between two modes.

B73-10289

DATA MULTIPLEXER USING A TREE SWITCH

R. A. Easton and E. E. Hilbert Jul. 1973 See also B73-10290

NPO-11333

Self-decoding FET-hybrid or integrated-circuit tree configuration uses minimum number of components and can be sequenced by clock or computer. Redundancy features can readily be incorporated into tree configuration; as tree grows in size and more sensors are included, percentage of parts that will affect given percentage of sensors steadily decreases.

#### FLEXIBLE FORMAT, COMPUTER ACCESSED TELEMETRY SYSTEM

R. A. Easton and E. E. Hilbert Jul. 1973 See also B73-10289 NPO-11358

With this system, it is possible to sample and generate two or more simultaneous formats; one can be transmitted to ground station in real time, and other is stored for later transmission. Sensor output comparison data, plus information to control format, compression algorithm, and allowable degree of sensor activity, are stored in memory.

#### B73-10291

#### HIGH-GAIN ANTENNA WITH SINGLY-CURVED REFLECTOR

A. C. Ludwig. Jul. 1973

NPO-11361

Reflector collects energy over large region of space and focuses it toward small region where antenna feed is located. When incident energy is in form of plane wave, logical choice for shape of reflecting surface is paraboloid which converts plane wave into spherical wave that converges at a point.

#### B73-10293

#### IMPROVED MASERS FOR X-BAND AND Ku BAND

R. C. Clauss and R. B. Quinn Jul. 1973

NPO-11437

Slow-wave structure of traveling-wave maser utilizes comb system which is comprised of ruby on one side and alumina on other; alumina also supports isolator material. Radiation at pump frequency is coupled to ruby through shaped alumina strips. Contact between ruby bars and comb completes conductance path for heat transfer.

#### R73-10294

#### NUMERICAL INTERACTIVE CONTROLLER

S. S. Brokl and A. I. Zygielbaum

Jul. 1973 See also B73-10132

NPO-11497

Device allows interaction of operator with data in computer central processor in order to shift frame of data in Cartesian coordinates and slew desired data into view. "Cursor generator program," in conjunction with device, provides light pen with sufficient resolving power to identify any particular set of coordinates with single-cell accuracy.

#### B73-10297

#### DIGITAL SERVO CONTROL OF RANDOM SOUND FIELDS R. B. Nakich (Time Zero Corp.)

Jul. 1973 See also B73-10139

NPO-11623

It is necessary to place number of sensors at different positions in sound field to determine actual sound intensities to which test object is subjected. It is possible to determine whether specification is being met adequately or exceeded. Since excitation is of random nature, signals are essentially coherent and it is impossible to obtain true average.

#### B73-10299

## MULTIPLE-REFLECTION CONICAL MICROWAVE ANTENNA

R. E. Oliver

Jul. 1973 See also B73-10291

NPO-11661

Conical-Gregorian antenna concept, using conical reflector,

promises excellent if performance and offers potential advantages in areas of mechanical and structural design, surface measurement, and in furlability. Multiple reflection scheme between one or more subreflectors and main reflector is utilized. Subreflector can be reduced to as little as 0.1 the diameter of main reflector.

#### B73-10305

#### DYNAMIC POWER LOAD SIMULATOR

K. P. Joncas (Avco Corp.), S. Birnbach (Avco Corp.), and M. Lambert, III (Avco Corp.)

Aug. 1973 See also NASA-CR-115760

JSC-14285; JSC-14286

Two independent models simulate dynamic and steady-state responses of electrical and electronic equipment under power load. One is resistance/capacitance/inductance network, and the other is variable resistance analog device. Resistance, inductance, and/or capacitance are selected by iterative process; time-domain response is compared with that of real equipment to select optimal values.

#### B73-10306

#### RF TO DIGITAL CONVERTER

T. E. Flanders (GE) and G. Kosa (GE)

Sep. 1973

JSC-14419

Converter can be used for automatic spectrum analysis. Automatic gain amplifier digitizes RF amplitude, and amplifier gain is measured by binary counter. Amount of gain corresponds to signal level and is proportional to count in counter. System can be used to calculate AM and FM modulation index and other parameters of pulse-modulated FM waves.

#### B73-10308

## INEXPENSIVE PROGRAMMABLE COMPUTER CLOCK

J. E. Vrancik

Dec. 1973 See also NASA-TM-X-2500

LEWIS-11797

Clock's computer interface accepts pulses from computer (computer commands) and translates them into control signals for clock, and vice versa. Clock is preset by computer to a fixed number of time pulses, and then started. After fixed number of time pulses has occured, clock reads pulse (via interface) to computer and stops.

#### B73-10313

#### EXTENDED RANGE HARMONIC FILTER

H. Jankowski (GE), A. J. Geia (GE), and C. C. Allen (GE)

Dec. 1973 See also NASA-CR-120927

LEWIS-12064

Two types of filters, leaky-wall and open-guide, are combined into single component. Combination gives 10 db or greater additional attenuation to fourth and higher harmonics, at expense of increasing loss of fundamental frequency by perhaps 0.05 to 0.08 db. Filter is applicable to all high power microwave transmitters, but is especially desirable for satellite transmitters.

#### B73-10317

#### PEAK-HOLDING CIRCUIT FOR EXTREMELY NARROW PULSES

R. W. ONeill (Lockheed Aircraft Corp.)

Sep. 1973

JSC-14129

Circuit was developed which can stretch pulses in 50- to 3200-ns range to make them acceptable for pulse-height analyzers. Circuit uses high-speed wide-band amplifier, does not need excessive frequency compensation, and can handle pulses one-tenth of width normally required by pulse analyzers.

## B73-10318

#### SCANNING BEACON LOCATOR SYSTEM: A CONCEPT

P. W. Shores Sep. 1973

JSC-12593

If aircraft and ships are equipped with beacons capable of communicating with satellites, rescue efforts may speed up significantly. In event of disaster, beacons can transmit distress nessage to satellite which, in turn, will relay message to nearest rescue center, indicating distress location.

ELECTRO-OPTICAL DEVICE FOR MONITORING WIRE SIZE E. E. Burcher and W. L. Kelly, IV

Oct. 1973 LANGLEY-11358

Device recognizes variations in wire size and is being used during computer memory-plane fabrication. Decrease in wire diameter, due to stretching, permits removal of wire from memory-plant mold. Monitoring provides means of detecting imperfect wire and permits fabrication of computer memory plane to be stopped prior to its insertion into mold.

SYNCHRONOUS TEN-MEGABIT BIPHASE DETECTOR

L Balliet (IBM)

Oct 1973

M-FS-22546

Synchronous phase-lock-loop detector accepts distorted input and generates litter-free clock. Data-detection circuitry takes advantage of this clock and employs integrate-and-dump decision circuit to provide near-theoretically ideal data decoding.

LASER SCANNER FOR TESTING SEMICONDUCTOR CHIPS

T. C. Hall (Hughes Aircraft Co.)

Oct. 1973

M-FS-22693

Individual "fingerprint" signals are produced when system photoexcites chips, "Fingerprints" are analyzed for characteristics associated with defects, including many not visible to the naked eye. Electromagnetic radiation photogenerates free electrons and holes in semiconductor chip. These carriers produce electrical signals at terminals. Signals vary depending on what defects are present

B73-10331

ISOLATED OUTPUT FOR CLASS-D de AMPLIFIERS

M. A. Honnel (Auburn Univ.) and J. K. Newell (Auburn Univ.) Sep. 1973

M-FS-21616

Transformer-coupled output stage is used with pulse-width modulated class-D dc amplifiers. Circuit is comprised of two channels corresponding to negative and positive input signals. Amplitude of secondary-current triangular pulse is function of duration of driving pulse. Therefore, circuit converts pulse-width modulated driving signal to pulse-amplitude modulated signal.

B73-10334

ACTIVE TUNING CIRCUIT

L L Kleinberg

Oct. 1973

G8FC-11340

Low-cost, inductorless, high Q active-tuning circuit can be made by coupling pair of transistors and their supporting circuitry to take advantage of frequency dependent energy storage effects. Circuit may be manufactured by standard micro-electronic techniques; has very low noise factor; and input-output matching networks are not necessary.

B73-10337 📑

DIGITAL SERVO CONTROLLER BEHAVES LIKE SYNCHRO

F. Byrne

Oct. 1973

KSC-10769

Encoder has been used for years to measure accurately positional parameters of controlled devices with very high accuracy and reliability. Digital control system has been designed using digital shaft angle encoders.

B73-10342

SINGLE-CHANNEL DIGITAL COMMAND-DETECTION SYSTEM

C. C. Carl, L. A. Couvillon, R. M. Goldstein, E. C. Posner, and R.

R Green Aug. 1973 NPO-11302

System, fabricated of highly-reliable digital logic elements, operates on binary pulse-code-modulated signals and derives internal synchronization from data signal. All-digital implementation of detector develops synchronization from data signal by computer cross-correlation of command modulation signal with its expected forms in sequence and adjusts detector phases in accordance with correlation peaks.

R73-10343

AUTOMATIC CARRIER ACQUISITION SYSTEM FOR PHASE-LOCK-LOOP RECEIVERS

R. C. Bunce Aug. 1973 NPO-11628

Programmable oscillator and zero-beat detector acquires phase-lock of carrier by frequency scanning. Generation of high-level do pulse at instant of zero crossing provides positive trigger for decision gate to stop search and close loop for phase-coherent tracking.

B73-10345

NOISE-ADDING RADIOMETER FOR MI-IMPROVED CROWAVE RECEIVERS

P. D. Batelaan, C. T. Stelzried, and R. M. Goldstein Aug. 1973

NPO-11706

Use of input switch and noise reference standard is avoided by using noise-adding technique. Excess noise from solid state noise-diode is coupled into receiver through directional coupler and square-wave modulated at low rate. High sensitivity receivers for radioastronomy applications are utilized with greater confidence in stability of radiometer.

B73-10352

SAFETY MONITORING SYSTEM FOR RADIOISOTOPE THERMOELECTRIC GENERATORS

A Zoltan

Aug. 1973 NPO-13285

System alerts personnel of hazards which may develop while they are performing tests on radioisotope thermoelectric generator (RTG). Remedial action is initiated to minimize damage. Five operating conditions are monitored; hot junction temperature, cold junction temperature, thermal shroud coolant flow, vacuum in test chamber, and alpha radiation.

B73-10353

LASER ENERGY CONVERTED INTO ELECTRIC POWER

K. Shimada

Aug. 1973

NPO-13308

Apparatus verifies concepts of converting laser energy directly into electric energy. Mirror, placed in beam and inclined at angle to it, directs small amount of incident radiation to monitor which establishes precise power levels and other beam characteristics. Second mirror and condensing lens direct bulk of laser energy into laser plasmadynamic converter.

B73-10354

PROCESSOR FOR HIGH-DENSITY DIGITAL TAPE-RECORDED SIGNALS

J. C. Ashlock

Aug. 1973

NPO-11399

Linear filter and detection theory can bear on problem of reconstructing recorded bit stream. Problem can be taken from realm of nonlinear problems even though basic record process is still recognized as highly nonlinear. Digital tape recorder can be modeled as particular type of linear communication channel with intersymbol interference.

**B73-10355** 

DIGITAL SLOPE-THRESHOLD DATA COMPRESSOR

T. O. Anderson Aug. 1973 NPO-11630

Slope-threshold compression scheme for telemetered video data is efficient, and its principle of operation is as follows: when slope of raw data exceeds threshold decision reference, previous sample is transmitted. All-digital design is more economical than analog system. It exhibits well-defined accuracy, provides unlimited storage time, and is convenient and reliable.

#### **B73-10361**

#### AUTOMATIC FOCUS CONTROL FOR FACSIMILE CAMERA

A. R. Sinclair, S. J. Katzberg, and E. E. Burcher

Oct. 1973

LANGLEY-11213

Focus control performs function of automatically focusing facsimile camera throughout object field being scanned. It does this by determining and adjusting focus of imaging sensor accordingly. Since facsimile camera images a scene by scanning discrete strips, it is possible to have entire three-dimensional scene in perfect focus at point of imaging by use of focus control.

#### B73-10365

## PULSE STRETCHER FOR NARROW PULSES

R. S. Lindsey, Jr. (Lockheed Electronics Co.) Oct. 1973 JSC-14130

Pulse stretching circuit can linearly stretch pulses as narrow as 50 nanoseconds and block incoming pulses following accepted input pulse until processing has been completed. It also removes baseline distortion by being completely direct coupled and provides monitor output which measures true number of input events that exceed predetermined threshold.

#### B73-10367

## PROGRAMMABLE RANDOM INTERVAL GENERATOR

R. S. Lindsey, Jr. (Lockheed Electronics Co.)

Oct. 1973 JSC-14131

Random pulse generator can supply constant-amplitude randomly distributed pulses with average rate ranging from a few counts per second to more than one million counts per second. Generator requires no high-voltage power supply or any special thermal cooling apparatus. Device is uniquely versatile and provides wide dynamic range of operation.

#### ALPHANUMERIC CHARACTER GENERATOR FOR OSCIL-LOSCOPE

D. C. Lockerson and R. E. Boston

Oct. 1973

**GSFC-11582** 

Compact portable alphanumeric display device can be used with any general-purpose externally-triggered oscilloscope without need for Z-axis modulation. Factors limiting size of display are: output line capacitance, read-only memory speed, and persistence of cathode-ray-tube.

#### B73-10382

#### DATA COMPRESSION BY A DECREASING SLOPE-THRESHOLD TEST

L. Kleinrock

Sep. 1973

NPO-10769

Resolution can be obtained at large compression ratios with method for selecting data points for transmission by telemetry in television compressed-data system. Test slope of raw data stream and compare it to symmetric pair of decreasing thresholds. When either threshold is exceeded, data are sampled and transmitted; thresholds are reset, and test begins again.

#### B73-10389

#### METER CIRCUIT FOR TUNING RE AMPLIFIERS

J. E. Longthorne

Sep. 1973

#### NPO-11865

Circuit computes and indicates efficiency of RF amplifier as inputs and other parameters are varied. Voltage drop across internal resistance of ammeter is amplified by operational amplifier and applied to one multiplier input. Other input is obtained through two resistors from positive terminal of power supply.

#### B73-10392

## ANKYLOSIS-STABILIZED OSCILLATOR

L. L. Kleinberg Oct. 1973

GSFC-11513

One feature of this mechanism is reduction of self-modulation, a source of harmonic generation. Since amplitude of oscillation is large, cutoff frequency is varied in proportion to the amplitude and frequency of oscillation. While one transistor is experiencing a positive alteration, the other is experiencing a negative alteration. Net effect is reduction in self-modulation.

#### B73-10401

#### VECTORCARDIOGRAM

M. Costello (Martin Marietta Corp.)

Nov. 1973

JSC-14427

System measures electrocardiographic potentials to produce precise quantitative measurement of changes that occur in individual's cardiac function. System is rugged, built to sustain extremes of temperature, pressure, humidity, shock, and vibration. It can also be used in pure oxygen environment without danger of combustion.

#### B73-10408

#### LOGIC CONTROLLED SOUD STATE SWITCHGEAR

E. Buchanan (Martin Marietta Corp.) and D. Waddington Dec. 1973 See also NASA-CR-121140

LEWIS-12044

Logic controlled solid state circuit breakers and power transfer switches have been designed and built to demonstrate their use for 270 V dc power systems. This switchgear provides remote operation, automatic current level, and operates several orders of magnitude faster with much greater accuracy of response than conventional switchgear.

#### B73-10410

## COMBINED DIPLEXER AND HARMONIC FILTER

C. C. Allen (GE)

Dec. 1973 See also NASA-CR-120927

LEWIS-12059

By using two directional filters having circular waveguide filter cavities, diplexing and harmonic filtering functions can be combined into a more compact integrated waveguide assembly. Device is filter which passes power within its pass band limits, but also has a directional characteristic so power transmitted into two-port output waveguide will travel in only one direction.

#### B73-10411

#### LOW-COST CLEARANCE INDICATOR FOR HIGH SPEED TURBOMACHINERY

R. C. Evans, D. J. Lesco, A. B. McLachian, and F. A. Deliatorre Dec. 1973

LEWIS-12128

System consists of hermetically sealed capacitance probe. compact electronic driver, power supply, and oscilloscope and/or voltmeter for readout. System requires no mechanical connection to the rotating parts of turbomachinery, and does not disrupt rotor mainstream flow pattern, it can be effectively used in other applications to measure dynamic clearances between moving and stationary parts.

#### B73-10425

#### FLARED-CONE TURNSTILE ANTENNA

T. G. Gavrillis (Martin Marietta Corp.) and D. J. Bottoms (Martin Marietta Corp.)

Dec. 1973

#### LANGLEY-10970

Antenna could be used in any application where increased

ultrahigh frequency beamwidth is desired. Possible applications include aircraft, communication links, ground omniranges, and satellites. It is also possible that antenna could be adapted for use in television transmission and receiving.

RE ANTENNA PATTERN VISUAL AIDS FOR FIELD USE J H. Williams

Dec. 1973

KSC-10821

Series of plots must be made of antenna pattern on polar-coordinate sheet depicting vertical planes. Separate sheets are plotted depicting antenna patterns in vertical plane at azimuth positions. After all polar plots are drawn, they are labeled according to their azimuthal positions. Transparencies are then stiffened with regular wire, cardboard, or molded plastic.

R73.10431

TELEVISION NOISE REDUCTION DEVICE

J. C. Stamps and B. L. Gordon (Taft Broadcasting Corp.) Dec. 1973

JSC-12607

System greatly improves signal-to-noise ratio with little or no loss in picture resolution. By storage of luminance component, which is summed with chrominance component, system performs mathematical integration of basically-repetitive television signals. Integration of signals over interval of their repetition causes little change in original signals and eliminates random noise.

#### B73-10449 DATA-MATCHED FILTER

N./R. Scheinberg (RCA) and D. Hampel (RCA)

Feb. 1974

JSC-14264

After amplification and normalization, incoming data bits are fed, alternately, to pair of integrators. While one integrator is operating, content of other is on hold, sample, and dump. Clock derived in bit-timing extractor times and controls integrators. Frequency of clock is one-half data rate.

#### R73-10451 HIGH-POWER MICROSTRIP SWITCH

S. D. Choi

Mar. 1974

NPO-11965

Switch, which uses only two p-i-n diodes on microstrip substrate, has been developed for application in spacecraft radio systems. Switch features improved power drain, weight, volume, magnetic cleanliness, and reliability, over currently-used circulator and electromechanical switches.

B73-10452

MEANS FOR MAPPING RADIATED FIELDS AND FOR MEASURING DIFFERENTIAL MOVEMENT OF ANTENNA **ELEMENTS** 

C. C. Lundy

Jan. 1974

NPO-13063

Null seeking system uses two transponders located at selected points on dish to detect phase-front of received signal. One signal line has continuously variable phase shifter driven by reversible stepmotor. Each of two transponders on dish is a dipole with mixer crystal between elements. Crystal is driven, in turn, by 181.6MHz signal carried by miniature coaxial cable.

B73-10454

PROBES FOR MEASURING NOISE CURRENT IN AN ELECTRONIC CABLE

C. C. Lundy Feb. 1974

NPO-13123

Electromagnetic interference in deep-space network receiver is often caused by stray coupling from power lines. These stray signals create potential differences between ground terminals. which leads to excessive noise in receiver circuits. Pair of probes detect and measure noise currents in conductors.

COMBINED SUN-ACQUISITION AND SUN GATE-SENSOR SYSTEM FOR SPACECRAFT ATTITUDE CONTROL

L. F. Schmidt Jan. 1974

NPO-13051

Arrangement combines acquisition and gate functions and reduces sensitivity so that attitude control is effective regardless of changes in solar intensity. There are five photoconductive detectors all electrically interconnected. Detectors are so positioned that, regardless of spacecraft orientation at any instant of interest, at least one detector is illuminated.

B73-10467

VERSATILE, ANALOG-TO-DIGITAL, POWER-REGULATOR CONTROLLER

W. T. McLyman

Mar. 1974

NPO-13178

Power controller uses digital techniques to vary duty ratio of switching-type power regulators. Duty ratio is adjusted by comparing error signal with ramp voltage signal. As compared to previously-used switching regulators, controller uses fewer components and no magnetics and is readily adaptable to thick-film technology.

B73-10479

INPUT-OUTPUT, EXPANDABLE-PARITY NETWORK

J. F. McKevitt, III (Hughes Aircraft Co.)

Mar. 1974

HQ-10728

Large-scale integrated circuit generates and checks parity of four eight-bit registers. In addition, circuit will indicate by output signal whether parity error exists. Circuit can also generate or check parity of words up to 32 bits. This is done by making appropriate internal wiring connections on the large-scale integrated chip.

873-10480

PSEUDOTACHOMETER FOR MOBILE METABOLIC ANA-LYZER

J. R. Currie Mar. 1974

M-FS-22909

Metabolic analyzer determines a patient's walking or ambulation speed and simultaneously measures his metabolic parameters. Analyzer is designed to move at some preselected human ambulation speed. During test, patient is connected to system and follows analyzer closely while his metabolic data is being manitared.

B73-10486

RECHARGEABLE, SILVER-ZINC BATTERY CONDITIONER/ MONITOR UNIT AND STATE-OF-CHARGE INDICATOR

C. E. Thomas (Chrysler Corp.)

Mar. 1974

M-FS-22835

Unit automatically charges batteries to desired state-ofcharge levels, monitors functional battery parameter data both on meters and printer, and automatically activates alarm in event of battery malfunctions. Unit consists of state-of-charge indicator panel, control panel, monitor panel, power panel, charging-current power supply, and load panel.

873-10487

BINARY-SELECTABLE DETECTOR HOLDOFF CIRCUIT

K. A. Kadrmas Mar. 1974

M-FS-22898

High-speed switching circuit protects detectors from sudden, extremely-intense backscattered radiation that results from short-range atmospheric dust layers, or low-level clouds, entering laser/radar field of view. Function of circuit is to provide computer-controlled switching of photodiode detector, preamplifier power-supply voltages, in approximately 10 nanoseconds.

B73-10491

#### SUBMINIATURE MICROPOWER DIGITAL RECORDER

R. M. Goodman (The Franklin Inst. Res. Labs.) and R. W. Pitman (The Franklin Inst. Res. Labs.)

Dec. 1973

ARC-10746

High-density digital data, collected periodically or randomly from multiplicity of sensors, are recorded by subminiature recorder. Magnetic recording head is energized with suitable pulsatile signals to reverse polarization on magnetically-sensitive tape while tape is immobilized at recording head. Prior to next recording, set tape so new area of tape is at recording head.

#### B73-10499 STEREOSCOPIC TELEVISION SYSTEM

J. L. Jones Dec. 1973

ARC-10160

In this system, both left and right optical images pass through same set of optical lenses and same TV transmission and receiving systems. Transmitted stereo images are of high quality because differences in image tone and gray scales, disparities in relative focusing and magnification, and nonsimilar distortions produced by electrical and optical imperfections are minimized.

#### B73-10500

#### IMPROVED 135.6-MHz ANTENNA

E. H. Gross Dec. 1973 ARC-10743

Commercially available four-element array can be readily modified to receive 135.6-MHz signals. Directibility of each of the four elements is improved by lengthening them, repositioning feed elements, and changing total element-to-element spacing in both planes.

#### B73-10606

#### TRUE AIRSPEED MEASURED BY AIRBORNE LASER DOPPLER VELOCIMETER

R. Munoz, H. W. Mocker (Honeywell Inc.), and L. E. Koehler (Honeyweil Inc.)

Dec. 1973

ARC-10763

Velocimeter utilizing carbon dioxide laser measures true airspeed of aircraft. Results of flight tests indicate that clearweather airspeeds can be measured with accuracy better than 0.1% at altitudes up to 3000 meters; measurements can be made at much greater altitudes in cloudy or turbid air.

#### B73-10510

#### AUTOMATIC PCM GUARD-BAND SELECTOR AND CALIBRATOR

T. T. Noda (New Mexico State Univ.)

Mar. 1974

K\$C-10812

Automatic method for selection of proper guard band eliminates human error and speeds up calibration process. There is also an option which allows a single channel to be calibrated, independently of other channels. Entire system is designed on 3- by 4-inch printed-circuit cards and may be used with any pulse code modulation system.

#### 873-10511

#### DIGITAL TRANSMITTER FOR DATA BUS COMMUNICA-TIONS SYSTEM

G. E. Proch (Lockheed Electronics Co.)

Mar. 1974 JSC-14558

Digital transmitter designed for Manchester coded signals (and all signals with ac waveforms) generated at a rate of one megabit per second includes efficient output isolation circuit. Transmitter consists of logic control section, amplifier, and output isolation section. Output isolation circuit provides dynamic impedance at terminals as function of amplifier output level.

#### B73-10513

#### ISOLATED TRANSFER OF ANALOG SIGNALS

T. Bezdek (Martin Marietta Corp.)

Mar. 1974

LANGLEY-11312

Technique transfers analog signal levels across high isolation boundary without circuit performance being affected by magnetizing reactance or leakage inductance. Transfers of analog information across isolated boundary are made by interrupting signal flow, with switch, in such a manner as to produce alternating signal which is applied to transformer.

#### B73-10514

#### EYE CONTROLLED "TELETYPEWRITER"

J. D. Holt, L. D. Leavitt, and H. D. Bowen (LTV Aerospaça Corp.)

Mar. 1974

#### LANGLEY-11564

Oculometer provides dynamic measurement of subject's look direction, and its outputs can be used to generate visual display of his look pattern and/or to cause equipment operation associated with his lookpoint at given times. Measured eye-direction information could be used as control input at man/machine interface.

#### VARIABLE-FREQUENCY INVERTER CONTROLS TORQUE. SPEED, AND BRAKING IN ac INDUCTION MOTORS

F. J. Nola Mar. 1974

M-FS-22088

Dc to ac inverter provides optimum frequency and voltage to ac induction motor, in response to different motor-load and speed requirements. Inverter varies slip frequency of motor in proportion to required torque. Inverter protects motor from high current surges, controls negative slip to apply braking, and returns energy stored in momentum of load to do power source.

## 03 PHYSICAL SCIENCES

## B73-10009

#### VIDEO ENHANCEMENT OF X-RAY AND NEUTRON RADIOGRAPHS

A. Vary Mar 1973

LEWIS-11944

System was devised for displaying radiographs on television screen and enhancing fine detail in picture. System uses analog-computer circuits to process television signal from low-noise television camera. Enhanced images are displayed in black and white and can be controlled to vary degree of enhancement and magnification of details in either radiographic transparencies or opaque photographs.

#### B73-10016

#### CONTINUOUS CATALYTIC DECOMPOSITION OF METH-ANE

J. E. Clifford (Battelle-Columbus Labs.), L. J. Hillenbrand (Battelle-Columbus Labs.), B. C. Kim (Battelle-Columbus Labs.), E. S. Kolic (Battelle-Columbus Labs.), and J. Zupan (Battelle-Columbus Labs.)

Jan. 1973 See also NASA-CR-1662

ARC-10339

Water is conserved by employing sequence of reactions whereby 75% of methane from Sabatier reaction is decomposed to solid carbon and hydrogen; hydrogen is then separated from residual methane and utilized in usual Sabatier reaction to reduce remaining metabolic carbon dioxide.

#### R73-10017

#### HIGH-TEMPERATURE-RADIATION ANALYZER

R. P. Farwell (Barnes Engineering Co.)

ARC-10565

Six-channel radiometer with three ultraviolet detection channels measures temperatures at 2-millisecond intervals. One infrared channel measures total radiation, and two infrared channels measure radiation in discrete spectral intervals at rate of 40 intervals per second. Analyzer consists of optical and electrical system.

#### B73-10018

#### DETECTION OF NITRIC OXIDE POLLUTION.

C. Chackerian, Jr. and M. F. Weisbach

Jan. 1973

ARC-10709

Studies of absorption spectra enhancement of certain atomic and molecular species inserter in dye-laser cavities have indicated that nitric oxide can be determined at low concentrations. Absorption coefficient of small amounts of nitric oxide in intra-laser-cavity absorption cell containing helium is enhanced by more than two orders of magnitude.

#### B73-10025

# APPARATUS FOR MEASURING ELECTRICAL PROPERTIES OF MATERIALS

V. Hadek

Jan. 1973

NPO-11749

Resistance of sample is measured with aid of usual electrical test instruments applied to electrical contects provided at ram and anvit assemblies. Temperature differential is established between ram and anvil for measurement of Seebeck coefficient. Voltage generated across sample is detected at electrical contacts.

#### B73-10027

# TWO NEW METHODS TO INCREASE THE CONTRAST OF TRACK-ETCH NEUTRON RADIOGRAPHS

J. Morley

Mar. 1973 See also NASA-TM-X-67947

LEWIS-11893

In one method, fluorescent dye is deposited into tracks of radiograph and viewed under ultraviolet light. In second method, track-etch radiograph is placed between crossed polaroid filters, exposed to diffused light and resulting image is projected onto photographic film.

#### B73-10031

#### EXPERIMENTAL VERIFICATION OF COMPUTER SPRAY-COMBUSTION MODELS

W. H. Nurick (Rocketdyne/N. Am. Rockwell Corp.), R. M. Clayton, and J. H. Rupe

Feb. 1973 See also NASA-CR-114479

ARC-10689

Analytical model formulation, representing performance of spray-combustion device, is based on understanding of atomization, mixing, vaporization, and combustion which occurs in device. Report lists results of correlations of computed values with values obtained from experiments with rocket combustor. Technique offers excellent method for evaluating validity and ranges of applicability of combustion models.

#### B73-10050

#### OPTICAL MONITORING SYSTEM

J. T. Nev (Gen. Dynamics Corp.), E. H. Wrench (Gen. Dynamics Corp.), M. G. Fox (Gen. Dynamics Corp.), and H. Lave (Gen. Dynamics Corp.)

Feb. 1973

#### M-FS-21692

Instrument can measure optical transmission, reflectance, and scattering. This information can be used to identify changes in optical properties or deviations from required optical standards. Device consists of monochromatic source, photo detector, transfer mirror, and hemiellipsoid. System might be used to measure optical properties of thin film.

#### B73-10058

## SUSPENSION OF OBJECTS IN MAGNETIC AND ELECTRIC

L. S. Wilk (MIT) Mar. 1973

ISC-14170

Device has improved suspension efficiency by simulating characteristics of diamagnetic materials. Pseudodiamagnetic device suspended magnet in magnetic field at rate of 232 Kg/W. Suspension in magnetic field can be produced in two ways: magnetic source can be stationary and pseudodiamagnetic device suspended or vice versa.

#### 873.10075

# VIBRATION MEASUREMENT BY PULSE DIFFERENTIAL HOLOGRAPHIC INTERFEROMETRY

D. A. Evensen (TRW, Inc.) and R. Aprahamian (TRW, Inc.)

Mar. 1973 See also NASA-CR-2028

LANGLEY-11092

Technique measures structural deformation of materials subjected to wide range of temperatures and other environmental conditions. Effects of convection currents are eliminated by operating a pulsed laser in double pulse mode that exposes hologram twice in quick succession.

#### 272.10086

#### HOLOGRAPHIC TESTING WITH A DOUBLE REFERENCE BEAM

F. H. Stuckenberg (Rockwell Intern. Corp.)

Mar. 1973 JSC-17959

Image of unstressed object is taken with reflected beam and one reference beam. Object is then stressed and second (double) exposure is made. Developed film plate provides double exposure hologram that can be projected by simultaneous illumination with both reference beams. Appearance of multiple

images may be eliminated while manipulating fringe patterns.

#### 873-1009B

#### A NEW OPTICAL RECORDING MEDIUM

H. Aronson (Isomet Corp.) and G. M. Loiacono (Isomet Corp.) Mar. 1973

M-FS-22348

Method has been developed for doping lithium niobiate crystals with transition metal to increase rate at which crystal can record optical data. Discovery may facilitate development of system for analog storage of TV frames, printed pages, photographs, and other visual information.

#### B73-10105

# THERMAL CONTACT RESISTANCE IN A NON-IDEAL JOINT R. T. Roca (MIT) and B. B. Mikic (MIT)

May 1973

M-FS-21775

Analysis has been conducted to determine thermal contact resistance at interface of two heat conductors and effect of roughness of mating surfaces on pressure distribution. Investigation reveals how heat transfer resistance may be decreased or increased by changing surface properties of particular interface being considered.

#### B73-10116

#### FAST-NEUTRON SPECTROMETER DEVELOPMENTS

R. B. Moler (IIT Res. Inst.), W. E. Zagotta (IIT Res. Inst.), and S. I. Baker (IIT Res. Inst.)

Jun. 1973

#### M-FS-22279

Li6 sandwich-type neutron spectrometer is equipped with proportional counter for particle identification. System uses current-sensitive preamplifiers to minimize pile-up of gamma-ray and particle pulses.

#### B73-10130

# MONITOR FOR PHYSICAL PROPERTY CHANGES IN SOLID PROPELLANTS

R. E. Black, Jr., (Thiokol Chem. Corp. Elkton Div.)

Mar. 1973 See also NASA-CR-114456 ARC-10702

Specially designed sensor is attached to or imbedded in propellant. When sensor is driven into vibration, it moves with a phase lag directly proportional to internal friction or loss coefficent. Resonance frequency of the system is related to Young's modulus. Modulus or internal friction can be monitored over long period of time.

#### B73-10131

LIGHT-DIRECTION SENSOR BASED ON BIREFRINGENCY

A. R. Johnston Mar. 1973 NPO-11201

Optical system consisting of polarizer, analyzer, quarterwave retarder converts incident light beam to one which has an intensity related to the extent the incident beam is off axis.

B73-10133

GAS-OPERATED ACTUATOR: A CONCEPT

P. G. Simmonds Mar. 1973 NPO-11369

Recyclable actuator does depend on valves for its operation. Palladium cathode tube in electrochemical cell is used to generate hydrogen by electrolysis. Hydrogen pressure generated inside tube causes expansion of bellows, which raises load. Bellows can be retracted by reversing electrical connections to cell electrodes.

#### B73-10137

#### ROCKET PLUME PROPERTIES MEASURED IN SPACE SIMULATORS

J. B. Stephens and J. G. Herrera Mar. 1973 See also B72-10243

Molecular sink facility and 25-foot space simulator have been used to distinguish nature of exhaust plumes from nozzles with relatively large internal boundary layer flow. Plume density has been measured by electron beam/photomultiplier system.

#### B73-10140

#### MICROWAVE EMISSION FROM GRANULAR SILICATES

J. E. Conel

Mar. 1973 See also JPL-TM-33-458

NPO-11702

Experimental finding is that mass absorption coefficient is independent of frequency but highly dependent on moisture content; effective conductivity increases with frequency, and low tangent is independent of frequency. Computed values of electrical properties are in rough numerical agreement with extrapolated laboratory values on other silicate materials.

#### B73-10143

#### IMPROVED TECHNIQUE FOR INSPECTION OF PLANAR SURFACES BY MICROSCOPY AND INTERFEROMETRY

D. S. Doubt Mar. 1973 NPO-11893

Incident white light and ordinary interferometer attachment provide images that differ in color according to relative heights of planar surfaces. With aid of technique, it is possible to perceive buried layers, such as diffused collectors, as well as discover defects in buried layers.

#### LASER ADDRESSED HOLOGRAPHIC MEMORY SYSTEM R. A. Gange (RCA), E. M. Wagle (RCA), and C. C. Steinmetz

(RCA) May 1973 See also B73-10166

M-FS-22565

Holographic recall and storage system uses red-lipid microcrystalline wax as storage medium. When laser beam strikes wax, its energy heats point of incidence enough to pass wax through transition temperature. Holograph image can then be written or erased in softened wax.

#### R73-10158

#### A FLEXIBLE ALL TEMPERATURE PRESSURE VESSEL

M. L. Strangeland (Rockwell Intern. Corp.)

May 1973

M-FS-19196

By interrupting lines of stress with convolutions, structure can be designed to contain pressure, operate at cryogenic and high temperatures, and provide flexibility necessary for repetitive cycles of parallel-offset shear translation.

#### REDUCED PREPARATION TIME FOR THERMAL VACUUM CHAMBER TESTS

T. W. Tysor (Rockwell Intern. Corp.)

May 1973

M-FS-24171

insulation system of test chamber will reach thermal equilibrium more quickly when it is gassy and least efficient than when evacuated and most efficient.

Q-SWITCHED, CAVITY-DUMPED, MODE-LOCKED LASER W. Fountain (GTE Sylvania)

Jun. 1973

GSFC-11509

Continuous-wave laser can achieve higher rate of emission through Q-switching. Technique keeps Q, energy storage rating, of laser cavity at low value while ion population inversion is being built up. Then Q is suddenly switched to high value just before instability occurs.

#### B73-10176

#### ROCKET BORNE INSTRUMENT TO MEASURE ELECTRIC FIELDS INSIDE ELECTRIFIED CLOUDS

t., H. Ruhnke (NOAA)

Jun. 1973

KSC-10730

Simple electric field measuring system is mounted on small rocket and consists of two voltage probes, one extending from nose and other on tail fin. Electric field through which rocket passes is determined by potential difference between probes.

#### B73-10181

#### ION MASKING IMPROVES RESOLUTION IN QUADRUPOLE MASS SPECTROMETERS

N. Ierokomos (Perkin-Elmer Corp.) and M. R. Ruecker (Perkin-Elmer Corp.)

Jun. 1973 See also NASA-CR-115781

GSFC-11406

Mass spectrometers analyze molecular composition by determining mass-to-charge ratio of ion fragments of molecules. Study adds significantly to quantitative understanding of quadrupole mass filter. It includes development of quantitative theory of ion oscillations, computer analysis of ion behavior. and identification of determining factors in peak tail size.

#### 873-10182

#### DESIGN AND FABRICATION OF AN EXPERIMENTAL IMAGE FORMING LIGHT MODULATOR

R. G. Shackelford (Georgia Inst. of Tech.) and J. R. Walsh, Jr. (Georgia Inst. of Tech.)

Jun. 1973

M-FS-22547

Image forming light modulator transforms electrical signal representation of two dimensional image into optical transparency. All major assemblies are easily demounted for convenience in adapting modulator to other operating modes with different modulation-media. High-speed vacuum pump is incorporated into modulator housing to help reach required operating pressure.

#### B73-10192

#### BALLOON-BORNE PACKAGE TEMPERATURE CONTROL-LER

M. Schach and J. T. Triolo

Jun. 1973

G\$FC-11620

Simple, inexpensive, lightweight enclosure traps upward long. wave radiation of earth while reflecting harsh solar radiation in upper atmosphere. It warms enclosed instruments in cold regions and protects them from overheating during the day. Device can be attached to balloon system without any changes in experimental design.

B73-10206

ANGULAR MAGNETIC FIELD BEAM IMPROVES EF-FICIENCY IN KLYSTRONS AND TRAVELING WAVE TUBES W. Neugebauer (GE)

Jun. 1973 See also NASA-CR-12114

LEWIS-11610

Special lens shaping allows variation of focusing strength with radius. Lens can be either converging or diverging depending on charge of particles and direction of angular magnetic field. There is potential use for lens in particle analyzers, electron beam welding systems, microwave tube refocusing systems, and possible display type devices.

B73-10209

#### A THEORETICAL STUDY OF AERODYNAMIC NOISE GENERATION

A. C. Peter (Rockwell Intern. Corp.)

Jun. 1973

M-FS-24167

Study focuses on physical mechanism of waves in fluid such as air. Strong interaction between energy of wave and fluid particle motion causes energy of wave to be dissipated. Dissipation depends not only on momentum, time-rate, and force, but also upon nature and magnitude of entropic-flow effects.

LASER SYSTEM DETECTS AIR TURBULENCE

W. K. Dahm, J. A. Dunkin, and E. A. Weaver

Jun. 1973

M-FS-21244

Laser beam is emitted from pod on side of aircraft. Some scattered light returns to aircraft, but at shifted frequency caused by Doppler effect from local air speeds. Current work focuses on extending range, including investigations of effects of particle density, focusing, back scatter efficiency, absorption, and other factors.

B73-10212

REAL TIME STATISTICAL ANALYSIS OF ACQUSTIC EMISSION SIGNALS FOR FLAW MONITORING SYSTEMS

F. E. Sugg (Rockwell Intern. Corp.) and F. J. Moskal (Rockwell Intern. Corp.)

Jun. 1973

M-FS-24402

Small structures are checked by monitoring samples for acoustical signal count. Flaws are located by observing relatively high acoustical activity within given area. Acoustical monitoring has been extended to large structures by dividing large samples into small areas and then monitoring each area separately.

B73-10221

A HEAT FLOW CALORIMETER

W. V. Johnston (Rockwell Intern. Corp.)

Aug. 1973

GSFC-11434

Reaction mechanism for nickel-cadmium cell is not known well enough to allow calculation of heat effects. Calorimeter can measure heat absorbed or evolved in cell, by determining amount of external heat that must be supplied to calorimeter to maintain constant flow to isothermal heat sink.

B73-10242

IMPROVED PHOTOGRAPHIC PRINTS WITH A LINEAR RADIAL TRANSMISSION FILTER

L. M. Weinstein

Aug. 1973

LANGLEY-11221

Linear Radial Transmission Filter (LRTF) is easy to use and yet results in prints which depict more information contained in negative than can be shown by direct printing. LRTF is optical-quality filter which has maximum transmission in center and linear drop in transmission radially out from center.

B73-10251

#### ATMOSPHERIC TEMPERATURE MEASUREMENTS BY RAMAN LASER SCATTERING

W. J. Masica, J. A. Salzman, and T. A. Coney

Dec. 1973 See also NASA-TN-D-6879; NASA-TN-D-7126 LEWIS-12065

System makes continuous synoptic measurement of air temperatures and temperature profiles from the ground in real time. Development is based on principle that intensity distribution of Raman scattered laser light is a function of temperature and it is theoretically possible to measure air temperature by analyzing its Raman spectrum.

B73-10252

TOTAL-PRESSURE MEASUREMENT IN PULSATING FLOWS

L. N. Krause, T. J. Dudzinski, and R. C. Johnson Dec. 1973 See also NASA-TM-X-68128

LEWIS-12077

Pneumatic-type probe was used as comparison instrument with total pressure tubes to determine true average pressure and, thus, to determine if nonlinear averaging effects were significant. Since pneumatic probe is more complicated to use than a total-pressure tube, it is used only as a comparison instrument to determine extent of averaging effects.

R73-10262

#### LASER VELOCIMETER WITH TRANSVERSE AND ON-AXIS SENSITIVITY

K. L. Orloff

Jun. 1973

ARC-10642

Laser Doppler velocimeters are used for measurement of localized fluid velocities without perturbation of flow field. Technique which utilizes only two outgoing beams polarized normally to one another can be processed in such a manner that local oscillator signal is obtained and usual dual-scatter velocity is also retrieved.

R73.10268

OPTICAL DETECTION OF OIL ON WATER

J. P. Millard and J. C. Arvesen

Jul. 1973 ARC-10649

Three radiometric techniques utilizing sunlight reflected and backscattered from water bodies have potential application for remote sensing of oil spills. Oil on water can be detected by viewing perpendicular polarization component of reflected light or difference between polarization components. Best detection is performed in ultraviolet or far-red portions of spectrum and in azimuth directions toward or opposite sun.

B73-10279

WIDE-FIELD REFLECTIVE SCANNING OPTICAL SYSTEMS

t. R. Abel (Honeywell Inc.) Aug. 1973

JSC-14096

Catoptric optical scanning system provides relatively fast line-scan rate for two-dimensional coverage. Rapid scan rates require low focal ratios between components and smallest possible masses. System is relatively free from monochromatic defects and chromatic aberrations.

873-10283

MEASUREMENT OF X-RAY SCATTERING BY OPTICAL SURFACES

R. S. Wriston (Martin Marietta Corp.)

Aug. 1973

GSFC-11590

Optical surfaces built for X-ray telescopes are made to reflect very short wavelengths that range in magnitude from 2 to 100 angstroms. Minor irregularities or contamination on sufrace of any telescope mirror can affect quality of optical image.

Apparatus checks reflection of optical surfaces; scattering of X-rays is measured with angular accuracy of one arc-second.

#### B73-10312

SELF-POWERED MIXER FOR PRESSURIZED CONTAINERS

Y. Y. Hsu and B. T. Ebihard

Dec. 1973 LEWIS-12054

Mechanical stirrer, installed entirely within tank, is powered by turbine driven by discharge flow of fluid. Contents of tank are automatically mixed whenever fluid in tank is discharged. Magnetic coupling eliminates need for shaft seal, particularly in high-pressure tanks.

#### B73-10330

#### HOLOGRAM RECORDING TUBES

J. H. Rajchman (RCA)

Oct. 1973

M-FS-22590; M-FS-22591

Optical memories allow extremely large numbers of bits to be stored and recalled in a matter of microseconds. Two recording tubes, similar to conventional image-converting tubes, but having a soft-glass surface on which hologram is recorded, do not degrade under repeated hologram read/write cycles.

#### B73-10336

#### A LASER HEAD FOR SIMULTANEOUS OPTICAL PUMPING OF SEVERAL DYE LASERS

P. B. Mumola and B. T. McAlexander

Oct. 1973

LANGLEY-11341

Device accomplishes simultaneous optical pumping using single flashlamp and electrical driver. Dye lasers require relatively low energy to operate (low-threshold pumping requirement) and provide simple method for producing simultaneous independent laser output at number of different wavelengths.

#### B73-10378

#### IMAGE FORMATION IN MICROWAVE HOLOGRAPHY

R. W. Cribbs (Electra-Physics Labs, Inc.) and B. L. Lamb (Electra-Physics Labs, Inc.)

Sep. 1973 ARC-10773

Microwave holograms are made without offset reference beam, but it has been found that Van der Lugt filter can be used to produce image offset. Also, filter permits 'decoding' of holograms in contrast with usual practice of reconstructing visible-light analogs of original micro-wave wave fronts.

#### B73-10379

# MICROWAVE HOLOGRAPHY FOR NONDESTRUCTIVE

R. W. Cribbs (Electra-Physics Labs, Inc.) and B. L. Lamb (Electra-Physics Labs, Inc.)

Sep. 1973

ARC-10774

Holographic methods permit use of very large effective apertures so that weak signals can be collected over wide area and integrated to form image. Technique, modification of side-looking radar principle, can be used at very short ranges needed for nondestructive inspection of test specimens.

#### B73-10381

#### CARRIER SUPPRESSION DEVICE FOR A HETERODYNE GAS ANALYZER

E. A. McClatchie (Andros Inc.) Sep. 1973 See also B72-10198

Analyzer operates with broadband light from blackbody infrared source. Light is passed sequentially through two gas-filled chambers to suitable infrared detector while pressures in gas-filled chambers are modulated in sinusoidal manner. Because pressure of infrared-absorbing gases in chambers is modulated, amount of light absorbed by gases is also modulated.

#### B73-10383

#### SEPARATION OF GAS FROM LIQUID IN A TWO-PHASE FLOW SYSTEM

L. G. Hayes and D. G. Elliott

Sep. 1973

NPO-11556 Separation system causes jets which leave two-phase nozzles to impinge on each other, so that liquid from jets tends to coalesce in center of combined jet streams while gas phase is forced to outer periphery. Thus, because liquid coalescence is

achieved without resort to separation with solid surfaces, cycle

efficiency is improved.

#### B73-10399

#### COHERENCE-LENGTH EXTENDER

R. L. Kurtz Oct. 1973 M-FS-22434

Holograms of large objects may be formed by using several coherent low-intensity laser sources. If several low intensity laser sources are available, they can be applied simultaneously. Each source is then used to establish one object beam and one reference beam whose path lengths are equal, recording a small portion of the total object.

#### B73-10409

#### METHOD OF PREDICTING IONIZATION-TYPE VACUUM GAGE SENSITIVITY FOR VARIOUS GASES

R. Holanda

See also NASA-TN-D-6815 Dec. 1973

LEWIS-12056

Sensitivity of gage for one gas can be correlated to its sensitivity for other gases by the ratio of gas ionization cross sections, lonization cross sections which best correlate with gage sensitivites vary according to gage type and ionization cross section energy level.

#### B73-10417

#### MACH-ZEHNDER OPTICAL CONFIGURATION WITH BREWSTER WINDOW AND TWO QUARTER-WAVE PLATES

T. R. Lawrence (Lockheed Corp.), L. K. Morrison (Lockheed Corp.), and M. C. Krause (Lockheed Corp.)

Dec. 1973

M-FS-22741

Configuration is improvement because of the following: It provides higher efficiency. It reduces or eliminates feedthrough of untranslated local oscillator, which would produce a beat signal at shifted frequency of translator. When used without translator and with low-power detector, telescope secondary mirror reflects portion of output to local oscillator.

#### B73-10420

#### ULTRASONIC CALIBRATION DEVICE

J. S. Heyman and J. G. Miller (Wash. Univ.)

Dec. 1973

LANGLEY-11435

Device is an instrument for producing known changes in both acoustic absorption and phase velocity. Calibration signal arises from actual change of acoustic parameters, not from electrical simulation. Instrument is able to simulate changes in sensitivity enhancement achieved by use of ultrasonic resonators. which cannot be achieved using electrical calibration techniques.

#### B73-10421

#### A REAL TIME MOVING-SCENE HOLOGRAPHIC CAMERA

A. L. Kurtz

Dec. 1973 See also B73-10434; B73-10435

M-FS-21087

Method can be useful laboratory tool for observation of rapidly moving objects such as bullets, aerodynamic bodies, and bodies undergoing collisions or interactions. Optical components of holographic system are positioned so light paths from laser source will be equal.

**ELASTIC LIGHT-SCATTERING MODULATOR: A CONCEPT** 

D. H. R. Vilkomerson (RCA) and R. S. Mezrich (RCA) Dec. 1973

#### M-FS-22724

Simple structure can be used as electrically-controlled light valve, to scatter both transmitted and reflected beams. Its operation is based on physical phenomenon called frosting. Device may be of interest to manufacturers of page composers. alphanumeric displays, flat-panel displays, large-screen televisions, and optical input terminals for computers.

#### B73-10423

## LASER-ACTUATED HOLOGRAPHIC STORAGE DEVICE

R. A. Gange (RCA), E. M. Nagle (RCA), and C. C. Steinmetz (RCA)

Nov. 1973

#### M-FS-22768

Device permits automatic selection of one out of thousands of pages in holographic memory system by using laser beam. In typical operation for 2 to 3 C temperature interval, using do power supply with no power regulation, holograms were successfully written and erased over 2- by 2-cm area, using 80-mW argon laser beam.

#### B73-10434

#### MOTION COMPENSATOR FOR HOLOGRAPHIC MOTION PICTURE CAMERA

R. L. Kurtz

See also B73-10421; B73-10435 Dec. 1973

#### M-FS-22517

When reference beam strikes target it undergoes Doppler shift dependent upon target velocity. To compensate, object beam is first reflected from rotating cylinder that revolves in direction opposite to target but at same speed. When beam strikes target it is returned to original frequency and is in phase with reference beam. Alternatively this motion compensator may act on reference beam.

#### **873-10435**

#### PHOTOGRAPHY OF RANDOM MOTION WITH A HOLO-GRAPHIC CAMERA

R. L. Kurtz

Dec. 1973 See also B73-10421; B73-10434

#### M-FS-22537

Three-dimensional system uses two additional mirrors and path compensators. It is essentially three mutually-orthogonal one-dimensional systems with common focus. Laser beam is split into four parts, three of which are object beams; and fourth is reference beam. Size of each ellipse depends on magnitude of velocity vectors.

#### B73-10440

# FLAW DETECTION BY MECHANICAL RESONANT MEA-

O. Buck (Rockwell Intern. Corp.), H. L. Marcus (Rockwell Intern. Corp.), G. A. Alers (Rockwell Intern. Corp.), and R. V. Inman. (Rockwell Intern. Corp.)

Feb. 1974

#### M-FS-19218

Testing technique is based on analysis of varying frequency scan applied to measured samples. Any changes in resonantfrequency harmonics detected in samples are used to indicate size of fault. Testing apparatus uses drive mechanism to apply vibrating force to sample. Force is applied longitudinally along axis to eliminate directionality on flexural vibrations.

#### R73-10441

#### IMPROVED DISCRIMINATION IN PHOTOGRAPHIC DENSITY CONTOURING

R. A. Godding (Technicolor Graphic Serv., Inc.) Feb. 1974

JSC-12588

Density discrimination can be accomplished through use of special photographic contouring material which has two sensitive layers (one negative, one positive) on single support. Process will be of interest to investigators who require finer discrimination of densities of original photograph for purposes such as identification of crops and analysis of energy levels of radiating

#### R73-10458

#### VERSATILE ELECTRONIC LOAD

K. R. Mussen Mar. 1974 NPO-13202

Variable load has very fast response under wide range of simulated dynamic operating conditions, and can accept inputs up to 1000 watts. Many types of signals may be applied to load. Variable oulse generator and flip-flop produce rectangular waveform. Other signals include steady state step and single nutse

#### B73-10462

#### MONEL-SHOT AND SCREEN REGENERATORS

C. W. Browning (Garrett Corp.)

Mar. 1974

#### GSFC-11593

Monel has been found to be ideal material for matrix of regenerators operating in temperature range of 325 K to 50 K. Two best shapes are as spheres or as wire mesh. For given size of regenerator, spherical shots are preferable for lowtemperature operation. At high temperatures, mesh would be superior by virtue of its lower flow resistance.

#### FINE GUIDANCE FOR A SPACEBORNE TELESCOPE

S. Rosin (Kollsman Instruments Corp.) and M. Amon (Kollsman Instruments Corp.)

Mar. 1974

#### GSFC-11487

Two transparent plates are mounted at equal and opposite angles in secondary optical-system housing, angles being set for optimum astigmatism correction. Rotation of secondary housing assembly and translation of detector are proportional to angular position of secondary image. Combined movement of two retains image within sagittal foci of secondary system.

#### B73-10471

#### IMPROVED METHOD FOR DESIGN OF EXPANSION-CHAMBER MUFFLERS WITH APPLICATION TO OPER-ATIONAL HELICOPTER

T. L. Parrott

Mar. 1974

#### LANGLEY-11548

Field test of muffler designed with aid of this method was conducted on helicopter with known exhaust-noise problem. When exhaust noises were compared for hover-flight conditions, muffler system was found to reduce exhaust noise by approximately 11 db. No significant degradation in engine performance was observed.

#### B73-10482

## ANALYSES OF UNSTEADY ENTROPIC-FLOW PROCESSES

A. C. Peter (Rockwell Intern. Corp.)

Mar 1974

#### M-FS-24475

One important aspect in these analyses is the derivation of physical mechanism of converted entropic perturbations, which is also directly related to mixing of fluids. In development of frictional fluid motion, entropy gradients of moving fluid particles perpetually increase. This growth is due to fluid particles which have been heated by frictional flow effects and are constantly lagging behind colder fluid.

#### B73-10488

## PROCESS FOR THE PRODUCTION OF STAR-TRACKING

RETICLES

A. R. Toft and W. O. Smith Mar. 1974

#### GSFC-11188

Reticles designed with quartz bases are masked with desired pattern and then are coated with highly adherent layers of chromium, chromium silver alloy, silver, copper, and black chromium (mixture of chromium and chromium oxides). Black chromium final layer produces required nonreflective surface.

873-10490

POROUS SURFACE MICROPHONE FOR MEASURING ACOUSTIC SIGNALS IN TURBULENT WINDSTREAMS

D. U. Noiseux (Bolt Beranek and Newman, Inc.)

Dec. 1973 See also NASA-CR-114593

ARC-10776

Microphone sensor transforms pressure variations caused by acoustic signals and turbulence into electrical output. Microphone is protected from direct thrust of slipstream by porous barrier. Airfoil is designed to create no turbulence in air flow over porous surface.

B73-10493

METAL TUBE USED AS SOLAR ENGINE

J. R. Jedlicka, L. R. Guist, and R. M. Beam

Dec. 1973

ARC-10461

Ends of metal tube are fastened to axles which are supported on bearings so tube can rotate about its long axis while subjected to invariant bending moment that stresses it along longitudinal axis of rotation. Heat absorbed leads to expansion of metal, which unbalances internal forces and generates rotational moment in tube.

HIGH-SPEED SPECTROGRAPH FOR SHOCK TUBE STUDIES

W. J. Borucki

Dec. 1973

ARC-10772 Instrument provides information on spatial distribution of electron density of gas flow in high-performance shock tube. System permits measurement of profiles of hydrogen-alpha and -beta lines with enough spectral range to record spectral features

from the near ultraviolet to the long-wavelength cutoff of photographic film.

B73-10516

FABRICATION OF OPTICAL REFLECTING DIFFRACTION GRATINGS BY LIGHT-INTERFERENCE PHENOMENON

A. J. Caruso and J. Zaniewski

Mar. 1974

GSFC-11860

Features of technique: major reduction in cost of fabrication; gratings exhibit low stray or scattered radiation, improve signal noise ratio, and eliminate false spectral-lines; gratings can be fabricated free of optical aberrations, with high groove frequencies. and on practically any surface geometry; and fabrication time has been reduced.

B73-10517

STABILIZING A GASEOU'S OPTICAL LASER

A. Jauan (MIT) and K. Shimoda (MIT)

Mar. 1974

XG5-03644

Frequency of gaseous optical laser can be stabilized by sinusoidally modulating the geometry of the cavity. Fabry-Perot dielectric mirrors are mounted in two Invar blocks that are connected by four magnetorestrictive bars. Each bar has three coils to sinusoidally modulate system. Ac establishes frequency, and do the average value; both are supplied to coil from control system.

# 04 MATERIALS/CHEMISTRY

B73-10002

GETTERING CAPSULE FOR REMOVING OXYGEN FROM

LIQUID LITHIUM SYSTEMS

L. K. Tower and R. Breitwieser

Mar. 1973 LEWIS-11509

Capsule consisting of tantalum shell lined with tantalum screen and partially filled with lithium and pieces of yttrium is immersed in hot lithium stream. Oxygen is removed from stream by being absorbed by gettering capsule. Oxygen passes through capsule wall and into lithium inside capsule where it reacts with yttrium to form Y2O3.

B73-10007

FIBER COMPOSITE MATERIALS: A SURVEY OF FIBER MATRIX INTERFACE MECHANICS

C. C. Chamis

Mar. 1973 See also NASA-TN-D-6588

LEWIS-11924

Report is described which discusses mechanism of load transfer from matrix to fiber through interface and effects of interface on composite structural integrity. Theoretical considerations are supplemented with experimental data. General trends and significant points are illustrated graphically.

B73-10014

TECHNIQUE FOR THE POLYMERIZATION OF MONOMERS FOR PPQ/GRAPHITE FIBER COMPOSITES

T. T. Serafini, P. Delvigs, and R. D. Vannucci

Mar. 1973 See also B71-10442

LEWIS-11879

Impregnation of fiber prior to appreciable polymerization completely eliminates impregnation problems encountered with use of high viscosity high molecular weight polyphenylquinoxalines (PPQ) solutions. Major part of polymerization of reactant mixture is conducted on fiber during solvent removal and final curing

B73-10019

RUBBER COMPOSITION COMPATIBLE WITH HYDRAZINE

J. Repar (Accessory Products Co.)

Jan. 1973

NPO-11440

Formulation improves compatibility of butyl rubbers with hydrazine while reducing permeation to low levels necessary for prolonged storage in space. This is accomplished by replacing carbon-black filler with inert materials such as hydrated silica or clay. Pressure increases suggest that hydrazine is decomposed only slightly by new type of rubber.

B73-10020

EVALUATION OF THERMAL INSULATION MATERIALS

O. J. Wilbers (McDonnell Douglas Corp.), J. C. Conti (McDonnell Douglas Corp.), J. V. McGee (McDonnell Douglas Corp.), and J. I. McPherson (McDonnell Douglas Corp.)

Jan. 1973 See Also NASA-CR-109612

NPO-11586

Data was obtained on silicone-bonded fiberglass, isocyanurate foam, and two dozen other insulators. Materials were selected to withstand heat sterilization, outer space, and the Martian atmosphere. Significant environmental parameters were vibration. landing shock, and launch venting.

B73-10021

INCREASING THE SENSITIVITY OF THE JAFFE REACTION FOR CREATININE

H. Y. Tom Jan. 1973

NPO-11587

Study of analytical procedure has revealed that linearity of creatinine calibration curve can be extended by using 0.03 molar picric acid solution made up in 70 percent ethanol instead of water. Three to five times more creatinine concentration can be encompassed within linear portion of calibration curve.

B73-10022

METHOD FOR ESTIMATING SOLUBILITY PARAMETER

D. D. Lawson and J. D. Ingham

lan 1973 NPO.11647

Semiempirical correlations have been developed between solubility parameters and refractive indices for series of model hydrocarbon compounds and organic polymers. Measurement of intermolecular forces is useful for assessment of material compatibility, glass-transition temperature, and transport properties.

B73-10024

#### STABLE PALLADIUM ALLOYS FOR DIFFUSION OF HYDROGEN

M. Patapoff Jan. 1973 NPO-11747

Literature search on hydrogen absorption effect on palladium alloys revealed existence of alloy compositions in which alphabeta transition does not take place. Survey conclusions: 40% gold alloy of palladium should be used in place of palladium; alloy must be free of interstitial impurities; and metallic surfaces of tube must be clean.

B73-10030

# AUTOMATED METHOD FOR STUDY OF DRUG METAB-

R. L. Furner and D. D. Feiler Feb. 1973

ARC 10469

Commercially available equipment can be modified to provide automated system for assaying drug metabolism by continuous flow-through. System includes steps and devices for mixing drug with enzyme and cofactor in the presence of pure oxygen, dialyzing resulting metabolite against buffer, and determining amount of metabolite by colorimetric method.

**673-10036** 

GLASS TRANSITION TEMPERATURES OF LIQUID PRE-POLYMERS OBTAINED BY THERMAL PENETROMETRY J. E. Potts, Jr. (Union Carbide Corp.) and A. C. Ashcraft (Union Carbide Corp.) Feb. 1973

NPO-11730

Thermal penetrometry is experimental technique for detecting temperature at which frozen prepolymer becomes soft enough to be pierced by weighted penetrometer needle; temperature at which this occurs is called penetration temperature. Apparatus used to obtain penetration temperatures can be set up largely from standard parts.

873-10037

# TLC DETERMINATION OF FUNCTIONALITY IN PREPOLYM-

J. E. Potts, Jr. (Union Carbide Corp.) and A. C. Ashcraft (Union Carbide Corp.)

Feb. 1973

NPO-11731

Application of thin-layer chromatographics provides rapid qualitative determination of functional distribution in experimental prepolymer. Functionality distribution is of fundamental importance for it determines; (1) manner in which given carboxyl-terminated prepolymer will cure and (2) physical properties of resulting product.

B73-10039

#### AN INEXPENSIVE AND EFFECTIVE METHOD FOR CALCU. LATING THE STRENGTH OF RANDOMLY REINFORCED FIBER COMPOSITES

C. C. Chamis-

Mar. 1973 See also NASA-TN-D-6696

LEWIS-11985

Planar randomly reinforced fiber composites (PRRFC) is pseudoisotropic laminate with large number of ply orientation combinations where strength is function of these ply orientation combinations. Laminate theory can be applied to determine strength of PRRFC, and in conjunction with composite microand macromechanics can predict mechanical properties of PRRFC's with any fiber/matrix combination.

R72-10044

A SPIRALED NIOBIUM TIN SUPERCONDUCTIVE RIBBON W. D. Coles

Feb. 1973 See also NASA-TM-X-68124

LEWIS-11726

Copper film is vapor-deposited on clean ribbon and sprayed with photosensitive etch-resistant material. Photographic film masks are placed on ribbon and exposed to ultraviolet light. Etchant removes copper and exposure to oxidizing atmosphere forms niobium oxide. Photosensitive material is removed and ribbon is immersed in molten temperatures.

B73-10056

VAPOR PHASE GROWTH OF GROUP 3, 4, AND 5 COMPOUNDS BY HCI TRANSPORT OF ELEMENTS

R. C. Tyagi (NCR Res. Associate), W. J. Debnam, Jr., M. F. McNear, R. K. Crouch, and R. A. Breckenridge Feb. 1973

LANGLEY-11144

Technique has been devised for vapor-phase epitaxial growth of group 3, 4, and 5 binary, ternary, or quaternary compounds by HCI transport of the constituent elements or dopants. Technique uses all the constituents of the alloy system in their elemental form. Transport of these elements by an HCI + H2 carrier gas facilitates their transport as subchlorides.

R73-10060

#### VACUUM-STRIPPED SILICONE BINDER FOR THERMAL-CONTROL PAINT

J. E. Gilligan (HT Res. Inst.) and F. O. Rogers (HT Res. Inst.)

Feb., 1973

M-FS-21397

Silicone elastomer is placed in evacuating system, heated 160 C and held at this temperature for 24 hours. Elastomer is then cooled to room temperature in vacuum, producing upgraded, low outgassing polymer of increased molecular weight.

LUBRICATION HANDBOOK

M. E. Campbell and M. B. Thompson Feb. 1973

M-FS-22326

Information on lubricants from government reports, military specifications, qualified parts lists, and suppliers of commercial lubricants has been consolidated in one source. Handbook includes data on chemical and physical properties of solid, bonded solid, and liquid lubricants; dispersions and composites; and greases. oils, and hydraulic fluids.

B73-10063

#### RESIDUAL STRESS EFFECTS ON THE IMPACT RESIST-ANCE AND STRENGTH OF FIBER COMPOSITES

C. C. Chamis

Apr. 1973 See also NASA-TM-X-52881; NASA-TN-D-6146; NASA-TN-D-6464

LEWIS-11984

Equations have been derived to predict degradation effects of microresidual stresses on impact resistance of unidirectional fiber composites. Equations also predict lamination residual stresses in multilayered angle ply composites.

B73-10068

# METAL-METAL REINFORCED LAMINAR COMPOSITES

J. W. Weeton and C. A. Hoffman

Feb. 1973

LEWIS-11790

Two prototype laminar composites have shown potential for high strength and high temperature applications. These composites might be made with less in-place anisotropy and be less expensive than comparable fiber composites.

#### B73-10069 PRODUCTION OF CIRCULAR POLYMER-GLASS FABRIC COMPOSITES

E. E. Hardesty (Goldsworthy Engineering, Inc.)

Feb. 1973

M-FS-22125

Potentially automated pultrusion technique has been provided for production of curved, glass-reinforced polyimide, epoxy, and graphite reinforced structures. Specially designed apparatus has been manufactured for production of curved structures.

#### B73-10071

#### SEMI-ORGANIC STRUCTURAL ADHESIVE FOR ALUMI-NUM

S. C. Kwan (Monsanto Corp.), M. T. Lehman (Monsanto Corp.). E. A. McElhill (Monsanto Corp.), J. J. OConnell (Monsanto Corp.), R. C. Steeves (Monsanto Corp.), and G. Tsigdinos (Monsanto Corp.)

Feb. 1973

M-FS-21328

Structural adhesive consists of titanium chelate polymer, reactive plasticizer, and cure accelerator (phenylsilanetriol). Mixture polymerizes in situ in 65 hours at 170 C.

## OXIDATION RESISTANT, THORIA-DISPERSED NICKEL-CHROMIUM-ALUMINUM ALLOY

S. Baranow (Fansteel, Inc.) and L. J. Klingler (Fansteel, Inc.) Mar. 1973 See also NASA-CR-120796 LEWIS-11541

Modified thoria-dispersed nickel-chromium alloy has been developed that exhibits greatly improved resistance to hightemperature oxidation. Additions of aluminum have been made to change nature of protective oxide scale entirely and to essentially inhibit oxidation at temperatures up to 1260 C.

#### FATIGUE OF BORON-ALUMINUM COMPOSITES BONDS AND JOINTS

M. S. Hersh (Gen. Dynamics Corp.)

Mar. 1973

M-FS-22326

Study examines effects of boron filament diameter on bonds and joints in boron-aluminum composite. Data include static strength, fatigue, and dynamic moduli of slasticity. Manson-Coffin analyses and metallurgical and fracture surface evaluation were also performed.

#### B73-10080

#### A NEW INTERMEDIATE FOR THE PRODUCTION OF FLEXIBLE STABLE POLYMERS

J. A. Webster (Monsanto Corp.)

Mar. 1973

M-FS-22355

Method of incorporating ether linkages into perfluoroalkylene segment of a dianydride intermediate yields intermediate that may be used in synthesis of flexible, stable polyimides for use as high-temperature, solvent-resistant sealants.

#### 873-10081

#### METALLIC COMPOSITES AS HIGH-TEMPERATURE **FASTENERS**

F. D. George (United Aircraft Corp.)

Mar. 1973

M-FS-2243B

Metallic composities can be fabricated in one-step process in which mixture is directionally solidified. Phase-reinforced eutectic alloys have superior high-temperature mechanical properties.

#### B73-10084

#### PREPARATION OF PREPREG GRAPHITE TAPE WITH INSOLUBLE POLYMER

C. I. Yates (Rockwell Intern. Corp.) Mar. 1973 See also NASA-CR-115713 JSC-14313

Powdered polymer is finely ground. Second polymer, soluble, is mixed with appropriate solvent. Milled polymer and graphite filaments are added to soluble polymer-solvent solution to create slurry. Slurry is dried, and when ready for processing, the soluble, binder-polymer is removed by heat during precure or cure cycle.

#### B73-10085

## FIRE RETARDANT CELLULOSIC FOAM

M. Luttinger (Battelle Mem. Inst.)

Mar. 1973

JSC-14336

Method mixture of cyanamide, phosphoric acid, and monobasic ammonium phosphates for preliminary treatment of paper. Papier-mache, in second step, is pulped in water and latex is added. Urea formaldehyde solution mixed to maximize foaming and resin dispersion is added. Mixture is then cast within 30 to 60 seconds and dried twice.

#### B73-10090

#### SELF-STERILIZING POLYMERS

J. J. Tulis (Becton, Dickinson and Co.), D. J. Daley (Becton, Dickinson and Co.), and G. B. Phillips (Becton, Dickinson and Co.)

Feb. 1973

M-F8-22054

Addition of approximately 1% paraformaldehyde to roomtemperature-vulcanizing potting polymer results in effective. controllable germicide. When heated above ambient temperatures, paraformaldehyde releases dry formaldehyde, which can pena-trate enclosed areas and packages, will not damage material, and leaves no permanent residue.

#### B73-10102

#### NONFLAMMABLE POTTING-ENCAPSULATING AND CONFORMAL COATING COMPOUNDS

S. L. Lieberman (Furane Plastics, Inc.) Mar. 1973 See also NASA-CR-115364

JSC-14164; JSC-14166

Two fluorosilicone rubber formulations have been produced which are nonflammable or self-extinguishing. Extensive report was prepared which includes information on testing and describes many alternate formulations.

#### B73-10103

#### OXYGEN SENSITIVE PAPER

J. F. Whidby (GE) Mar. 1973

M-FS-22354

Paper is impregnated with mixture of methylene blue and ethylenediaminetetraacetic acid. Methylene blue is photo-reduced to leuco-form. Paper is kept isolated from oxygen until ready for use. Paper can be reused by photo-reduction after oxygen exposure.

#### B73-10108

#### HOLOGRAPHIC NONDESTRUCTIVE TESTING OF LAM-INATES

F. H. Stuckenberg (Rockwell Intern. Corp.)

May 1973 JSC-19107

Very small differences in laminate thickness result in interference fringes in holograph image. These indicate presence of unbonded area. Theoretical knowledge of membrane deflection may be used in conjunction with reduced number of pretest experiments to determine number of optical fringes that should appear for given laminate.

#### B73-10113

#### AUTOIGNITION TEST CELL WITH FLEXIBLE ATMOSPHERE CONTROL

D. Evans, C. L. Springfield, and C. Bryan (Southern Res. Inst.) Jun. 1973

KSC-10198

Spontaneous combustion temperatures are usually found by simply beating material until it bursts into flames. Test cell allows control of test atmosphere and composition. Reusable device permits periodic sampling of decomposition products in test atmosphere. With modifications, cell could be used to determine melting points and reactivites of wide variety of substances.

#### B73.10121

## LIGHTWEIGHT GRAPHITE/POLYIMIDE PANELS

J. G. Poesch (Hercules, Inc.) and J. B. Merlette (Hercules, Inc.) May 1973 See also NASA-CR-115421; NASA-CR-115637; NASA-CR-128610

JSC-14375

Panels are constructed of honeycombed polyimide/graphite core covered with thin face sheet of same material. Fabrication is based on extension of thin-gage graphite technology and modification of class filament polyimide honeycomb techniques.

#### DESIGN AND MATERIAL SELECTION FOR INVERTER TRANSFORMER CORES

W. T. McLyman Mar. 1973 NPO-11726

Report is announced which studied magnetic properties of candidate materials for use in spacecraft transformers, static inverters, converters, and transformer-rectifier power supplies. included are material characteristics for available alloy compositions in tabular form, including: trade names, saturated flux density, do coercive force, loop squareness, material density, and watts per pound at 3 KHz.

#### CALIBRATION OF DISSOLVED OXYGEN STANDARD FOR ANALYSIS WITH METHYLENE BLUE

J. F. Whidby (GE) May 1973

M-FS-22353

Accurate standard solutions of oxygen can be prepared with this apparatus. Sample may be used as a dissolved oxygen standard with methylene blue or with other techniques such as gas chromatography.

#### B73-10148

#### A NEW CONCEPT FOR JOINING DISSIMILAR COM-POSITES

K. C. Dullea (Rockwell Intern. Corp.) and J. A. Evangelista (Rockwell Intern. Corp.)

May 1973

M-FS-24307

Bi-composite joint serves as interface between two dissimilar materials by interleaving plies of one composite with plies of another. This interleaving forms transition area between composites. Voids are filled in with epoxy resin to form strong, smooth transition between two materials.

#### B73.10149

#### AN IMPROVED TECHNIQUE FOR THE USE OF ZINC-RICH COATINGS

W. J. Paton May 1973

KSC-10786

Blistering and peeling of topcoats used over ethyl silicate, inorganic, zinc-rich protective coatings are virtually eliminated when primer is allowed to cure outdoors for extended period of time and is moistened during process.

#### B73-10151

#### **ION-TRACER ANEMOMETER**

R. L. Bass (Southwest Res. Inst.), T. E. Owen (Southwest Res. Inst.), C. R. Gerlach (Southwest Res. Inst.), and S. A. Suhler (Southwest Res. Inst.) Mar. 1973

M-FS-21399

Gas\_velocity measuring instrument measures transport time of ion-trace traveling fixed distance between ionization probe and detector probe. Electric field superimposes drift velocity onto flow velocity so travel times can be reduced to minimize ion diffusion effects.

#### R72-10153

## THIN FILM THERMOELECTRIC DEVICES AS THERMAL CONTROL COATINGS: A STUDY J. M. Clemons and A. C. Krupnick

May 1973 See also NASA-TM-X-64570

M-FS-21384

Peltier effect. Thomson effect, and Seeback effect are utilized in design of thermal control coating that serves as versatile means for controlling heat absorbed and radiated by surface. Coatings may be useful in extreme temperature environment enclosures or as heat shields.

#### B73-10168

#### HYDROGEN-ENVIRONMENT EMBRITTLEMENT OF MET-ALS: A STUDY

W. T. Chandler (Rockwell Intern. Corp.), R. P. Frohmber (Rockwell Intern. Corp.), R. P. Lewett (Rockwell Intern. Corp.), W. B. McPherson (Rockwell Intern. Corp.), and R. J. Walter (Rockwell Intern. Corp.)

Jun. 1973

M-FS-22540

Study includes extensive tests examining effects of hydrogen environment on different high-strength metals and alloys. Recommendations for preventing metal failure include use of hydrogen-resistant coatings and inhibitors. Study includes references to related investigations and discussion of work in progréss:

#### B73-10172

#### AUTOCLAVE HEAT TREATMENT FOR PREALLOYED POWDER PRODUCTS

J. C. Freche and R. L. Ashbrook

May 1973 See also NASA TN-D-7117

LEWIS-11953

Technique could be applied directly to loose powders as part of hot pressing process of forming them to any required shapes. This would eliminate initial extrusion step commonly applied to prealloyed powders, substantially reduce cost of forming operation, and result in optimum properties.

#### R73.10180

#### NEW EXPLOSIVE SEAM WELDING CONCEPTS

L. J. Bement

Jun. 1973 See also B72-10002

LANGLEY-11211

Recently developed techniques provide totally-confined linear explosive seam welding and produce scarf joint with linear explosive seam welding. Linear ribbon explosives are utilized in making narrow, continuous, airtight joints in variety of aluminum alloys, titanium, copper, brass, and stainless steel.

#### B73-10187

#### HANDBOOK ON THERMOPHYSICAL PROPERTIES OF **OXYGEN**

H. M. Roder (NBS), L. A. Weber (NBS), P. M. Ordin, and G. Mandel

Jun. 1973 See also NASA-SP-3071; NASA-SP-3072 LEWIS-11962

Handbook has been compiled by Cryogenic Data Center of National Bureau of Standards. It covers thermodynamic functions, physical properties, and heat transfer data for oxygen. Handbook addresses primarily low temperature regime, but also includes some data above room temperature.

#### B73-10188

#### HANDBOOK OF CLEANING REQUIREMENTS, PRO-CEDURES, AND VERIFICATION TECHNIQUES FOR OXYGEN SYSTEMS

H. Bankaitis and C. F. Schueller

Jun. 1973 See also NASA-SP-3071; NASA-SP-3072

Oxygen system cleaning specifications have been drawn from twenty-three government and industrial sources. Cleaning processes for meeting these specifications and recommended postcleaning inspection procedures are compiled in handbook.

Microfiche supplement of pertinent pages of listed references is included.

#### B73-10194

REDUCTIVE CLEAVAGE OF THE PEPTIDE BOND

J. Holian and W. M. Garrison

Jun. 1973

LRL-10026

In many biological research efforts, long chain organic molecules are studied by breaking large molecules into smaller components. Cleavage technique of recent interest is the use of solvated electrons. These are formed when aqueous solutions are bombarded with gamma radiation. Solvated electron is very reactive and can reduce most any species present, even to form free radicals.

#### 873-10208

## THERMALLY RESPONSIVE MECHANICAL ACTUATOR

J. M. Madev Aug. 1973

GSFC-11697

Device built for use in heat control, heat measurement, and mechanical actuation by heat include thermometers, thermostats, safety switches, circuit breakers, and mechanical actuators. Silicon rubber has highest coefficient of expansion of any known material and seems suitable for most of these devices.

#### B73-10213

#### EFFECTS OF ENVIRONMENTAL EXPOSURE ON CRYO-GENIC THERMAL INSULATION MATERIALS

R.T. Parmley (Lockheed Missiles & Space Co.), F. J. Smith (Lockheed Missiles & Space Co.), A. P. Glassford (Lockheed Missiles & Space Co.), J. Coleman (Lockheed Missiles & Space Co.), and D. R. Stevenson (Lockheed Missiles & Space Co.)

#### Nov. 1973 See also NASA-CR-120978; NASA-CR-120979 LEWIS-12007

Investigation was made to optimize selection of insulation materials for reusable space vehicles which will be repeatedly operated over periods of up to ten years. Results of study are summarized in two reports. Volume I describes tests and significant findings. In Volume II, extensive test data obtained are organized in handbook form.

#### B73-10215

#### REFRACTORY PORCELAIN ENAMEL PASSIVE-THERMAL-CONTROL COATING FOR HIGH-TEMPERATURE SUPER-**ALLOYS**

H. Levin (Hughes Aircraft Co.), B. H. Auker (Hughes Aircraft Co.), and M. N. Gardos (Hughes Aircraft Co.)

Aug. 1973

M-FS-22324

Study was conducted to match thermal expansion coefficients thereby preventing enamels from cracking. Report discusses various enamel coatings that are applied to two different high-temperature superalloys. Study may be of interest to manufacturers of chemical equipment, furnaces, and metal components intended for high-temperature applications.

#### **B73-10224**

#### CHEMICAL PRETREATMENT FOR THE DISTILLATION OF URINE

T. L. Hurley (Chemtric Inc.)

Aug. 1973 See also NASA-CR-128878

JSC-14225

Pretreatment of urine prevents micro-organism growth in boiler and kills micro-organisms in condenser. Chemicals also clean evaporation surface, fix ammonia in boiling chamber, and suppress foaming.

#### B73-10228

#### FORMALDEHYDE MONITOR FOR AUTOMOBILE EX-HAUSTS

W. C. Easley Aug. 1973 LANGLEY-11352

Device makes use of microwave spectral absorption in low-Q resonant Stark cell, and indications are that ultimate sensitivity of instrument is within 100 parts per billion of formaldehyde. Microwave source is very small and requires only six-volt do bias for operation. Coarse tuning is accomplished mechanically and fine tuning by adjusting dc-bias voltage.

#### B73-10238

#### APPLYING HIGH-EMITTANCE AND SOLAR-ABSORPTANCE COATING TO ALUMINUM

D. J. Progar

Aug. 1973

#### LANGLEY-10151

Coated surface withstands space environment with negilgible change in radiation characteristics and physical properties. Process can be used with any porous substance, as long as pores are large enough to allow molecules of reacting solutions to enter and yet not so large as to allow nickel sulfide to be leached out of pores before sealing.

#### B73-10253

## AUTOMATIC DEVICE FOR SHELL FREEZING OF LIQUIDS

B. Kelbaugh, C. Owen, and G. L. Picciolo

Oct. 1973

GSFC-11737

Unit is insulated enclosure designed to contain liquid nitrogen. It also includes set of stainless steel rotating rods for holding vessels containing liquids to be frozen, and electric drive mechanism for rotating these rods. Present device will accept 10 vessels at a time.

#### B73-10254

#### GRAPHITE/POLYIMIDE LAMINATES WITH NEAR-ZERO THERMAL EXPANSION

W. N. Reynolds (Rockwell Intern. Corp.) and A. H. Striepens (Rockwell Intern. Corp.)

Aug. 1973

JSC-17662; JSC-17928

Composite structures can be laminated to have very low coefficients of thermal expansion. Such structures are light and strong and have many uses where expansion or contraction with temperature change is undesirable. One application is with instruments that measure thermal expansion.

#### B73-10260

#### ZETA POTENTIAL CONTROL FOR ELECTROPHORESIS CELLS

G. L. Fogal (GE)

Aug. 1973

M-FS-22333

Zeta potential arises from fact that ions tend to be adsorbed on surface of cell walls. This potential interfaces with electric field sensed by migrating particles and degrades resolution of separation. By regulating sign and magnitude of applied potential induced charge can be used to increase or decrease effective wall zeta potential.

#### B73-10269

#### FABRICATION TECHNIQUES FOR POLYBENZIMIDAZOLE COMPOSITES

J. A. Parker, E. L. Winkler, D. Kourtides, and B. S. Marks (Lockheed Missiles & Space Co.)
Jul. 1973 See also NASA-CR-1723

ARC-10724

Performance of polybenzimidazole composites as ablation shields can be substantially improved by thermal crosslinking. Program was designed to develop new processing methods and techniques for fabrication of polybenzimidazole composites. Report, which describes fabrication in detail, also includes specification and manufacturing standards.

#### B73-10271

# 'DRY-COLUMN' CHROMATOGRAPHY OF PLANT PIG-

F. H. Woeller, M. F. Lehwalt, and V. I. Oyama Jul. 1973

#### ARC-10780

Separation of plant pigments which can be accomplished on thin-layer silica plates with mixture of petroleum ether, halocarbon, acetone, and polar solvent can be readily translated into dry-column technique that yields reproducible chromatograms after elution in fashion of liquid chromatography with fluorimeter as detector. Best solvent system was found to be mixture of petroleum ether, dichloromethane, acetone, and ethyl acetate.

#### B73-10310

#### LIQUID AND GASEOUS OXYGEN SAFETY REVIEW

A. Lapin (Air Products & Chemicals, Inc.)

Dec. 1973 See also NASA-CR-120922; SP-3071; SP-3072 LEWIS-12041

Materials used in oxygen systems and allowable oxygen environments are specified for each material. Design criteria. cleaning procedures and quality control methods are covered. Guidelines for protection against hazards involved with production. transportation, storage and use of oxygen are presented. Study also lists extensive references.

#### B73-10314

# CREEP-FATIGUE ANALYSIS BY STRAINRANGE PARTI-

S. S. Manson, G. R. Halford, and M. H. Hirschbere Dec. 1973 See also NASA-TM-X-67838; NASA-TM-X-68023; NASA-TM-X-68171 LEWIS-12072

Strainrange Partitioning provides unifying framework for characterizing high-temperature, low-cycle, creep-fatigue properties of metals and alloys. Method offers distinct advantage to designers of immediately providing reliable upper and lower bounds on cyclic life for any type of inelastic strain cycle that may be encountered in service.

#### B73-10315

#### RESISTANCE SPOT WELDING DISPERSION-STRENGTHENED NICKEL ALLOYS

T. J. Moore

Dec. 1973 See also NASA-TN-D-7256

LEWIS-12075

To develop easily-applied production method for resistance spot welding use unrecrystallized sheet material, develop welding schedule that will produce a solid-state spot weld without recrystallizing sheat, and postheat to produce grain growth across weld line during recrystallization of sheet material.

#### SINGLE CRYSTAL TUBES OF BETA ALUMINA

R. W. Stormont (Tyco Lab., Inc.), F. H. Cocks (Tyco Lab., Inc.), and J. D. Giner (Tyco Lab., Inc.)

Dec. 1973 See also NASA-CR-121033

**LEWIS 11844** 

Edge-defined, film-fed growth process allows both tubular shapes and single crystallinity to be achieved. Beta alumina in single crystal form makes possible membranes with improved conductivities. Single crystal membranes also eliminate problems associated with electrical short circuiting of membrane due to possible sodium metal diffusion.

#### B73-10319

#### PREPARING THERMOPLASTIC AROMATIC POLYIMIDES

V. L. Bell Sep. 1973

LANGLEY-11372

Method prepares aromatic polyimides with significantly reduced glass-transition temperatures and without accompanying loss of high-level thermo-oxidative stability which has been typical. This has been made possible by use of diamine monomers with specific stereoisomeric features.

#### B73-10328

#### ELECTROPHORESIS SEPARATOR COMBINING CENTRIF-UGAL SEPARATION

H. W. Semon (GE)

Oct. 1973

#### M.ES.21396

Centrifugal force causes buffer, chosen to be denser than particles, to move outward and particles to move inward. Electrophones force can be made to equal centrifugal force. System tends not to be affected by convection and other disturbances that are so troublesome in conventional electrophoresis systems.

#### B73-10338

#### IMPROVED MOLD RELEASE FOR FILLED SILICONE COMPOUNDS

O. E. Accountius (Rockwell Intern. Corp.)

Sep. 1973

JSC-19300

Ceramic and filled-plastic materials used for fabrication of tiles are relatively brittle and easily break as they are being removed from molds. Dusting mold surfaces with commercially available glass microspheres provides mold release superior to existing spray releases. Glass-microsphere dusting also permits removal of uncured tile which has very little strength.

#### DYNAMIC TECHNIQUE FOR MEASURING ADSORPTION IN A GAS CHROMATOGRAPH

C. L. Deuel (Analytical Res. Labs. Inc.), N. W. Hultgren (Analytical Res. Labs. Inc.), and M. L. Mobert (Analytical Res. Labs.Inc.) Oct. 1973 See also NASA-CR-115202 JSC-14083

Gas-chromatographic procedure, together with mathematical analysis of adsorption isotherm, allows relative surface areas and adsorptive powers for trace concentrations to be determined in a few minutes. Technique may be used to evaluate relative surface areas of different adsorbates, expressed as volume of adsorbent/ gram of adsorbate, and to evaluate their relative adsorptive power.

#### B73-10341

#### TRANSPARENT POLYMERIC LAMINATES

J. A. Parker, G. M. Fohlen, and P. M. Sawko Aug. 1973 ARC-10783

Laminate prepared from epoxy-boroxine and phenolphthalein polycarbonate has high mechanical strength at elevated temperature and is resistant to impact, fire, and high-energy thermal radiation. Polycarbonate is prepared by reaction of phenolohthalein with phosgene in presence of amine catalyst and immiscible organic solvent phase.

#### B73-10349

#### LOW-RESISTIVITY HOMOGENEOUS ELASTOMERS

R. B. Somoano, Si.-P. S. Yen, and A. Rembaum Aug. 1973

NPO-11881

Mixture of polyurethans polyelectrolyte and soluble, conducting organic compound produces homogeneous elastomer which has resistivity several orders of magnitude less than polyelectrolyte alone. Elastomeric material has novel resistivity dependence on temperature, that is, resistivity changes dramatically over narrow temperature range in vicinity of glass transition temperature.

#### B73-10357

#### PARTICULATE AND AEROSOL DETECTOR

W. H. Kinard, R. L. O'Neal, J. J. Wortman (Res. Triangle Inst.), R. P. Donovan (Res. Triangle Inst.), A. D. Brooks (Res. Triangle Inst.), and L. K. Monteith (Res. Triangle Inst.), Oct. 1973

#### LANGLEY-11434

Particulate detector which monitors emissions from solid propellant fuels can monitor air quality. High signal-to-noise ratio detector can count aerosols and particles efficiently. Detector can distinguish one particle from another with respect to both time and energy of impact. Detector consists of accelerator. capacitor sensor, and readout recording equipment.

THREE-DIMENSIONAL GAS TURBULENCE MEASURE-MENT WITH A LASER-DOPPLER VELOCIMETER SYSTEM C. E. Fuller (Remtech, Inc.)

Oct. 1973 M-FS-22713

Laser-Doppler system records gas-velocity data over wide dynamic range in three-dimensional space without physical probe. System detects shift in laser beam scattered by flowing particles and uses this frequency to calculate particle velocities. Technique is based on principle that laser beam scattered by flowing particles is shifted in frequency by amount proportional to laser frequency.

B73-10372

MATERIALS DATA HANDBOOK ON TITANIUM 6AI 4V

R. F. Muraca (Western Appl. Res. and Develop., Inc.) and J. S. Whittick (Western Appl. Res. and Develop., Inc.) Oct. 1973

M-FS-22796

Handbook has been prepared which describes latest property information on titanium 6Al-4V. Scope of information presented includes physical- and mechanical-property data at cryogenic. ambient, and elevated temperatures, supplemented with useful information in such areas as material procurement, metallurgy of alloy, corrosion, environmental effects, fabrication, and joining technology.

B73-10373

MATERIALS DATA HANDBOOKS ON ALUMINUM ALLOYS

R. F. Muraca (Western Appl. Res. and Develop., Inc.) and J. S. Whittick (Western Appl. Res. and Develop., Inc.) Oct. 1973

M-FS-22798

Five handbooks have been prepared which describe up-to-date properties of the following wrought-aluminum alloys: 2014, 2219, 5456, 6061, and 7075. Each handbook is divided into twelve chapters. Scope of information presented includes physical- and mechanical-property data at cryogenic, ambient, and elevated temperatures.

B73-10376

CATALYTIC REACTOR WITH DISPOSABLE CARTRIDGE

C. M. McCullough (Appl. Electrochemistry, Inc.)

Sen. 1973

ARC-10747

Catalytic reactor, disposable cartridge enclosing iron catalyst, acts as container for solid carbon formed by decomposition of carbon monoxide. Deposition of carbon in other parts of oxygen recovery system does not occur because of lack of catalytic activity; filters trap carbon particles and prevent their being transported outside reaction zone.

B73-10385

LONG-TERM MATERIAL COMPATIBILITY TESTING SYS-TEM

L. R. Toth, R. S. Weiner, D. C. Griffin, Jr., and R. W. Porter Sep. 1973

NPO 11776

System includes procedure for hermetically sealing solid materials and fluids in glass ampoule and use of temperaturecontrolled facility containing sample holder, which permits sample containers to be retrieved safely and conveniently. Solid material and fluid are sealed within chemically-clean glass ampoule according to highly detailed procedure.

B73-10388

BALSA WOOD AS AN ENERGY DISSIPATOR

A. C. Knoell Sep. 1973 NPO-11839

Studies have been undertaken to determine response of balsa wood in variety of environmental conditions. Response is dependent upon state of balsa wood as well as environment to which it is exposed, but certain combinations of conditions serve to increase significantly energy-dissipating capacity of wood relative to its normal capacity.

B73-10394

AN EQUATION OF STATE FOR OXYGEN AND NITROGEN

R. T. Jacobsen (Idaho Univ.), A. F. Myers (Idaho Univ.), and R. B. Stewart (Idaho Univ.)

Oct. 1973 See also NASA-CR-128525; NASA-CR-128527; NASA-CR-128528

JSC-14465

Recent measurements of thermodynamic properties of oxygen and nitrogen have provided data necessary for development of a single equation of state for both fluids. Data are available in summary report and two-part detailed study on thermodynamic properties of oxygen and nitrogen. Same data are used to develop vapor-pressure equation and heat-capacity equation.

B73-10396

MATERIALS DATA HANDBOOK ON INCONEL ALLOY 718

R. F. Muraga (Western Appl. Res. and Develop., Inc.) and J. S. Whittick (Western Appl. Res. and Develop., Inc.)

Oct. 1973 M-FS-22793

Handbook is divided into twelve chapters. Scope of information presented includes physical- and mechanical-property data at cryogenic, ambient, and elevated temperatures. This is supplemented with useful information in such areas as material

procurement, metallurgy of alloy, corrosion, environmental effect, fabrication, and joining techniques. Design data are presented, as available.

B73-10397

MATERIALS DATA HANDBOOKS ON STAINLESS STEELS

R. F. Muraca (Western Appl. Res. and Develop., Inc.) and J. S. Whittick (Western Appl. Res. and Develop., Inc.)

M-FS-22797

Two handbooks which summarize latest available data have been published. Two types of stainless steels, alloy A-286 and Type 301, are described. Each handbook is divided into twelve chapters. Scope of information presented includes physical- and mechanical-property data at cryogenic, ambient, and elevated temperatures.

R73-10400

LIGHTWEIGHT INFLATABLE MATERIAL WITH LOW PERMEABILITY

E. C. White and F. R. Matthews

Oct. 1973

LANGLEY-10928

Material features combination of Mylar, for strength, and Saran, for impermeable qualities. Second lamination of Mylar prevents blocking, adds strength, and increases barrier rating. Different combinations of laminations produce variety of thicknesses and barrier ratings. Material can be metallized for increased barrier reliability and radar reflectivity, and can be treated with a heat-resistant coating.

R73-10402

DESIGN OF A UNIT TO PRODUCE HOT DISTILLED WATER FOR THE SAME POWER CONSUMPTION AS A WATER HEATER

R. A. Bambenek (Chemtric Inc.) and P. P. Nuccio (Chemtric Inc.)

Nov. 1973 See also NASA-CR-128878

JSC-14224

Unit recovers 97% of water contained in pretreated waste water. Some factors are: cleansing agent prevents fouling of heat transfer surface by highly concentrated waste; absence of dynamic seals reduces required purge gas flow rate; and recycle loop maintains constant flushing process to carry cleansing agent across evaporation surface.

B73-10403

INTEGRATING SPHERE COATING

J. W. Stuart

Nov. 1973

GSFC-11214

Sodium chloride, used with proper solvent-dispersant combination, forms very durable reflective coatings. Several other inorganic salts, such as barium sulfate, barium carbonate, sodium fluoride, potassium chloride, sodium hexafluorosilicate, and aluminum oxide, are also suitable. Sodium chloride may also be used with other formulations to produce same type of coating.

#### B73-10406 GAS CHROMOTOGRAPHY OF VOLATILE ORGANIC COMPOUNDS

A. Zlatkis (Houston Univ.)

Dec. 1973 JSC-14428

System has been used for problems such as analysis of volatile metabolities in human blood and urine, analysis of air pollutants, and in tobacco smoke chemistry. Since adsorbent is reusable after proper reconditioning, method is both convenient and economical. System could be used for large scale on-site sampling programs in which sample is shipped to central location for analysis.

#### 873-10407 RADIOCHEMICAL SYNTHESIS OF PURE ANHYDROUS METAL HALIDES

W. H. Philipp, S. J. Marsik, and C. E. May

Dec. 1973 See also 872-10439

LEWIS-11860

Method uses radiation chemistry as practical tool for inorganic preparations and in particular deposition of metals by irradiation of their aqueous metal salt solutions with high energy electrons. Higher valence metal halide is dissolved in organic liquid and exposed to high energy electrons. This causes metal halide to be reduced to a lower valence metal halide.

#### B73-10424 ESTIMATING SORBER CAPACITY FOR MULTIPLE CON-TAMINANTS

T. M. Olcott (Lockheed Missiles & Space Co.) and R. A. Lamparter Dec. 1973 See also NASA-CR-2027 LANGLEY-11056

Computer program estimates quantity of activated charcoal required to control multiple contaminants. Program scans all contaminants by potential parameter value and then orders them from lowest to highest values. It calculates quantity of sorbent required to remove most strongly adsorbed material; and then, using potential plot data, capacity of other materials is calculated on basis of corrected capacity.

#### R73.10437 AN AUTOMATED REMOTE MARSHLAND WATER. SAMPLING STATION

O. F. Thomas Feb. 1974

LANGLEY-11503

Station may be made to turn on and off remotely in response to radio, audio, photo, or other suitable signals, as well as by hard-wire switching. Station will remain operational under conditions of 4-foot tidal variations, along with 4-foot wave action, and will withstand hurricane-force winds without toppling over.

#### B73-10447 NEW METHOD FOR DETERMINING THERMOPHYSICAL PROPERTIES OF TEST SPECIMENS

R. A. Jones Feb. 1974

LANGLEY-11053

Model can be tested directly, which eliminates costly. time-consuming, and inaccurate method of making test models solely for purpose of determining thermophysical properties. Method is adaptable to numerous modifications and variations.

## PROBABILITY OF STRESS CORROSION FRACTURE UNDER RANDOM LOADING

J. -N. Yang . Jan. 1974 NPO-13113

Mathematical formulation is based on cumulative-damage hypothesis and experimentally-determined stress-corrosion characteristics. Under both stationary random loadings, mean value and variance of cumulative damage are obtained. Probability of stress-corrosion fracture is then evaluated, using principle of maximum entropy.

#### B73-10457

#### HIGH-TEMPERATURE GAS/LIQUID STRESS RELAXOME-TERS

S. H. Kalfavan and R. H. Silver

Mar. 1974 NPO-13168

Two relaxometers allow testing of elastomers in various fluids. First relaxometer uses fork-like loading spacer interposed between loading lever and support ring, so that sample is stretched predetermined amount. In second relaxometer, degree of initial elongation is set by means of adjustable collar, which, when locked in place on piston rod, enables sample to be stretched predetermined length.

#### R73-10469 ULTRAVIOLET REFLECTIVE COATING

J. B. Schutt Mar. 1974

GSFC-11786

Composition consists of dispersion of barium sulphate in aqueous solution of water-soluble inorganic binder. Binder is selected from group consisting of alkali metal sulphates. Coating exhibits high reflectance of ultraviolet light to wavelengths of approximately 200.0 nm, which compares favorably with high reflectance of virgin barium sulphate power.

#### B73-10475 VAPOR-DEPOSITED PLATINUM AS A FUEL-CELL CAT-ALYST

W. J. Asher (Exxon Corp.) and J. S. Batzold (Exxon Corp.) Mar. 1974 See also B73-10472; B73-10473; B73-10489 M-FS-21317

Electrodes are prepared by vacuum deposition of platinum on nickel substrate with conventional vapor-deposition apparatus. Amount of platinum loaded on substrate can be veried by changing exposure time during deposition. These electrodes are significantly more effective than conventional oxygen electrodes. \*\*

## WELDING HIGH-STRENGTH ALUMINUM ALLOYS

P. G. Parks, R. V. Hoppes, E. A. Hasemeyer, and K. Masubuchi (MIT)

Mar. 1974 M-FS-22918

Handbook has been published which integrates results of 19 research programs involving welding of high-strength aluminum alloys. Book introduces metallurgy and properties of aluminum alloys by discussing commercial alloys and heat treatments. Several current welding processes are reviewed such as gas tungsten-arc welding and gas metal-arc welding.

#### B73-10483 TRANSFER OF GASEOUS OXYGEN FROM JEHIGH-PRESSURE CONTAINERS AND THE JOULE-THOMSON INVERSION

E. R. Schumann (Bendix Corp.)

Mar. 1974

KSC-10721

From the experiments performed in study, it was determined that oxygen transferred at ambient temperature and pressures up to 10,000 psig consistently dropped in temperature. All results therefore indicate that gaseous oxygen transferred at ambient temperature does not exhibit Joule-Thomson inversion below 10,000 psig.

#### B73-10503

#### SOIL MOISTURE BY EXTRACTION AND GAS CHROMA-TOGRAPHY

E. L. Merek and G. C. Carle

Dec. 1973

ARC-10748

To determine moisture content of soils rapidly and conveniently extract moisture with methanol and determine water content of methanol extract by gas chromatography. Moisture content of sample is calculated from weight of water and methanol in aliquot and weight of methanol added to sample.

#### REUSABLE SILICA SURFACE-INSULATION MATERIAL

H. E. Goldstein, M. Smith, and D. Leiser Dec. 1973 See Also NASA-TM-X-2719

ARC-10721

Material was specifically developed for manufacture of insulating tiles, but it can be molded into other shapes as required. Basic raw materials are high-purity silica fiber, fumed-silica powder, and reagent-grade starch. Only purest materials are used, and care must be taken to avoid contamination during processing.

#### POLYIMIDE FIBER-GLASS COMPOSITE RESISTS HIGH **TEMPERATURES**

W. J. Gilwee, R. W. Rosser, and J. A. Parker Dec. 1973

ARC-10782

Composites synthesized from bismaleimide have superior strength and oxidation resistance at elevated temperatures when compared with similar composites prepared with epoxy or silicon polymers of similar cost. Polyimide synthesis technique and processing method yield essentially void-free fiber-glass reinforced composites.

#### B73-10507

#### MOISTURE-RESISTANT COATINGS FOR OPTICAL COMPO-NENTS

J. R. Hollahan, T. Wydeven, and C. C. Johnson

Dec. 1973 See also B72-10710

ARC-10749

Plasma polymerization technique is used to apply thin. adherent, hydrophobic coatings from chlorotrifluoroethylene monomer. Apparently much of the chlorine contained in original monomer is lost during polymerization, and characteristic C-Cl absorption in infrared region is essentially absent.

#### SILICON ON SAPPHIRE FOR ION IMPLANTATION STUDIES

B. P. Pisciotta Mar. 1974 LANGLEY-11415

Van der Pauw or bridge samples are ultrasonically cut from silicon on sapphire wafers. Contact pad regions are implanted with moderately heavy dose of ions, Ion of interest is implanted into sample; and, before being annealed in vacuum, sample is sealed with sputtered layer of silicon dioxide. Nickel or aluminum is sputtered onto contact pad areas and is sintered in nitrogen atmosphere.

#### SELECTIVE COATING FOR COLLECTING SOLAR ENERGY ON ALUMINUM

J. R. Lowery Mar. 1974 M-FS-22562

Presently used coatings, which were originally developed for brass, copper, and steel substrates, yield relatively low absorptance/emittance ratios when applied to aluminum. Efficient, black-nickel plating applied to aluminum substrate enhances solar absorptance to 93% and reduces emittance to 6%.

# 05 LIFE SCIENCES

#### R73-10033

#### MATHEMATICAL MODEL FOR PREDICTING HUMAN VERTEBRAL FRACTURE

J. V. Benedict (Technol. Inc.)

Feb. 1973 See also NASA-CR-114452

ARC-10691

Mathematical model has been constructed to predict dynamic response of tapered, curved beam columns in as much as human spine closely resembles this form. Model takes into consideration effects of impact force, mass distribution, and material properties. Solutions were verified by dynamic tests on curved, tapered, elastic polyethylene beam.

#### B73-10045

#### RAPID DETECTION OF BACTERIA IN FOODS AND BIOLOGICAL FLUIDS

R. D. Fealey and W. Renner

Feb. 1973

GSFC-11738

Simple and inexpensive apparatus, called 'redox monitoring cell, rapidly detects presence of bacteria. Bacteria is detected by measuring drop in oxygen content in test solution. Apparatus consists of vial with two specially designed electrodes connected to sensitive voltmeter.

#### B73-10046

#### AN ECONOMICAL ARTERIAL-PULSE-WAVE TRANSDÜCER C. Kim, D. Gorelick, and W. Chen

Feb. 1973

GSFC-11531

Transducer records arterial pulses externally. Device uses thin plastic membrane which is fluid coupled to pressure sensitive transistor. Transistor is connected to amplifier which, in turn, is connected to recorder. End section is threaded to accept suitable holder and contains pressure relief vent allowing transistor to sense only pressure levels greater than atmospheric.

#### B73-10048

## FLEXIBLE ELECTROENCEPHALOGRAM (EEG) HEADBAND

L. J. Raggio (N. Am. Rockwell Corp.)

Feb. 1973

LANGLEY-10927

Headband incorporates sensors which are embedded in sponges and are exposed only on surface that touches skin. Electrode sponge system is continually fed electrolyte through forced feed vacuum system. Headband may be used for EEG testing in hospitals, clinical laboratories, rest homes, and law enforcement agencies.

#### B73-10078

## LIMITED TACTILE STIMULUS FOR PROSTHETIC HANDS

W. L. Scott (Rockwell Intern. Corp.)

Mar. 1973

M-FS-16570

Heat and pressure transducers mounted in prosthetic hand permit wearer to sense temperature and pressure to which hand is subjected.

#### B73-10089

#### ARTIFICIAL ATMOSPHERE CONTROL SYSTEM

D. R. Rebert (McDonnell Douglas Corp.). M. E. Peeples (McDonnell Douglas Corp.) J. D. Fuller and (McDonnell Douglas Corp.), Feb. 1973

M-FS-22159

Two-gas control system has been developed which uses existing hardware. Three systems are used for control, monitoring. and safety backup. Pure oxygen will be supplied to maintain safe pressure level should something go wrong.

#### B73-10092

# PRESERVATION OF FLAVOR IN FREEZE DRIED GREEN

C. S. Huber (Technol. Inc.), N. D. Heidelbaugh (Technol. Inc.), and D. Davis (Technol. Inc.)

Mar. 1973

#### JSC-14149

Before freeze drying, green beans are heated to point at which their cell structure is altered. Beans freeze dried with altered cell structure have improved rehydration properties and retain color, flavor, and texture.

#### B73-10099

PORTABLE LIGHT DETECTION SYSTEM FOR THE RUND R. L. Wilber (Southwest Res. Inst.) and B. L. Carpenter (Southwest Res. Inst.) Feb 1972

M-FS-22403

System can be used to detect 'ready' light on automatic cooking device, to tell if lights are on for visitors, or to tell whether it is daylight or dark outside. Device is actuated like flashlight. Light impinging on photo cell activates transistor which energizes buzzer to indicate presence of light.

#### R73-10156

# A PRACTICAL SOLAR ENERGY HEATING AND COOLING

M. J. ONeill (Lockheed Aircraft Corp.), A. J. McDanal (Lockheed Aircraft Corp.), and W. H. Sims (Lockheed Aircraft Corp.) May 1973

M-FS-22563

Recent study has concluded that solar-powered residential heating and cooling system is non technically and economically feasible. Proposed system provides space heating, air conditioning. and hot water. Installation costs will be greater than for conventional heating systems, but this difference will eventually be defrayed by very low operating costs.

#### B73-10177 POTASSIUM FOOD SUPPLEMENT

C. T. Bourland (Technol. Inc.), C. S. Huber (Technol. Inc.), C. Rambaut, and N. D. Heidelbaugh Jun. 1973

JSC-14391

Potassium gluconate is considered best supplementary source for potassium. Gluconate consistently received highest taste rating and was indistinguishable from nonsupplemented samples. No unfavorable side effects were found during use, and none are reported in literature. Gluconate is normal intermediary metabolite that is readily adsorbed and produces no evidence of gastrointestinal ulcerations.

#### B73-10198 REPRODUCTIVE CELL SEPARATION: A CONCEPT

A. J. Cutaia (Battelle Mem. Inst.)

Aug. 1973

M-FS-22627

Attempt has been made to separate mammalian male (Y) bearing sperm from female (X) bearing sperm. Both types of sperm are very dependent on gravity for their direction of movement. Proposed concept suggests electrophoretic force of suitable magnitude and direction may be effective means of separating X and Y sperm under zero gravity.

#### B73-10220

#### INSULATED ECG ELECTRODES

W. M. Portney (Tex. Technol, Univ.) and R. M. David (Tex. Technol. Univ.)

Jun. 1973 See also NASA-CR-115530

JSC-14339

Insulated, capacitively coupled electrode does not require electrolyte paste for attachment. Other features of electrode include wide range of nontoxic material that may be employed for dielectric because of sputtering technique used. Also, electrode size is reduced because there is no need for external compensating networks with FET operational amplifier.

#### B73-10222

#### BACTERIAL CONTAMINATION MONITOR

E. Rich and N. H. MacLeod

Aug. 1973

GSFC-10879

Economical, simple, and fast method uses apparatus which detects bacteria by photography. Apparatus contains camera, film assembly, calibrated light bulb, opaque plastic plate with built-in reflecting surface and transparent window section, opaque slide. plate with chemical packages, and cover containing roller attached to handle.

#### B73-10229

#### AUTOMATIC MICROBIAL TRANSFER

J. R. Wilkins and S. M. Mills

Aug. 1973

LANGLEY-11354

Device can transfer metabolites or inhibitory agents to broth cultures of bacteria, in various stages of growth, for study, It also has application in transfer of other micro-organisms, such as yeasts, and could be useful in clinical and research laboratories. Device has been used for wide variety of purposes in experimental situations.

#### B73-10241

#### MEASURING MICRO-ORGANISM GAS PRODUCTION

J. R. Wilkins, A. O. Pearson, and S. M. Mills Aug. 1973

#### LANGLEY-11326

Transducer, which senses pressure buildup, is easy to assemble and use, and rate of gas produced can be measured automatically and accurately. Method can be used in research. in clinical laboratories, and for environmental pollution studies because of its ability to detect and quantify rapidly the number of ass-producing microorganisms in water, beverages, and clinical samples

#### B73-10270

## IMPROVED FORMAT FOR RADIOCARDIOGRAPHIC DATA

J. Dimeff and G. Sevelius Jul. 1973

ARC-10742

Technique involves introduction of radioactive sample into antecubital vein. Scintillation crystal mounted in collimating housing views portion of right and left hearts. As radioactive sample passes through heart, counting rate is measured by crystal and recorded on strip chart. Data is insensitive to geometric effects and other parameters.

#### B73-10272

#### NEW SYSTEM FOR BATHING BEDRIDDEN PATIENTS

J. E. Greenleaf, R. A. Staley, and P. A. Payne

Aug. 1973 ARC-10745

Multihead shower facility can be used with minimal patient handling. Waterproof curtain allows patient to bathe with his head out of shower. He can move completely inside shower to wash his face and hair. Main advantage of shower system is time saved in giving bath.

#### B73-10320

#### EIGHT-CHANNEL TELEPHONE TELEMETRY SYSTEM

R. Smith (SCI Systems, Inc.) and T. Carr (SCI Systems, Inc.) Sep. 1973 See also NASA-CR-128877 JSC-14452

Portable telemetry system uses conventional telephone link which eliminates mailing or messenger service between physician and analyst. Transmitter is used by physician; receiver is used by analyst. Each unit is inductively coupled to its respective. telephone set, transmitter converting EEG into audio frequency and receiver converting this frequency back to EEG.

#### **873-10359**

## DYE LASER REMOTE SENSING OF MARINE PLANKTON

P. B. Mumola, O. Jarrett, Jr., and C. A. Brown, Jr. Oct. 1973

LANGLEY-11382

Dye laser, emitting four wavelengths sequentially in time, has been incorporated into helicopter-borne lidar flight package, for performing studies of laser-induced fluorescence of chlorophyll A in algae. Data obtained by multicolor lidar technique can provide water-resource management with rapid-access wide-area coverage of the impact of various environmental factors for any body of

B73-10377

UNIFIED LIFE DETECTION SYSTEM: A CONCEPT

J. P. Martin (Martin Marietta Corp.) and M. E. Crissey (Martin Marietta Corp.)

Sep. 1973 ARC-10769

Systematic investigation of techniques and hardware which could be utilized in life detection system has resulted in identification of group of candidate concepts and selection of 'unified system'. Theme of concept permits greatest flexibility in procedural details for experiments which can be performed in individual ampules.

B73-10404

## APPLICATION OF BIOLOGICAL FILTERS IN WATER TREATMENT SYSTEMS

T. L. Hurley (Chemtric Inc.) and R. A. Bambenek (Chemtric Inc.)

Nov. 1973 See also NASA-CR-128878

JSC-14226

Silver chloride placed on or close to barrier kills bacteria as they arrive. Dead bacteria accumulate linearly, whereas previously, live bacteria accumulated exponentially. During continuous 30-day tests, no bacteriological contamination was found downstream of filters with silver chloride added.

B73-10428

#### DESIGN FOR WASTE-MANAGEMENT SYSTEM

C. A. Guarneri (Grumman Aerospace Corp.), A. Reed (Grumman Aerospace Corp.), and R. Renman (Grumman Aerospace Corp.) Dec. 1973 See also NASA-CR-128857; NASA-CR-128858 JSC-14486

Study was made and system defined for water-recovery and solid-waste processing for low-rise apartment complexes. System can be modified to conform with unique requirements of community, including hydrology, geology, and climate. Reclamation is accomplished by treatment process that features reverse-osmosis membranes.

#### SYSTEM FOR MEASURING PASSENGER REACTION TO TRANSPORTATION-VEHICLE VIBRATION

S. A. Clevenson, A. C. Dibble, J. K. Lusby, Jr., H. F. Scholl, and D. G. Stephens

Feb 1974

LANGLEY-11353

Equipment is capable of measuring frequencies from 0 to 50 Hz and is portable, light, inexpensive, and easily adaptable to field operations. System could be used in situations where it is necessary to record simultaneously subject response to other types-of physical measurement or stimuli, such as temperature, noise, or pressure.

B73-10448

## MOTIVATION TECHNIQUES FOR SUPERVISION

N. D. Gray (Rockwell Intern. Corp.)

Feb. 1974

JSC-19187

Guide has been published which deals with various aspects of employee motivation. Training methods are designed to improve communication between supervisors and subordinates, to create feeling of achievement and recognition for every employee, and to retain personnel confidence in spite of some negative motivators. End result of training is reduction or prevention of

873-10474

BIODETECTION GRINDER

F. J. Beyerle

Mar. 1974 M-FS-22833

Grinder, which employs shearing action with minimum energy

input, obtains desired particle sizes in materials ranging from soft plastics to hard rocks. Modified version of this grinder might be used in hospitals and biological laboratories involved with bacteriological research and testing.

B73-10477

### CARDIOTACHOMETER DISPLAYS HEART RATE ON A BEAT-TO-BEAT BASIS

J. R. Rasquin, H. E. Smith, and R. A. Taylor

Mar. 1974

M-FS-20284

Electronics for this system may be chosen so that complete calculation and display may be accomplished in a few milliseconds. far less than even the fastest heartbeat interval. Accuracy may be increased, if desired, by using higher-frequency timing oscillator, although this will require large capacity registers at increased cost.

B73-10492

#### MINIATURIZED HAPLOSCOPE FOR TESTING BINOCULAR VISION

T. A. Decker (Baylor Coll. of Med.)

Dec. 1973

ARC-10759

Device can reproduce virtually all binocular stimulus conditions (target configuration, vergence angle, and accommodative distance) used to test binocular performance. All subsystems of electronic controls are open-loop and solid-state-controlled and, with the exception of vergence angle drive, utilize do stepping motors as prime movers. Arrangement is also made for readouts of each variable.

B73-10494

#### COMPUTER SYSTEM FOR MONITORING RADIORESPI-ROMETRY DATA

D. D. Feller, E. D. Nevilte, and A. O. Cole

Dec. 1973

ARC-10784

System monitors expired breath patterns simultaneously from four small animals after they have been injected with carbon-14 substrates. It has revealed significant quantitative differences in oxidation patterns of glucose following such mild treatments of rats as a change in diet or environment.

B73-10495

# INTEGRAL AIRCRAFT PASSENGER SEAT

C. C. Kubokawa

Dec. 1973 See also B72-10692

ARC-10799

Human-engineering approach was used to design integral seat which provides all the safety, comfort, and protective features that can possibly be afforded airline passengers. Results of dynamic impact testing indicated that seat can withstand and attenuate gravity loads of 21-g horizontal and 45-g vertical; by design, seat will withstand lateral g's as well.

B73-10498

### FLEXIBLE TEMPERATURE PROBE FOR BIOLOGICAL SYSTEMS

P. J. Haro, C. Winget, and J. R. Beljan (Calif. Univ., Davis)

Dec. 1973

ARC-10796

Probe is sufficiently flexible so that it can be worn comfortably for long periods of time, but relatively rigid to permit easy insertion. Body and electrical leads of small thermistor are imbedded in flexible fluorosilicane matrix contained in vinyl plastic tubing.

#### DETECTING AND MEASURING METABOLIC BYPRODUCTS BY ELECTROCHEMICAL SENSING

J. R. Wilkins and G. E. Stoner (Virginia Univ.)

Mar. 1974

LANGLEY-11525

Method of detecting certain groups of bacteria is based on sensing buildup in molecular hydrogen. Apparatus is easy to assemble and use, and it has added advantage that hydrogen evolution by test micro-organisms can be measured automatically and accurately. System has been used to detect and enumerate variety of gram-negative bacteria of enterobacteriaceae group.

# 06 MECHANICS

#### B73-10023 1

#### SATELLITE AUXILIARY PROPULSION SYSTEMS

L B Holcomb

Jan. 1973 See also JPL-TR-32-1505

NPO-11744

Report is announced which describes techniques for selecting optimum system for specific satellite mission. Descriptions of propulsion systems are presented along with illustrations and diagrams. Report contains references, cost-effectiveness techniques, and reliability measurements and estimates.

#### B73-10026

## MAGNETIC LATCHING VALVE

J. M. Conley Jan. 1973

NPQ-11790

Latching, fast-acting 2-port poppet valve has been developed for use in gas chromatograph - mass spectrometer combinations. Requisites included positive actuation time, few hundredths of a second, and static force holding valve in position at all times.

#### R73.10028

#### FLUID INSULATION TO PREVENT ICE FORMATION IN **HEAT EXCHANGERS**

G. A. Coffinberry (GE)

Mar. 1973

LEWIS-11959

Heat transfer surfaces were insulated to maintain air side surface temperature above freezing. Double wall tubes, with annular space between tubes, were filled with static liquid hydrogen. Low thermal conductivity of this hydrogen provided thermal resistance.

#### B73-10029

#### BIMETALLIC DEVICES FOR STIRRING FLUIDS

T. N. Canning

Feb. 1973

ARC-10441

Device consists of helical heating coil inside cylinder and affixed at one end. Piston is fastened at other end and is free to move existly through cylinder. Electrical power extends coil when applied to conductors. Birnetallic stirrer may also be made in vane form.

### B73-10034

### MECHANICAL POSITIONING DEVICE FOR LANGMUIR PROBE

C. W. Perkins

Feb. 1973

NPO-11626

Lightweight, portable device has been developed to permit probe movement in two planes. It also provides accurate information about location of probe tip in a closed chamber.

## MAGNETIC PARTICLE CLUTCH CONTROLS SERVO SYSTEM

P. B. Fow (Rockwell Intern. Corp.)

Mar. 1973

JSC-17136

Magnetic clutches provide alternative means of driving low-power rate or positioning servo systems. They may be used over wide variety of input speed ranges and weigh comparatively little. Power drain is good with overall motor/clutch efficiency greater than 50%, and gain of clutch is close to linear. following hysteresis curve of core and rotor material.

#### R73-10042

### TRAVELING DIGITAL COUNTERS FOR MICROMETERS

C. T. Haley and J. M. Moore

Feb. 1973

LANGLEY-11258

Five digit micrometer readings are made directly and quickly with no loss of precision. It is virtually impossible for micrometer to be misread. Digitized micrometer can also be used for reptitive measurements.

#### B73-10057

### DYNAMIC TESTING OF COMPLEX STRUCTURES

C. Birs (Grumman Aerospace Corp.) and P. Anderson (Grumman Aerospace Corp.)

Mar. 1973

JSC-12569

Response of structure is determined under impulses large enough to create severe strains. Electrodynamic shaker can provide impulses to nearly any point on structure and can deliver repeated pulses of varying force and duration.

#### R73-10059

#### MECHANICAL IMPEDANCE AND ACQUISTIC MOBILITY MEASUREMENT TECHNIQUES OF SPECIFYING VIBRA-TION ENVIRONMENTS

G. C. Kao (Wyle Labs.)

Feb 1973

M-FS-22016

Method has been developed for predicting interaction between components and corresponding support structures subjected to acoustic excitations. Force environments determined in spectral form are called force spectra. Force-spectra equation is determined based on one-dimensional structural impedance model.

#### B73-10061

#### MEASUREMENT OF DIMENSIONS AND ALIGNMENT WITH OPTICAL INSTRUMENTS

W. F. Dendy

Feb. 1973

M-FS-22168

Course, as contained in manual, encompasses principles involved in determining and applying proper optical tooling devices to fulfill precise measuring requirements.

## B73-10076

#### THERMAL-DYNAMIC MODELING STUDY

I. U. Ojalvo (Grumman Aerospace Corp.) Mar. 1973 See also NASA-CR-2125

LANGLEY-11309

Study, provides basic information for designing models and conducting thermal-dynamic structural tests. Factors considered are development and interpretation of thermal-dynamic structural scaling laws; identification of major problem areas; and presentation of model fabrication, instrumentation, and test procedures.

#### 873-10111

# A VERSATILE FLAMMABILITY TEST CHAMBER

C. L. Springfield, W. J. Paton, and J. D. Jeter

May 1973

KSC-10126

Relatively inexpensive test chamber safely tests flammability of most materials while allowing constant observation of test. Chamber can be used at various pressures, under controlled atmosphere, and is equipped with probes to vary distance from heat source to test object or to move it for observation from several different angles.

#### B73-10117

#### PARTICLE-FLUID INTERACTIONS FOR FLOW MEASURE. MENTS

N. S. Berman (Arizona State Univ.)

### Mar. 1973 M-FS-21727

Study has been made of the motion of single particle and of group of particles, emphasizing solid particles in gaseous fluid. Velocities of fluid and particle are compared for several conditions of physical interest. Mean velocity and velocity fluctuations are calculated for single particle, and some consideration is given to multiparticle systems.

#### B73-10128 DETECTOR FOR INSPECTION OF FIRE ALARMS

G. T. Clawson Mar. 1973 GSFC-11600

Portable detector tests rate-of-rise temperature devices. Incandescent light bulb is calibrated to produce rate of temperature rise necessary to activate properly functioning alarm;

#### B73-10150

# A SIMPLE, ACCURATE DEPTH CHECK GUAGE

E. P. Rauch (Rockwell Intern. Corp.) May 1973

JSC-17166

Easily made, pen-light battery operated production check gauge has probe-activated switch with fail-safe features to insure proper operation. Parts can be reliably and quickly checked. Gauge is equipped with tolerance band adjustment and can use interchangeable probes for different applications. Accompanying tester permits frequent check of calibration.

#### B73-10183

# THEORETICAL PREDICTION OF INTERFERENCE LOADING ON AIRCRAFT STORES: PART II -- SUPERSONIC SPEEDS

C. H. Fox, Jr. and F. Fernandes (Gen. Dynamics Corp.)

Jun. 1973 See also B73-10184

LANGLEY-11250

Linear theory is used, without two dimensional or slender body assumptions, to predict flow field produced by aircraft wing. nose, inlet, and pylons. Aircraft shock wave locations are predicted. and their effect on flow field is included through transformation of aircraft geometry. Program was written in FORTRAN IV for CDC 6400 computer.

# THEORETICAL PREDICTION OF INTERFERENCE LOADING ON AIRCRAFT STORES: PART 1 - SUBSONIC SPEEDS

C. H. Fox, Jr. and F. Fernandes (Gen. Dynamics Corp.)

Jun. 1973 See also 873-10183

# LANGLEY-11249

Computer program is developed for theoretically predicting loading on pylon-mounted stores in subsonic compressible flow. Linear theory predicts flow field produced by aircraft wing, nose, inlet, and pylons. Program was written in FORTRAN IV for CDC 6000 computer.

#### B73-10200

#### AIR-ATOMIZING SPLASH-CONE FUEL NOZZLE REDUCES POLLUTANT EMISSIONS FROM TURBOJET ENGINES

R. D. Ingebo and C. T. Norgren

Nov. 1973 See also NASA-TN-D-7154

## LEWIS-11918

Advantages of fuel nozzle over conventional pressureatomizing fuel nozzles: simplicity of construction, ability to distribute fuel-air mixture uniformly across full height of combustor without using auxiliary air supply, reliability when using contaminated fuels, and durability of nozzle at high operating temperatures.

# B73-10201

## A SELF-SUPPORTING STRAIN TRANSDUCER

I. S. Hoffman Jun. 1973

LANGLEY-11263

Self-contained mechanical measuring system is handmounted by simply compressing installation spring and inserting device into hole of matching size. It is self-aligning as each contact pin maintains constant contact with surface being measured. Strain level is controlled by design to provide for measurements over almost unlimited number of load cycles.

#### B73-10205

#### BRAZE ALLOYS FOR HIGH TEMPERATURE SERVICE

R. A. Lindberg, R. L. McKisson (Rockwell Intern. Corp.), and G. Erwin, Jr. (Rockwell Intern. Corp.)

Jun. 1973 See also NASA-CR-1591; NASA-CR-1592; NASA-CR-54093; NASA-CR-72850; NASA-CR-120831

Two groups of refractory metal compositions have been developed that are very useful as high temperature brazing alloys for sealing between ceramic and metal parts. Each group consists of various compositions of three selected refractory metals which, when combined, have characteristics required of good braze alloys.

#### B73-10207

MASS FLOW CONTROLLER FOR GASEOUS PROPELLANTS Innovator not given (Parker Hannifin Corp.) Jun. 1973 See also NASA-CR-128639

#### JSC-14221

Gaseous propellants exhibit large variations in pressure and temperature and hence in fuel delivery. All-mechanical, mass flow controller which compensates for these variations has been developed to maintain constant fuel rate of gas. Further work is necessary to ease inlet pressure limitation. .gu.=

## FLUIDIC DEVICE FOR MEASURING CONSTITUENT MASSES OF A FLOWING BINARY GAS MIXTURE

P. R. Prokopius

Nov. 1973 See also NASA-TM-X-1269; NASA-TM-X-2741 LEWIS-11995

Device consists of fluidic humidity sensor and specially designed flow calorimeter. Calorimeter provides readings of gas stream temperature rise produced by measured amount of heat that is dissipated into gas stream, and humidity sensor is used to obtain continuous calculation of specific heat capacity of gas mixture.

#### B73-10234

#### HIGH-FRICTION MECHANICAL GRIPS

E. G. Stevens (Rockwell Intern. Corp.)

Aug. 1973 JSC-19260

Plasma-arc spraying offers method of preparing required surface at greatly reduced cost. Coarse-grained, tungsten carbide

bonded-nickel coating is applied by spraying. Coating has been used successfully on wedge-shaped mechanical test grips.

# B73-10239

#### METHOD FOR PREDICTING ROTOR FREE-WAKE POSI-TIONS AND THE RESULTING ROTOR BLADE AIRLOADS D. Deen, W. R. Mantay, and S. G. Sadler (Rochester Appl. Res. Assoc., Inc.)

# Aug. 1973 LANGLEY-10674

Computer program has been designed and written to predict rotor free-wake positions and resulting rotor blade airloads without requiring time-consuming and tedious calculations. This program was written in FORTRAN IV for use on an IBM-360 computer.

# BONDED PANEL, FLAW DETECTION STANDARDS

R. J. Platt, Jr., L. B. Thurston, Jr., and R. M. Baucom Aug. 1973

#### LANGLEY-11399

With optical holography or ultrasonic equipment, process prepares standards for use in detection of flaws in bonded panels. Metal-to-metal, composite-to-metal, and composite-to-composite flaw standards have been produced by this process, and all have been used and tested successfully.

### B73-10276

OPTIMIZATION OF STRUCTURES ON THE BASIS OF

#### FRACTURE MECHANICS AND RELIABILITY CRITERIA

E. Heer and J. -N. Yang

Jun. 1973 See also NASA-CR-116827

NPO-11645

Systematic summary of factors which are involved in optimization of given structural configuration is part of report resulting from study of analysis of objective function. Predicted reliability of performance of finished structure is sharply dependent upon results of coupon tests. Optimization analysis developed by study also involves expected cost of proof testing.

#### 873.10326

ACOUSTIC EMISSION SIGNAL-PROCESSING ANALOG UNIT FOR LOCATING FLAWS IN LARGE TANKS

F. J. Moskal (Rockwell Intern. Corp.) and J. D. Fageol (Rockwell

Sep. 1973

M-FS-24424

Technique monitors structural flaws in 105-in. diameter tanks. Tank surface is divided into many areas and each area is sectioned into 20 equilateral triangles that form icosahedron. Twelve transducers are equally positioned on tank surface at vertex of each triangle. Transducers monitor area for flaws by detecting any increase in acoustical activity.

# B73-10326

ARTICULATED ELASTIC-LOOP ROVING VEHICLES

C. J. Chang (Lockheed Corp.) and W. Trautwein Oct. 1973

M-FS-22691

Prototype vehicle features exceptional obstacle-negotiating and slope-climbing capabilities plus high propulsive efficiency. Concept should interest designers of polar or ocean-bottom research vehicles. Also, its large footprint and low ground pressure will minimize ecological damage on terrain with low bearing strength, as in off-the-road application.

### B73-10332

#### A. MULTIDEGREE-OF-FREEDOM VIBRATIONAL PARATUS

:

J. J. Kerley, Jr. and N. C. Schaller

Sep. 1973

GSFC-11302

Apparatus uses prestressed cables to support vibrational table. Cables are durable, do not require frequent servicing, and provide increased safety. Because much weight rests on these cables, vibration actuating pistons can provide longer service. In event of structural failure of other supporting components, they will support entire weight of vibrational table.

#### B73-10347

THERMALLY ACTUATED VALVE

R...H. Silver Aug. 1973

NPO-11846 Effective seal in one-shot valve is made by shrink-fitting ball within cylinder; thermal expansion of cylinder, caused by contiguous source of heat, will release ball and open valve. Valve can also be adapted for repeated operation and made capable of being opened without pressurized fluid,

#### B73-10348

# HEATED BIMETAL STRIP PREVENTS DAMAGE OF BEARINGS BY VIBRATION

L. J. Derr Aug. 1973

NPO-11870

Strip of bimetal is shaped as split ring; when properly fabricated from thin sheet, width of strip increases when it is heated. When width of strip increases, outer races are forced apart, thus pressing balls tightly against inner races. Strip applies axial load to bearing, amount of load being function of temperature to which strip is heated.

## B73-10364

STRUCTURAL HEAT PIPE

S. Ollendorf Oct 1973 GSEC.11619

When solar heat is absorbed through the structural support member it is fed directly to a heat pipe. Energy is transferred by heat pipe around to a cooler spot before it can find its way to the structure. This prevents local hot spots from occurring on the sun side and excessive heat leaks on the dark side.

#### B73-10380

LOW-CLOSING-FORCE SEAL

L. E. Bergquist (Martin Marietta Corp.) Sep. 1973

ARC-10775

Compress soft, inert metal gasket between cone and corresponding socket to attach tubes to vessels containing gas samples. Technique effects seals with minimum of applied force and does not contaminate contents. Seal is formed when port connector is pushed firmly into its socket. Gold washer is deformed and forced to flow into imperfections in surfaces.

#### R73.10395

# ISOGRID DESIGN HANDBOOK

R. R. Meyer (McDonnell Douglas Corp.), O. P. Harwood (McDonnell-Douglas Corp.), M. B. Harmon (McDonnell Douglas Corp.), and J. J. Orlando (McDonnell Douglas Corp.) Oct 1973

# M-FS-22686

Handbook has been published which presents information needed for design of isogrid triangular integral-stiffened structures. It develops equations, methods, and graphs to handle wide variety of loadings, materials, and geometry. Handbook is divided into. seven sections. Handbook may be used by marine and civilengineers and by students and designers without access to computers.

#### B73-10398

#### INDUSTRIAL FILTER BAGS CLEANED BY HIGH-FREQUENCY VIBRATION: A CONCEPT

A. V. Kooy (Rockwell Intern. Corp.)

Nov. 1973

M-FS-24445

System holds filter bag around fine-mesh metal screen and vibrates screen at its resonant frequency. This removes deposited byproducts and protects bag fibers from damaging forces: Because filter bags represent 20 to 40% of any industrial filtering investment, this method of extending bag life should be of interest to those responsible for plant maintenance.

# B73-10405

### BACKFLUSHING SYSTEM RAPIDLY CLEANS FLUID FILTERS

V. A. DesCamp (Martin Marietta Corp.), M. W. Boex (Martin Marietta Corp.), M. W. Hussey (Martin Marietta Corp.), and T. P. Larson (Martin Marietta Corp.)

Nov. 1973 See also NASA-CR-115505

JSC-14273

Self contained unit can backflush filter elements in fraction. of the time expended by presently used equipment. This innovation may be of interest to manufacturers of hydraulic and pneumatic systems as well as to chemical, food, processing, and filter manufacturing industries.

#### R73-10414

# SMOKE GENERATOR

K. L. Parrish Dec. 1973

LANGLEY-11433

Generator is simple in construction, efficient, and extremely easy to start and regulate. It can be of such small size and weight that it can be installed easily inside a model. Size can be changed to suit needs, as long as operating temperatures can be attained and identified controls are utilized.

#### B73-10419

## ACCELEROMETER-CONTROLLED AUTOMATIC BRAKING

R. C. Dreher, R. K. Sleeper, and J. R. Nayadley, Sr. Dec. 1973 See also NASA-TN-D-6953

LANGLEY-11383

Braking system, which employs angular accelerometer to control wheel braking and results in low level of tire slip, has been developed and tested. Tests indicate that system is feasible for operations on surfaces of different slipperinesses. System restricts tire slip and is capable of adapting to rapidly-changing surface conditions.

B73-10429

### CONDENSATE-REMOVAL DEVICE FOR HEAT EXCHANG-**ERS**

R. B. Trusch (United Aircraft Corp.) and E. W. OConnor (United Aircraft Corp.)

Dec. 1973 JSC-14143

Device comprises array of perforated tubes manifolded together and connected to a vacuum suction device. Vacuum applied to these tubes pulls mixture of condensate and effluent gas through perforations and along length of tubes to discharge device. Discharge device may be a separator which separates water vapor from effluent air and allows recirculation of both of them.

B73-10430

SEQUENTIAL-STRIP AND SEQUENTIAL-DISK FILTERS

J. P. Winzen (Brunswick Corp.)

Dec 1973

JSC-14592

Filter senses increasing pressure drop and uses this to compress bellows. Compression of bellows stores energy in spring until predetermined pressure-drop level is reached. At this point, bellows and spring are released. Relaxation of spring is used to move a clean area of screen into position across fluid stream.

B73-10455

INSTRUMENT FOR MEASURING THIN-FILM BELT LENGTHS

T. A. Casad, H. Piggott, and J. K. Hoffman

Mar. 1974

NPO-13149

Instrument consists of base, vernier height gauge, sliding block, and balance-beam assembly with tension weight. Pulley bracket is provided with three pulley mounting holes, 4 inches apart, to accommodate widely different belt lengths. Instrument is accurate to within 0.001 inch and is suitable for commercial production.

B73-10456

LINEAR KINEMATIC AIR BEARING

S. D. Mayali Mar. 1974 NPO-13151

Bearing provides continuous, smooth movement of the cat's-eye mirror, eliminating wear and deterioration of bearing surface and resulting oscillation effects in servo system. Design features self-aligning configuration; single-point, pivotal pad mounting, having air passage through it; and design of pads that allows for precise control of discharge path of air from pads.

B73-10464

NONDESTRUCTIVE LEAK TESTING

T. K. Lusby, Jr. and F. Lawrence

Mar. 1974

LANGLEY-11561

Method provides opportunity to effect repairs without compromising integrity of enclosed circuitry or mechanism by loss of atmosphere or by ingestion of foreign matter or gas. It is possible to detect leaks in modules which are sealed while fully evacuated, partially evacuated, or containing some form of gas.

873-10465

STRAIN ARRESTOR PLATE FOR MOUNTING RIGID INSULATING TILES

M. H. Kural (Lockheed Missiles & Space Co.)

Mar. 1974 JSC-14182

Plate is made of material having coefficient to thermal expansion similar to that of insulating material. Although plate may be formed from appropriate alloy, it has been found that a combination of graphite fibers in epoxy resin is satisfactory and much lighter in weight.

873-10466 SOLID-STATE CONTROLLER

C. L. Bailey Mar. 1974 JSC-12394

Attitude controllers are used to guide roll, pitch, and yaw of vehicle in flight. Controllers enclose multitude of switches, gears, cams, and other hardware needed to transmit pilot's commands to attitude control systems. New design, using magnetic coupled transducers, eliminates many mechanical parts. improving reliability and reducing maintenance.

B73-10470

IMPROVED METHOD FOR AERODYNAMIC ANALYSIS OF WING-BODY-TAIL CONFIGURATIONS IN SUBSONIC AND SUPERSONIC FLOW

C. H. Jr. Fox and F. A. Woodward (Analytical Methods, Inc.)

Mar. 1974

LANGLEY-11305

Method permits analysis of noncircular bodies and calculation of wing-body interference effects in presence of body closure. two features not previously available. In addition, use of vortex distribution, having linear variation in streamwise direction, results in improved chordwise pressure distributions on wing and tail surfaces.

B73-10478

IMPROVED SYNCOM-TYPE FLUID DAMPER

J. Evans

Mar. 1974

GSFC-11205

Two efficient types of fluid nutation dampers that are simple, reliable, and inexpensive have been developed. In use, either damper may be mounted on a spinning body, parallel to the spin axis of the body and radially displaced from it, to eliminate nutation.

**B73-10484** 

SOLAR-ENERGY ABSORBER: ACTIVE INFRARED (IR) TRAP

L. W. Brantley, Jr.

Mar. 1974

M-FS-22743

Efficiency of solar-energy absorbers may be improved to 95% by actively cooling their intermediate glass plates. This approach may be of interest to manufacturers of solar absorbers and to engineers and scientists developing new sources of energy.

B73-10485

SOLAR-ENERGY ABSORBER: ACTIVE INFRARED (IR) TRAP WITHOUT GLASS

L. W. Brantley, Jr. Mar. 1974

M-FS-22744

Absorber efficiency can be improved to 90% by removing glass plates and using infrared traps. Absorber configuration may be of interest to manufacturers of solar absorbers and to engineers and scientists developing new sources of energy.

B73-10496

MASTER/SLAVE MANIPULATOR SYSTEM

H. C. Vykukal, R. F. King, and W. C. Vallotton

Dec. 1973 See also B72-10297

ARC-10756

System capabilities are equivalent to mobility, dexterity, and strength of human arm. Arrangement of torque motor, harmonic drive, and potentiometer combination allows all power and control leads to pass through center of slave with position-transducer arrangement of master, and 'stovepipe joint' is incorporated for manipulator applications.

#### B73-10497 MECHANICAL PLANETARY COMPENSATING DRIVE SYSTEM

R. J. Zeiger and J. C. Gerdts, Jr. Dec. 1973

ARC-10462

Drive enables two concentric output shafts to be controlled independently or rotated as a unit. Possible uses are pointing and tracking devices, rotary camera shutters with variable light control, gimbal systems with yaw and pitch movement, spectrometer mirror scanning devices, etc.

# 873-10502

FLEX FLAP

N. S. Currey (Lockheed-Georgia Co.) and J. T. Perry (Lockheed-Georgia Co.)

Dec. 1973 ARC-10771

To provide flap with large upper surface radius as required for airplanes with over-the-wing blowing, distort upper surface of flap by actuator. Flap can be used as control surface at leading as well as trailing adges and, with minor modification, as variant of Jacobs-Hurkamp air flap.

# B73-10518 NONCONTACTING DEVICES TO INDICATE DEFLECTION AND VIBRATION OF TURBOPUMP INTERNAL ROTATING PARTS

D. B. Hamilton (Battelle Mem. Inst.), D. Ensminger (Battelle Mem. Inst.), D. R. Grieser (Battelle Mem. Inst.), A. M. Plummer (Battelle Mem. Inst.), E. J. Saccocio (Battelle Mem. Inst.), and J. W. Kissel (Battelle Mem. Inst.)

Mar. 1974

M-FS-22678

Published report discusses feasibility of ultrasonic techniques; neutron techniques; X-radiography; optical devices; gamma ray devices; and conventional displacement sensors. Use of signal transmitters in place of slip rings indicated possible improvement and will be subject of futher study.

#### B73-10524

SOLAR-ENERGY CONVERSION SYSTEM PROVIDES. ELECTRICAL POWER AND THERMAL CONTROL FOR LIFE-SUPPORT SYSTEMS

B. K. Davis Mar. 1974

M-FS-21628

LEWIS-11035

System utilizes Freon cycle and includes boiler turbogenerator with heat exchanger, regenerator and thermal-control heat exchangers, low-pressure and boiler-feed pumps, and condenser. Exchanger may be of interest to engineers and scientists investigating new energy sources.

# 07 MACHINERY, EQUIPMENT AND TOOLS

B73-10001
A FLEXIBLE CRUCIFORM JOURNAL BEARING MOUNT
A. E. Frost (Mechanical Technol., Inc.) and W. A. Geiger.
(Mechanical Technol., Inc.)
Nov. 1973 See also NASA-CR-121098

Flexible mount achieves low roll, pitch and yaw stiffnesses while maintaining high radial stiffness by holding bearing pad in fixed relationship to deep web cruciform member and holding this member in fixed relationship to bearing support. This mount has particular application in small, high performance gas turbines.

#### R73-10008

CARBIDE FACTOR PREDICTS ROLLING ELEMENT BEAR-ING FATIGUE LIFE

J. L. Chevalier (Army Air Mobility R & D Lab.) and E. V. Zaretsky Mar. 1973 See also NASA-TN-D-6835

LEWIS-11940

Analysis was made to determine correlation between number and size of carbide particles and rolling-element fatigue. Correlation was established, and carbide factor was derived that can be used to predict fatigue life more effectively than such variables as heat treatment, chemical composition, and hardening mechanism.

#### R73,10047

FATIGUE TESTING DEVICE

F. E. Eichenbrenner and L. A. Imig

Feb. 1973

LANGLEY-10426

Anti-buckling assembly prevents buckling of sheet metal fatigue specimen when axial compressive load is applied. It provides for cyclic heating and cooling of specimen during testing. Assembly permits tests at two locations on specimen. Device has ports for visual, optical, or photographic monitoring of fatigue crack propagation in test specimen.

#### R73-10070

REDUNDANT SCREWJACK

R. W. Benjamin (Rockwell Intern. Corp.)

Aug. 1973

JSC-19200

Device uses differential gears to drive either one of two nut-screw assemblies. In event that one assembly jams, second assembly is driven at twice its normal rate with no loss in overall performance.

#### B73-10098

BEAM LEAD FORMING TOOL

P. W. Clemons (Sperry Rand Corp.)

Feb. 1973

M-FS-22133

Tool was designed for table-top manual operation that can bend leads to any desired angle up to 90 degrees. It can be readily adapted to electrical, hydraulic, or pneumatic operation. This innovation may be of interest to electronics, sheet metal, and appliance industries.

#### B73-10110

GEYSERING INHIBITOR PIPE

F. S. Howard Jun. 1973 KSC-10615

Smaller concentric pipe is welded to main pipe beginning above bottom of isolation valve and terminating in storage tank at top. There is continuous circulation of fluid which maintains fluid temperature below boiling temperature of liquid oxygen.

#### B73-10124 MAGNETOCALORIC PUMP

G. V. Brown

Aug. 1973 See also NASA-TM-X-52983

LEWIS-11672

Very cold liquids and gases such as helium, neon, and nitrogen can be pumped by using magnetocaloric effect. Adiabatic magnetization and demagnetization are used to alternately heat and cool slug of pumped fluid contained in closed chamber.

# B73-10125

ELECTROMAGNETIC CONNECTOR

W. C. Gardner (Rockwell Intern. Corp.)

Mar. 1973

#### JSC-17420

Connector pair consists of two iron cores brought together a short distance from each other. Each core is wound with insulated wire. Ac signal is connected through the pair across the gap by magnetic induction. Device can be used underwater or in flammable atmosphere.

#### B73-10190

# FLOATING BAFFLE TO IMPROVE EFFICIENCY OF LIQUID TRANSFER FROM TANKS

F. S. Howard Jun. 1973 KSC-10639

When liquid tank is full, baffle is held up against a stop on top of shaft to prevent restriction of flow from outlet. As tank is being emptied, baffle, floating on top of liquid surface, descends with liquid level toward outlet until it reaches its bottom stop. Baffle prevents gas pull-through until practically all liquid is emptied from tank.

#### B73-10193 MULTIHEAD MEASURING TAPE

D. L. Posey Jun. 1973

#### LANGLEY 11266

By using multihead measuring tape, procedure to obtain length and angle measurement on either wood or metal stock is reduced to one step. Length and angle of measurement can be locked in on measuring device for repetitive measurements. Measuring tape can be used for layout work or to duplicate length and angle of existing stock.

#### B73-10203 LEAK DETECTOR-MEASURER

J. T. Sawyer Jun. 1973 M-FS-21761

Detector locates leaks from inside pressurized cabins. Head is placed flush against area being tested. Should leak be present, most air inside detector housing will escape. Diaphragm will then flex into chamber and push electrical contact together, closing circuit and turning on warning light.

#### B73-10204

# ADVANCED ACTION MANIPULATOR SYSTEM (ADAMS) D. A. Kugath (GE), D. H. Dane, and H. T. Blaise

Jun. 1973 M-FS-22022

Manipulator offers improved performance over other models in its category. It features larger force and reach capabilities and is readily convertible for underwater use. Unique kinematic arrangement provides extremely large working envelope. System has six degrees of motion: azimuth joint, shoulder joint, upper arm rotating joint, elbow joint, wrist pitch, and wrist twist.

## B73-10216

# A PROPOSED HAND-TOOL ASSEMBLY FOR ROBOTS

D. H. Dane and H. T. Blaise

Aug. 1973 See also B73-10204

# M-FS-22266

Terminator Kit Assembly (TKA) includes all features that mechanical manipulator needs to use hand tools for maintenance, repair, or assembly work. Tool box holds hand tools and, on command, releases them to hand interface which accepts and operates them. TKA is being studied as possible prosthetic device.

## **B73-10250**

# SELF-ADJUSTING ASSEMBLY JIG

M. J. Hasser Dec. 1973 LEWIS-12034

Jig adjusts for thermal expansion and contraction to hold parts being joined under constant pressure and in correct alignment during entire joining operation. Jig is simple and easy to use, durable and maintenance free. Several methods may be used to join parts of many sizes and shapes.

#### R73-10324

UNIVERSAL DRILL JIG

E. J. Stringer (Rockwell Intern. Corp.)

Oct. 1973

#### M-FS-24464

Inexpensive jig can steadily guide drill at selected angles to flat plane from any direction. Jig uses two mutually perpendicular bevel bodies, each corresponding to interval settings. Drill block has spline on one side to engage groove on bevel body at selected angle. Angles are set by loosening wing nuts, tilting drill block to desired angle until spline engages groove, and tightening nuts.

#### B73-10329

#### SMALL PORTABLE SPEED CALCULATOR

J. L. Burch and J. C. Billions

Oct. 1973

### M-FS-22638

Calculator is adapted stopwatch calibrated for fast accurate measurement of speeds. Single assembled unit is rugged, self-contained, and relatively inexpensive to manufacture. Potential market includes automobile-speed enforcement, railroads, and field-test facilities.

#### B73-10335

#### VARIABLE LOAD INDICATOR

W. T. Appleberry (McDonnell Douglas Corp.)

Oct. 1973

M-FS-21728

Weighing device measures loads as a function of its elongation. Device is compact, simple, and inexpensive. It does not require presetting and will measure any load from zero to its yield point. Because of its low cost relative to other load indicators such as strain gauges, device can be used as turnbuckle for tensioning straps, rods, or cables where accurate preloading is critical.

#### B73-10369

#### EMERGENCY-ESCAPE DEVICE

P. M. Broussard Oct. 1973

M-FS-22720

Relatively simple inexpensive device uses reeled steel cable, is controlled by automotive-type shock absorber, and allows safe descent from burning building. Device is cheap to manufacture and assemble and requires neither skill, special knowledge, or athletic ability to operate. It is reliable and fireproof and can be deployed instantly.

### **B73-10412**

# DESIGN HANDBOOK FOR GASEOUS FUEL ENGINE INJECTORS AND COMBUSTION CHAMBERS

D. F. Calhoon (Aerojet Liquid Rocket Co.), I. Ito (Aerojet Liquid Rocket Co.), and D. L. Kors (Aerojet Liquid Rocket Co.)

Dec. 1973 See also NASA-CR-121234

LEWIS-12154

Results of investigation of injection, mixing, and combustion processes using gaseous fuels and oxidizers have been summarized in handbook presenting succinct design procedures for injectors and methods for estimating combustion efficiency, chamber heat flux and stability characteristics. Handbook presents two approaches to injector and combustion chamber design: empirical and analytical.

#### 873-10413

# COLLAPSIBLE PISTONS FOR LIGHT-GAS GUNS

R. N. Teng (McDonnell Douglas Corp.)

Dec. 1973

JSC-13789

Moving and expandable parts of gun consist of pump-tube diaphragm, piston, launch-tube diaphragm, and saboted projectile. As a result of improved piston design, pressure cycle has been significantly improved by smoother buildup, increasing muzzle velocities up to 50%.

#### R73.10415

POPPET VALVE TESTER

G. F. Tellier (Rockwell Intern. Corp.) Dec. 1973 See also NASA-CR-120976

LEWIS-11655

Tester investigates fundamental factors affecting cyclic life and sealing performance of valve seats and poppets. Tester provides for varying impact loading of poppet against seat and rate of cycling, and controls amount and type of relative motion between sealing faces of seat and poppet. Relative motion between seat and poppet can be varied in three modes.

#### B73-10416

### CONTAINER SEAL FOR DUSTY ENVIRONMENT

R. S. Nevin, Sr. (Martin Marietta Corp.)

Dec. 1973

#### LANGLEY-10962

Method maintains cleanliness of joint-sealing surfaces under dust-laden conditions. This is accomplished by keeping seal and sealing surface covered with sliding plastic rings, which slide out of the way when a joint is seated.

#### B73-10433

# TOOL FOR INSTALLING OR EXTRACTING SMALL BULBS IN LIMITED-ACCESS SPACES

E. B. Snyder and J. H. Parker

Dec. 1973

#### Langley-11543

Installing and extracting component of tool is plastic tubing with inside diameter which provides snug fit over bulb. Other components, which provide sturdiness and ease of operation, consist of metal tube, with collar near one end, and plunger, with knob on one end and Teffon tip on the other.

14 17 3

#### B73-10450

# FAIL-SAFE BIDIRECTIONAL VALVE DRIVER

4.00

H. Fujimoto

Feb. 1974

NPO-11958

Cross-coupled diodes are added to commonly used bidirectional valve driver circuit to protect circuit and power supply. Circuit may be used in systems requiring fail-safe bidirectional valve operation, particularly in chemical- and petroleum-processing control systems and computer-controlled hydraulic or pneumatic systems.

### B73-10461

### INJECTOR HAS NO BACKSPLASH

W. B. Powell Jan. 1974

NPO-13208

Passages of injector have been modified to eliminates backsplashing. All fluid is expelled in downstream spray fan. Result is that face of injector is completely free of liquid obstructions.

# B73-10463

#### FERROFLUID SEPARATOR FOR NONFERROUS SCRAP SEPARATION

R. Kaiser (Avco Corp.) and L. Mir (Avco Corp.)

Mar. 1974

#### LANGLEY-11523

Behavior of nonmagnetic objects within separator is essentially function of density, and independent of size or shape of objects. Results show close agreement between density of object and apparent density of ferrofluid required to float it. Results also demonstrate that very high separation rates are achievable by ferrofluid sink-float separation.

#### B73-10472

# À METHANOL/AIR FUEL CELL SYSTEM

W. J. Asher (Exxon Corp.)

Mar. 1974 | See also B73-10472; B73-10473; B73-10475; B73-10489 |

M-FS-22541

High power-density, self-regulating fuel cell develops

electrical power from catalyzed reaction between methanol and atmospheric oxygen. Cells such as these are of particular interest, because they may one day offer an emission-free, extremely efficient alternative to internal-combustion engines as power source.

#### B73-10473

# AN ELECTROCHEMICAL ENGINE

W. J. Asher (Exxon Corp.)

Mar. 1974 See also B73-10472; B73-10475; B73-10489 M-FS-22542

Thin-electrode fuel cell, with electrodes arranged in circular shape, can provide power for new electrochemical engine. With this system, a safe high-voltage engine may be constructed. Since each electrode assumes a potential relative to electrolyte, and since there are no electrolyte paths between cells, any number of cell stacks can be connected in series.

#### B73-10489

### FUEL-CELL HEAT AND MASS PLATE

W. J. Asher (Exxon Corp.)

Mar. 1974 See also B73-10472; B73-10473; B73-10475 M-FS-2131B: M-FS-21319

Plate, serving as heat pipe, can be built into cell to control temperature and water inventory. Plate consists of matrix, filled with liquid water, and a space, filled with water vapor. Both matrix and space extend beyond fuel-cell stack so heat and water may be removed as necessary.

#### B73 10521

# APPARATUS FOR CUTTING ELASTOMERIC MATERIALS

A. B. Corbett Mar, 1974

NPO-13146

Sharp thin cutting edge is held in head of milling machine designed for metal working. Controls of machine are used to position cutting edge in same plane as vibrating specimen. Controls then are operated, making blade come into contact with specimen, to cut it into shapes and sizes desired. Cut surfaces appear mirror-smooth; vibrating mechanism causes no visible striations.

# 08 FABRICATION TECHNOLOGY

#### B73-10003

PRODUCTION OF SMALL DIAMETER HIGH-TEMPERATURE-STRENGTH REFRACTORY METAL WIRES D. W. Petrasek, R. A. Signorelli, and G. W. King (Westinghouse Elec. Corp.)

Mar. 1973 See also NASA-CR-120925; NASA-TN-D-6881 LEWIS-11802

Special thermomechanical techniques (schedules) have been developed to produce small diameter wire from three refractory metal alloys: colombian base alloy, tantalum base alloy, and tungsten base alloy. High strengths of these wires indicate their potential for contributing increased strength to metallic composites.

# B73-10005

# IMPROVED DIFFUSION WELDING AND ROLL WELDING OF TITANIUM ALLOYS

K. H. Holko

Mar. 1973 See also 871-10455; NASA-TN-D-6409; NASA-TN-D-6958

# LEWIS-11852

Auto-vacuum cleaning technique was applied to titanium parts prior to welding. This provides oxide-free welding surfaces. Diffusion welding can be accomplished in as little as five minutes of hot pressing. Roll welding can be accomplished with only 10% deformation.

REFRACTORY INSERTS USED TO FORM COOLING PASSAGES IN CAST SUPERALLOY TURBINE VANES

A. Terpay Mar. 1973

LEWIS-11169

Economical technique has been developed for manufacturing air-cooled turbine blades and vanes for gas turbine engines. Process uses tungsten inserts to form coolant passages. After casting, inserts are reduced to tungsten exide during sublimation with oxygen at elevated temperature. Tungsten oxide is leached out of coolant passages with a molten salt solution.

#### B73-10032

METHOD FOR CASTING POLYETHYLENE PIPE

R. M. Elam, Jr. Feb. 1973 ARC-10706

Short lengths of 7-cm ID polyethylene pipe are cast in a mold which has a core made of room-temperature-vulcanizable (RTV) silicone. Core expands during casting and shrinks on cooling to allow for contraction of the polyethylene.

#### B73-10038

LARGE BORON--EPOXY FILAMENT-WOUND PRESSURE

W. M. Jensen, R. L. Bailey, and A. C. Knoell Feb. 1973

NPO-11900

Advanced composite material used to fabricate pressure vessel is prepeg (partially cured) consisting of continuous, parallel boron filaments in epoxy resin matrix arranged to form tape. To fabricate chamber, tape is wound on form which must be removable after composite has been cured. Configuration of boron--epoxy composite pressure vessel was determined by computer program.

#### B73-10040

DENSIFICATION OF POWDER METALLURGY BILLETS BY A ROLL CONSOLIDATION TECHNIQUE

W. H. Sellman (Fansteel, Inc.) and W. R. Weinberger (Fansteel, Inc.)

Mar. 1973 See also NASA-CR-120796

LEWIS-11395

Container design is used to convert partially densified powder metallurgy compacts into fully densified slabs in one processing step. Technique improves product yield, lowers costs and yields great flexibility in process scale-up. Technique is applicable to all types of fabricable metallic materials that are produced from powder metallurgy process.

#### B73-10072

DIFFUSION WELDING TOOL

T. B. Milam (Pratt & Whitney Aircraft Corp.) Feb. 1973

LEWIS-11807

Tool allows flat plate diffusion welding to be done in standard brazing furnace. Weld is achieved using high water pressure applied by hand-operated positive-displacement pump. Good welds have been obtained between nickel and nickel-base alloy plates at temperature of 1200 K and water pressure of 13.8 million N/sq m.

# B73-10082

FILAMENT WINDING TECHNIQUE PRODUCES STRONG LIGHTWEIGHT OXYGEN TANKS

J. F. Shuessler (McDonnell Douglas Corp.) and R. J. Dannenmueiter (McDonnell Douglas Corp.)

May 1973

M-FS-22470

Fiberglass is wound in three winding and cure sequences with first two followed by grit blasting of surface before final step. Result is uniformly stressed metal liner assembly with excellent structural characteristics.

#### B73-10258

IMPROVED FIBERGLASS-TO-METAL JOINT PRODUCES LIGHTER STRONGER FIBERGLASS STRUT

J. R. Barber, H. E. Johnson (Lockheed Missiles & Space Co.), and K. T. Eugene (Lockheed Missiles & Space Co.) Aug. 1973 See also NASA-CR-72538 LEWIS-11661

Axial tension and compression are transmitted between end fittings and fiberglass tube without depending on glass-to-metal bonding, conventional fasteners or combination of these things. Joint design significantly reduces both structural weight of strut and its cross-sectional area.

#### B73-10265

BORON--EPOXY TUBULAR STRUCTURE MEMBERS

W. B. J. Shakespeare (TRW Systems Group), P. T. Nelson (TRW Systems Group), and E. C. Lindkvist (TRW Systems Group)

ARC-10737

Composite materials fabricate thin-walled tubular members which have same load-carrying capabilities as aluminum, titanium, or other metals, but are lighter. Interface between stepped end fitting and tube lends itself to attachments by primary as well as secondary bonding. Interlaminar shear and hoop stress buildup in attachment at end fitting is avoided.

#### B73-10284

EUTECTIC BONDING OF SAPPHIRE TO SAPPHIRE

J. J. Deluca Aug. 1973

GSFC-11577 Eutectic mixture of aluminum oxide and zirconium oxide provides new bonding technique for sapphires and rubies.

Technique effectively reduces possibility of contamination. Bonding material is aluminum oxide and zirconium oxide mixture that matches coefficient of thermal expansion of sapphire.

SHUTTLE ORBITER STORAGE LOCKER SYSTEM: A STUDY

D. R. Butler (Raymond Loewy/William Snaith, Inc.), D. T. Schowalter (Raymond Loewy/William Snaith, Inc.), and D. C. Weil (Raymond Loewy/William Snaith, Inc.) Sep. 1973 See also NASA-CR-128864

JSC-14448

Study has been made to assure maximum utility of storage space and crew member facilities in planned space shuttle orbiter. Techniques discussed in this study should be of interest to designers of storage facilities in which space is at premium and vibration is severe. Manufacturers of boats, campers, house trailers, and aircraft could benefit from it.

# B73-10298

EMBOSSED METAL DIAPHRAGM HAS TWO-WAY STRETCH

W. F. MacGlashan, Jr.

Jul. 1973

NPO-11635

Diaphragm with embossed pattern has greater structural rigidity than one with smooth surfaces, but under severe stress, tensile loads will flatten embossing. This provides necessary additional panel stretch needed to prevent rupture of diaphragm material. Hexagonal embossing-configuration allows panel stretch in any direction or in all directions simultaneously.

#### 873-10311

DESIGN GUIDE FOR GLASS FIBER REINFORCED METAL PRESSURE VESSEL

R. E. Landes (Structura) Composites Ind.)

Dec. 1973 See also NASA-CR-120917; NASA-CR-120918

Design Guide has been prepared for pressure vessel engineers concerned with specific glass fiber reinforced metal tank design or general tank tradeoff study. Design philosophy, general equations, and curves are provided for safelife design of tanks operating under anticipated space shuttle service conditions.

#### **B73-10340**

#### RADIAL HONEYCOMB CORE

R. B. Cantley (Lockheed-Georgia Co.), C. C. Nelson, Jr. (Lockheed-Georgia Co.), R. W. Patterson (Lockheed-Georgia Co.), and K. H. Potter (Lockheed-Georgia Co.)

Aug. 1973 ARC-10727

Core alleviates many limitations of conventional nacelle construction methods. Radical core, made of metals or nonmetals, is fabricated either by joining nodes and then expanding, or by performing each layer and then joining nodes. Core may also be produced from ribbons or strips with joined nodes or ribbons oriented in longitudinal planes.

#### B73-10358

# NEW CONCEPT IN BRAZING METALLIC HONEYCOMB PANELS

P. D. Carter (Boeing Co.), R. E. Layton (Boeing Co.), and F. W. Stratton (Boeing Co.)

Oct. 1973

LANGLEY-10957

Aluminum oxide coating provides surface which will not be wetted by brazing alloy and which stops metallic diffusion welding of tooling materials to part being produced. This method eliminates loss of tooling materials and parts from braze wetting and allows fall-apart disassembly of tooling after brazing.

#### 873-10375 Manufacture of Large, Lightweight Párabolic Antennas

S. W. Hooper (TRW, Inc.)

Sep. 1973

ARC-10741

Antenna was produced in segments. Parabole sections were built up as aluminum foil sandwich with core bonded by film adhesive; whole structure was oven-cured after assembly. Structure was assembled with special tool for splice-bonding segments into complete dish, and inflatable bladder to apply pressure at joints during cure.

# 873-10391 FLAT-BAND ASSEMBLY FOR TOROIDAL TRANSFORMER CORES

W. T. McLyman Sep. 1973

NPO-11966

Toroidal transformer cores are often banded together by means of strap. Spot welds secure strap. Proper tension is obtained by use of special fixture in conjunction with winding of wire which is placed temporarily on core; winding is excited by dc current to hold core halves together magnetically during alignment.

#### B73-10438

#### PROCEDURE FOR DISPERSING FIBER BUNDLES

D. Padilla (Martin Marietta Corp.)

Feb. 1974

LANGLEY-11224

Fiber bundles are dispersed and fibers are cleaned within enclosed container; therefore, safety clothing, masks, and eye protection are not required. Procedure also could be used wherever materials, such as fiberglass or insulation, require dispersion, fluffing, or cleaning. Process could be automated into continuous operation for handling-large quantities of fiber.

### 873-10439

#### ADHESIVE COATING ELIMINATED IN NEW HONEYCOMB-CORE FABRICATION PROCESS

W. L. Batty (Martin Marietta Corp.), R. H. Hayes (Martin Marietta Corp.), and F. S. Magee (Martin Marietta Corp.) Jan. 1974

LANGLEY-11.134

Technique eliminates use of silicone-based adhesive material as bonding medium. Adhesive requires precise time-temperature cure. Prepreg resin is used as bonding medium, and each layer is laminated together to form honeycomb billet. Process can be

used in any application where nonmetallic honeycomb core is being fabricated.

#### B73-10508

# GRAIN REFINEMENT CONTROL IN GAS-SHIELDED ARC WELDING OF ALUMINUM TUBING

W. F. Iceland (Rockwell Intern. Corp.) and E. L. Whiffen (Rockwell Intern. Corp.)

Mar. 1974 JSC-19095

When sections are being welded, operator varies pulse rate of power supply and simultaneously monitors signal on oscilloscope until rate is found which produces maximum arc gas voltage. Remainder of welding is performed with power supply set at this pulse rate, producing desired maximum weld puddle agitation and fine uniform weld of grain structure.

### B73-10528

# X-RAY OPAQUE ADDITIVE FOR INSPECTION OF WELD JOINTS

R. L. Brown and J. L. Cook (McDonnell Douglas Corp.) Mar. 1974

M-FS-22896

Thin coating of copper applied to each faying surface of aluminum-alloy improve X ray detection of welding defects. Copper may be applied by spraying, coating, or deposition. It thickness of faying surfaces must be uniform in range. Coating must be free from spalling and blistering and must contain no porosity.

# 09 COMPUTER PROGRAMS

#### B73-10012

#### N-BODY U AND K MATRIX PROGRAM

R. N. Setter (Gen. Dynamics Corp.), L. Ojeda (Gen. Dynamics Corp.) and R. F. Hoeft (Gen. Dynamics Corp.)

Mar. 1973

LEWIS-11438

Computer program was devised to compute free-fall trajectories of satellites, allowing for injection errors and midcourse velocity perturbations. Program consists of trajectory perturbing program and N-body integrating conic program which can also be used as 2-body patch conic program.

## B73-10049

# A COMPREHENSIVE PROGRAM FOR TEXTUAL CONCORDANCES AND STATISTICS

L. A. Ule (Rockwell Intern. Corp.)

Mar. 1973

JSC-17484

Literary research tool can provide concordance and many other textual statistics relating to authorship or sequence of composition. Mechanical text manipulation provides wide variety of text formats and conventions (such as upper case). This program is written in FORTRAN H for use on 1BM-360 computer.

### B73-10053

# AUTOMATED DATA MANAGEMENT INFORMATION SYSTEM

C. Blackstone, D. Dunn, E. Sullivan, J. Whitlock (GE), D. Buehler (GE), L. Pratt, T. Hoffiditz (Federal Elec. Corp.), J. Rose (Federal Elec. Corp.), M. Smithson (Federal Elec. Corp.), and J. Feëley (Federal Elec. Corp.)
Mar. 1974

KSC-10619

ADMIS stores and controls data and documents associated with manned space flight effort. System contains all data oriented toward a specific document; it is primary source of reports generated by the system. Each group of records is composed of one document record, one distribution record for each recipient of the document, and one summary record.

#### B73-10064

COMPUTER PROGRAM FOR TRANSIENT RESPONSE OF STRUCTURAL RINGS SUBJECTED TO FRAGMENT IMPACT R. W. -H. Wu (MIT) and E. A. Witmer (MIT)

May 1973

**LEWIS 11926** 

Mathematical optimization of containment/deflection system would save time, effort, and material as well as afford designer greater opportunity to investigate new ideas and variety of materials.

#### B73-10065

#### AEROTHERM CHARRING MATERIALS ABLATION COM-PUTER PROGRAM

C. A. Powars (Acurex Corp.) and R. M. Kendal (Acurex Corp.) May 1973

LEWIS-11854

Ablating-surface boundary conditions involve considerations of surface thermochemistry. Several programs may be used to provide surface thermochemistry information.

#### B73-10066

#### COMPUTER PROGRAM FOR PRELIMINARY DESIGN ANALYSIS OF AXIAL-FLOW TURBINES

A. J. Glassman Feb. 1973

LEWIS-11815

Computations are based on mean-diameter flow properties. For any given turbine, all stages, except the first, are specified to have same shape velocity diagram. First stage inlet flow is

#### B73-10067

axial.

#### A METHOD FOR ECONOMIC EVALUATION OF **DUNDANCY LEVELS FOR AEROSPACE SYSTEMS**

P. W. Hodge (Grumman Aerospace Corp.) and B. Frumkin. (Grumman Aerospace Corp.)

Feb. 1973 See also NASA-CR-128494

KSC-10754

Principle comprises primary cost impacts, such as operational delays, reflown missions due to aborts, procurement of equipment, and vehicle expansion to accommodate additional equipment. Economics are estimated by criterion which is relatively insensitive to impertinent cost factors.

#### B73-10073

#### MEDICAL INFORMATION MANAGEMENT SYSTEM AN AUTOMATED HOSPITAL INFORMATION SYSTEM

S. Alterescu, R. A. Schwarz (Federal City Coll.), and L. S. Collins (Federal City Coll.)

Mar. 1973

GSFC-11540

Flexible system of computer programs allows manipulation and retrieval of data related to patient care. System is written in version of FORTRAN developed for CDC-6600 computer.

#### B73-10083

## BINARY CONCATENATED CODING SYSTEM

L. G. Monford, Jr.

Mar. 1973

JSC-14082

Coding, using 3-bit binary words, is applicable to any measurement having integer scale up to 100. System using 6-bit data words can be expanded to read from 1 to 10,000, and 9-bit data words can increase range to 1,000,000. Code may be "read" directly by observation after memorizing simple listing of 9's and 10's.

#### B73-10087

#### PPUAS-PHOTOPEAK UNFOLDING AND SELF-SHIELDING **PROGRAM**

M. Taherzadeh Mar. 1973

NPO-13188

Computer code was developed to determine radioactive

emission rates of nuclear fuels. Code is basically written for two different source geometries; however, unfolding routine can be executed for other source geometries.

#### **B73-10088**

#### A GENERAL PURPOSE MANEUVER TURNS COMPUTER PROGRAM

G. I. Jaivin Mar. 1973

NPO-13213

Program computes turns required to point given spacecraftfixed vector in direction of given inertially-fixed vector. Program was written in FORTRAN V language for Univac-1108 computer.

#### B73-10091

#### A LINEAR CIRCUIT ANALYSIS PROGRAM WITH STIFF SYSTEMS CAPABILITY

C. H. Cook (Old Dominion Univ.) and S. J. Bavuso

Feb 1973

#### LANGLEY-11184

Several existing network analysis programs have been modified and combined to employ a variable topological approach to circuit translation. Efficient numerical integration techniques are used for transient analysis.

#### B73-10101

#### A GENERALIZED APPROACH TO COMPUTER SYNTHESIS OF DIGITAL HOLOGRAMS

W. A. Hopper (Sperry Rand Corp.)

Feb. 1973

M-FS-21973

Hologram is constructed by taking number of digitized sample points and blending them together to form "continuous" picture. New system selects better set of sample points resulting in improved hologram from same amount of information.

#### B73-10104

#### A SUMMARY REPORT ON SYSTEM EFFECTIVENESS AND OPTIMIZATION STUDY

O. L. Williamson (Federal Elec. Corp.), A. J. Rydberg (Federal Elec. Corp.), and G. Dorris (Federal Elec. Corp.) Mar. 1973

### M-FS-22126

Report treats optimization and effectiveness separately. Report illustrates example of dynamic programming solution to system optimization. Computer algorithm has been developed to solve effectiveness problem and is included in report.

#### EIGENVALUE ROUTINE BY STURM SEQUENCE METHOD K. K. Gupta

Mar. 1973 NPO-11805

Computer program has been generated for efficient solution of certain broad classes of eigenvalue problems. Procedure fully exploits banded nature of associated matrices and further enables user to compute either all roots or any specific ones desired. Special storage options enable storing only nonzero elements of associated main matrix of eigenvalue problem.

#### 873-10115

#### AUTOMATED SHELL THEORY FOR ROTATING STRUC-TURES (ASTROS)

B. J. Foster (Teledyne Brown Engineering) and J. M. Thomas (Teledyne Brown Engineering)

Mar. 1973

#### M-FS-21970

Computer program can be used to analyze any disk or shell of revolution of arbitrary cross section under inertial loads caused by rotation about shell axis and under various static loads, including thermal gradients. Geometric shapes incorporated in program are ellipsoidal, spherical, ogival, toroidal, conical, circular plate, cylindrical, and parabolic.

#### B73-10120

ASCENT CONTROL ANALYSIS FOR S-II DERIVATIVE

#### LAUNCH VEHICLES, DIGITAL COMPUTER PROGRAM

P. D. Andrews (Rockwell Intern. Corp.) May 1973

#### M-FS-24324

Model is used for analysis of the six degrees-of-freedom dynamics of general launch vehicle during atmospheric boost. Equations of motion are developed for rigid body and flat earth. Case may be started at any time beginning with ignition of stage and may be ended upon, or prior to, stage burnout. End of case may be at a specified time or based on propellant expended

#### GREMEX UPDATE (GODDARD RESEARCH ENGINEERING MANAGEMENT EXERCISE)

M. J. Vaccaro and M. F. Denault Jun. 1973

### GSFC-11512; GSFC-11515

Management simulation techniques offer training in management problems. Exercise was developed to provide experience in research and development project decision making from management rather than technological perspective. Program and documentation have been revised innumerable times in past. Described report is revised version as it exists to date.

# THEORY AND CALCULUS OF CUBICAL COMPLEXES

M. Perlman

Jun. 1973

### NPO-11491

Combination switching networks with multiple outputs may be represented by Boolean functions. Report has been prepared which describes derivation and use of extraction algorithm that may be adapted to simplification of such simultaneous Boolean functions.

#### B73-10166

# AN IMPROVED HOLOGRAPHIC RECORDING MEDIUM

R. A. Gange (RCA)

Jun. 1973 See also B73-10155

# M-FS-22532

Solid, linear chain hydrocarbons with molecular weight ranging from about 300 to 2000 can serve as long-lived recording medium in optical memory system. Suitable recording hydrocarbons include microcrystalline waxes and low molecular weight polymers or ethylene.

#### PRESSURE DROP AND PUMPING POWER FOR FLUID FLOW THROUGH ROUND TUBES

D. Jelinek (Rockwell Intern. Corp.)

Jun. 1973

### M-FS-24172

Program, written for Hewlett-Packard 9100A electronic desk computer provides convenient and immediate solution to problem of calculating pressure drop and fluid pumping power for flow through round tubes. Program was designed specifically for steady-state analysis and assumes laminar flow.

#### COMPUTER PROGRAM FOR THE DESIGN OF TOROIDAL TRANSFORMERS

J. A. Dayton, Jr.

Nov. 1973

Program relieves designer of most of the computational details. while he maintains control over most engineering decisions Number of specifications that must be supplied by user allows for considerable flexibility and for exercise of engineering judgment. Speed of program makes it possible to run many cases, economically determining effect of various parameter changes.

# A FAULT-TOLERANT CLOCK

W. P. Daley (MIT) and J. F. McKenna, Jr. (MIT)

Computers must operate correctly even though one or more off components have failed. Electronic clock has been designed to be insensitive to occurrence of faults; it is substantial advance over any known clock.

#### B73-10219

### VALIDITY TEST FOR LINEAR ERROR ANALYSIS

L. S. Diamant (TRW/ Inc.)

Aug. 1973

JSC-14378

To determine whether estimation process simulated by linear error analysis will converge, criterion has been developed based on extension of classical observability. Particular application of technique is with groups of batched navigation data where statistics of estimation errors are derived with classical minimumvariance methods

#### B73-10227

## SPECTRAL ANALYSIS PROGRAM (SAP)

D. M. Detchmendy (TRW, Inc.) and W. L. Hayden (TRW, Inc.) Aug. 1973

JSC-14310

Program eliminates or reduces time-consuming aspects of computation of power spectrum for high-frequency communication system. This program was written in FORTRAN IV for UNIVAC 1230 or 1108 computer.

#### B73-10231

#### COMPUTER PROGRAM FOR CALCULATION OF THER-MODYNAMIC AND TRANSPORT PROPERTIES OF COM-PLEX CHEMICAL SYSTEMS

R. A. Svehla and B. J. McBride

Nov. 1973

LEWIS-11997

Program performs calculations such as chemical equilibrium for assigned thermodynamic states, theoretical rocket performance for both equilibrium and frozen compositions during expansion, incident and reflected shock properties, and Chapman-Jouget detonation properties. Features include simplicity of input and storage of all thermodynamic and transport property data on master tape.

#### B73-10232

#### A COMPUTER PROGRAM FOR CALCULATING DESIGN AND OFF-DESIGN PERFORMANCE FOR TURBOJET AND TURBOFAN ENGINES

R. W. Koenig and L. H. Fishbach

Nov. 1973 See also B73-10245

LEWIS-12010

Program uses component performance maps to enable user to do analytical engine cycle calculations. Through scaling procedure, each of the component maps can be used to represent a family of maps. Either convergent or convergent-divergent nozzies may be used.

# B73-10233

#### COMPUTER PROGRAM TO DETERMINE THE IRROTATION-AL NOZZLE ADMITTANCE

W. A. Bell (Georgia Inst. of Tech.) and B. T. Zinn (Georgia Inst. of Tech.)

Nov. 1973

Irrotational nozzle admittance is the boundary condition that must be satisfied by combustor flow oscillations at nozzle entrance. Defined as the ratio of axial velocity perturbation to the pressure perturbation at nozzle entrance, nozzle admittance can also be used to determine whether wave motion in nozzle under consideration adds or removes energy from combustor oscillations.

### COMPUTER PROGRAM TO DETERMINE ROOTS OF POLYNOMIALS BY RATIO OF SUCCESSIVE DERIVATIVES

J. E. Crouse and C. W. Putt

Nov. 1973

LEWIS-11809

High speed computing finds roots of polynomials with real number coefficients. Ratios of successive polynomial derivatives approach provides accurate roots-of-polynomial computer programs with very high reliability. With derivative ratio method, root analysis can still be done even though the polynomial and its lower order derivatives cannot be evaluated with sufficient accuracy.

#### B73-10245

#### A COMPUTER PROGRAM FOR CALCULATING DESIGN AND OFF-DESIGN PERFORMANCE OF TWO- AND THREE-SPOOL TURBOFANS WITH AS MANY AS THREE NOZZLES

L. H. Fishbach and R. W. Koenig Nov. 1973 See also B73-10232 LEWIS-12011

Program uses component performance maps to enable user to do analytical engine cycle calculations. Either convergent or convergent-divergent nozzles may be used.

#### B73-10246

# COMPUTER PROGRAM FOR COMPRESSIBLE FLOW NETWORK ANALYSIS

M. E. Wilton (GE) and J. P. Murtaugh (GE) Dec. 1973

LEWIS-11859

Program solves problem of an arbitrarily connected one dimensional compressible flow network with pumping in the channels and momentum balancing at flow junctions. Program includes pressure drop calculations for impingement flow and flow through pin fin arrangements, as currently found in many air cooled turbine bucket and vane cooling configurations.

#### B73-10247

# COMPUTER PROGRAM TO COMPUTE BUCKLING LOADS OF SIMPLY SUPPORTED ANISOTROPIC PLATES

C. C. Chamis Dec. 1973 LEWIS-11961

Program handles several types of composites and several load conditions for each plate, both compressive or tensile membrane loads, and bending-stretching coupling via the concept of reduced bending rigidities. Vibration frequencies of homogeneous or layered anisotropic plates can be calculated by slightly modifying the program.

#### B73-10248

#### COMPUTER PROGRAM CALCULATES QUASI-ONE-DIMENSIONAL FLOW ACROSS FACE SEALS AND NARROW SLOTS

J. Zuk and P. J. Smith

Dec. 1973 See also B72-10114

LEWIS-11996

Program calculates mass and volume leakage across seal; mean friction factor; force; center of pressure; and distributions of pressure, temperature, density, friction parameter, velocity, and Mach number across seal for both laminar flow and turbulent flow regimes and for choked and subsonic flow.

#### B73-10256

# A NEW ALGORITHM FOR FINDING SURVIVAL COEFFICIENTS EMPLOYED IN RELIABILITY EQUATIONS

W. G. Bouricus (IBM) and B. J. Flehinger (IBM) Aug. 1973

M-FS-22296

Product reliabilities are predicted from past failure rates and reasonable estimate of future failure rates. Algorithm is used to calculate probability that product will function correctly. Algorithm sums the probabilities of each survival pattern and number of permutations for that pattern, over all possible ways in which product can survive.

#### B73-10263

# COMPUTER PROGRAM FOR PREDICTING SYMMETRIC JET MIXING OF COMPRESSIBLE FLOW IN JETS

G. B. Gilbert (Dynatech Corp.) and P. G. Hill (Queens Univ.)

Jun. 1973 See also NASA-CR-2251

ARC-10730

Finite-difference computer program has been developed for treating mixing of two parallel and compressible air streams; one of them may be supersonic. This development is restricted to symmetric jet mixing in which high-speed jet is located on axis of channel and no provision is made for blowing or suction along channel walls.

#### B73-10266

#### DIGITAL RANDOM-NUMBER GENERATOR

D. H. Brocker Jul. 1973

ARC-10096

For binary digit array of N bits, use N noise sources to feed N nonlinear operators; each flip-flop in digit array is set by nonlinear operator to reflect whether amplitude of generator which feeds it is above or below mean value of generated noise. Fixed-point uniform distribution random number generation method can also be used to generate random numbers with other than uniform distribution.

#### B73-10274

# MINIMUM SWITCHING NETWORK FOR GENERATING THE WEIGHT OF A BINARY VECTOR

T. O. Anderson Jun. 1973

NPO-11590

Vector is divided into three variable sections, and each section is processed by unary-to-binary decoder or adder. Resulting network performs on iterative collection process; all outputs of same kind are collected in same manner. In combination with simple comparator gates, weighting network can also be used as majority network.

#### B73-10296

# NODE-RECORDING METHOD FOR STIFFNESS MATRIX WAVEFRONT REDUCTION IN STRUCTURAL ANALYSIS

R. Levy Jul. 1973

NPO-11620

Method provides approach to automatic node relabeling that is consistent with requirements of wavefront concept. Specific applications are in analysis of aircraft, building structures, radar and surveillance structures, bridges, etc., or any other structure that is studied with aid of large and complex analytical model. Minimum growth sequencing is effective, rapid, and capable of producing economies.

### B73-10300

# HYBRID COORDINATE FORMULATION USED FOR THE DESIGN OF ATTITUDE CONTROL SYSTEMS FOR FLEXIBLE SPACECRAFT

P. W. Likins (UCLA) and E. E. Fleisher

Jul. 1973

NPO-11714

Formulation combines certain advantages of discrete and distributed coordinates by using both simultaneously. In report summarizing method, theoretical development is extended as necessary for applications of practical interest. Explicit analyses are presented in sufficient detail to establish utility in flexible space vehicle control system of hybrid coordinate formulation.

#### B73-10301

# STRUCTURAL ANALYSIS OF VISCOELASTIC MATERIALS UNDER THERMAL AND PRESSURE LOADING

J. C. Chen Jul. 1973

NPO-11727

Technique computes stresses resulting from axisymmetric transient thermal loading in circular solid-propellant grain section with circular ports. Propellant is assumed to be linear, thermal rheologically simple, viscoelastic material; material properties are represented by exponential series in time.

B73.10302

## ANALYSIS OF NONLINEAR VIBRATIONS OF CYLINDERS

J. C. Chen

Jul. 1973 See also JPL-SPS-37-62-VOL-3; JPL-SPS-37-64-

NPO-11736

In study of geometric nonlinear vibrations, infinite, long, thin-walled cylinder was analyzed under periodic, dynamic loading to demonstrate that some nonlinear phenomena cannot be obtained by straight-forward numerical solution methods. Results demonstrate that nonlinear phenomenon in large amplitude vibration traveling-wave condition can be predicted by analysis.

B73-10303

# USE OF MULTIVARIABLE ASYMPTOTIC EXPANSIONS IN A SATELLITE THEORY

S. S. Dallas

NPQ-11750

Initial conditions and perturbative force of satellite are restricted to yield motion of equatorial satellite about oblate body. In this manner, exact analytic solution exists and can be used as standard of comparison in numerical accuracy comparisons. Detailed numerical accuracy studies of uniformly valid asymptotic expansions were made.

B73-10307

# COMPUTER PROGRAM FOR THE PREDICTION OF RECRIENTATION FLOW DYNAMICS

W. S. Betts, Jr. (Gen. Dynamics Corp.)

Dec. 1973

LEWIS-11816

Program uses Navier-Stokes and continuity equations for incompressible, viscous fluid as the basic equations governing reorientation flow dynamics. Program can simulate curved as well as straight-walled boundaries; has ability to calculate both free-surface and confined flows; and can be used in either cylindrical or plane geometry.

B73-10309

#### PROGRAM FOR CALCULATING TOTAL-EFFICIENCY OF SPECIFIC-SPEED CHARACTERISTICS OF CENTRIFUGAL COMPRESSORS

M. R. Galvas (Army Air Mobility R. & D. Lab.)

Dec. 1973

LEWIS-12008

Program uses one-dimensional mean streamline analysis conducted at fixed stagnation conditions. Seven specific losses are calculated for each set of compressors geometric variables and inlet velocity diagram characteristics studied. Categories used as input information are compressor geometry, thermodynamic properties of working fluid, velocity diagram characteristics, and iteration limits.

B73-10322

### CHARACTERISTICS OF FORTRAN

W. R. Garner (Martin Marietta Corp.)

Oct. 1973

LANGLEY-11177

Publication is announced which outlines source program differences between IBM 360, UNIVAC 1108, CDC 6000, and Honeywell Series 32 computer systems. Publication can be guide to programmer in converting existing program from one computer system to another.

B73-10344

# LOW-COST CODING TECHNIQUES FOR DIGITAL FAULT DIAGNOSIS

A. Avizienis

Aug. 1973 See also JPL-TR-32-1476

NPO-11701

Published report discusses fault location properties of arithmetic codes. Criterian for effectiveness of given code is detection probability of local fault by application of checking algorithm to results of entire set of algorithms of processor. Report also presents analysis of arithmetic codes with low-cost check algorithm which possesses partial fault-location properties.

B73.10360

#### LOGICAL-FUNCTION GENERATOR

W. E. Sivertson, Jr.

Oct. 1973

XLA-05099

Apparatus and technique for generating logical functions and circuits have been developed. They provide aid in designing and constructing hardware to generate logic circuits, by defining circuit connections required to generate these functions. With this method, it is possible quickly and automatically to design logic, while eliminating involved and time-consuming mathematical manipulations.

B73-10362

# COMPUTER PROGRAM TO DETERMINE PRESSURE DISTRIBUTIONS AND FORCES ON BLUNT BODIES OF REVOLUTION

C. M. Jackson, Jr., W. C. Sawyer, and R. S. Smith

Oct. 1973

LANGLEY-11197

Program was written to include integration of surface pressure in order to obtain axial-force, normal-force, and pitching-moment coefficients. Program was written in CDC FORTRAN for the CDC-6600 computer system.

B73-10363

# COMPUTER PROGRAM FOR STRESS, VIBRATION, AND BUCKLING CHARACTERISTICS OF GENERAL SHELLS OF REVOLUTION

G. A. Cohen (Structures Res. Assoc.) and R. T. Haftka (Structures Res. Assoc.)

Sep. 1973

LANGLEY-11369

Structures Research Associates (SRA) system of programs is composed of six compatible computer programs for structural analyses of axisymmetric shell structures. Theories and methods upon which these programs are based are presented in documentation. They apply to a common structural model but analyze different modes of structural response.

873-10384

#### IMPROVED PROCEDURES FOR MASS MATRIX-REDUCTIONS IN EIGENVALUE SOLUTIONS

R. Levy

Sep. 1973

NPO-11619

Analytical models of three structures were used to test mass matrix-reduction schemes. Accuracy of four mode shapes and frequencies was tracked through successive mass matrix-reductions with diminishing numbers of indicator degrees of freedom. Results were consistently disappointing. Two new procedures were developed in attempt to improve accuracy.

B73-10418

# LOGISTICS HARDWARE AND SERVICES CONTROL SYSTEM

A. Koromilas (Boeing Co.), K. Miller (Boeing Co.), and T. Lamb (Boeing Co.)

Dec. 1973

KSC-10819

Software system permits onsite direct control of logistics operations, which include spare parts, initial installation, tool control, and repairable parts status and control, through all facets of operations. System integrates logistics actions and controls receipts, issues, loans, repairs, fabrications, and modifications and assets in predicting and allocating logistics parts and services effectively.

B73-10432

# MARSHALL SYSTEM FOR AEROSPACE SIMULATION (MARSYAS)

H. H. Tranboth (Computer Sciences Corp.), A. J. Ventre (Computer Sciences Corp.), W. L. McCollum (Computer Sciences Corp.), T. L. Balentine (Computer Sciences Corp.), and R. Savigny (Computer Sciences Corp.)

Dec. 1973

#### M-FS-22872

System is simple flexible language which can be coded by users unfamiliar with computer programming. It is designed for engineers with little experience in simulation, who desire to simulate large physical systems. User has ability to mix differential equations with diagrams in his model. With few exceptions, there is no rigid statement-operator structure within given module.

#### **B73-10443**

#### DYNAMIC NONLINEAR ANALYSIS OF SHELLS OF REVOLU-TION (DYNASOR II)

J. R. Tillerson (Tex. A&M Univ.) and W. E. Haisler (Tex. A&M Feb. 1974 See also B73-10446 JSC-14496 Univ.)

Equations of motion of shell are solved using Houbolt's numerical procedure with nonlinear terms being moved to right-hand side of equilibrium equations and treated as generalized loads. Program was written in FORTRAN IV for IBM 360 or CDC 6000 series computers.

#### B73-10444

# FREQUENCIES AND MODES FOR SHELLS OF REVOLUTION

L. B. McWhorter (Tex. A&M Univ.) and W. E. Haisler (Tex. A&M Univ.)

Feb. 1974 See also B73-10446

#### JSC-14497

Using stiffness matrix and lumped-mass representation specified number of natural frequencies are obtained using inverse iteration method. Mode shapes for each frequency are also obtained. These frequencies and mode shapes can be found in reasonable periods of computer time utilizing this code.

#### B73-10445

#### THE STATIC NONLINEAR ANALYSIS OF SHELLS OF REVOLUTION (SNASOR II)

J. A. Stricklin (Tex. A&M Univ.) and W. E. Haisler (Tex. A&M Univ.)

Feb. 1974 See also B73-10446

# JSC-14495

Utilizing stiffness matrices and supplying as input the loading and boundary conditions, program generates equilibrium equations for structure. Nonlinear strain energy terms result in pseudogeneralized forces which are combined with applied generalized forces. Resulting set of nonlinear algebraic equilibrium equations is solved by one of several methods.

#### B73-10446

#### STIFFNESS AND MASS MATRICES FOR SHELLS OF REVOLUTION (SAMMSOR II)

J. R. Tillerson (Tex. A&M Univ.) and W. E. Haisler (Tex. A&M Univ.)

Jan. 1974

#### JSC-14494

Utilizing element properties, structural stiffness and mass matrices are generated for as many as twenty harmonics and stored on magnetic tape. Matrices generated constitute input data to be used by other stiffness of revolution programs. Variety of boundary and loading conditions can be employed without having to create new mass and stiffness matrices for each case.

#### B73-10526

#### STEREOSCOPIC COMPUTER GRAPHICS DISPLAY SYSTEM H. H. Plott, Jr. (Auburn Univ.) and J. D. Irwin (Auburn Univ.) Mar. 1974

### M-FS-22322

Handbook was published on study which describes relative merits of two general-purpose, steroscopic display systems. Both systems are adaptable to most small data processing facilities and, with minimal hardware development, greatly enhance user ability to interact with computer and to interpret data output. Section also describes digital-to-analog converters designed for use with system.

# SUBJECT INDEX

Issue 14

#### 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., 873-10249, is located under and to the right of the title and is followed by a two-digit number, e.g., 01, which designates the subject category in which the entire entry can be found.

#### A

#### ARIATION

Aerotherm charring materials ablation computer program

LEWIS-11854

B73-10065 09

#### ARIATIVE MATERIALS

Fabrication techniques for polybenzimidazole composites ARC-10724 B73-10269 04

## ABRASION RESISTANCE

An improved technique for the use of zinc-rich coatings KSC-10766 B73-10149 04

#### ABSORRENTS

Gas chromotography of volatile organic compounds

JSC-14428

B73-10406 04

#### ABSORPTION

Carrier suppression device for a heterodyne gas analyzer B73-10381 03 ARC-10785

### **ABSORPTION SPECTRA**

Formaldehyde monitor for automobile exhausts

LANGLEY-11352

B73-10228 04

## ABSORPTION SPECTROSCOPY

Detection of nitric oxide pollution ARC-10709 B73-10018 03

#### ABSORPTIVITY

Microwave emission from granular silicates

#### NPO-11702

B73-10140 03

# ACCELERATION STRESSES (PHYSIOL-

Mathematical model for predicting human vertebral fracture B73-10033 05 ARC 10691

#### ACCELEROMETERS

New motor shaft angular accelerometer concept LANGLEY-11030 873-10119 02

Simultaneous processing of vibration test data

NPO-11616 B73-10139 01 Accelerometer-controlled automatic

braking system LÀNGLEY-11383

B73-10419 06

#### **ACCIDENT INVESTIGATION**

Liquid and gaseous oxygen safety review

LEWIS-12041

B73-10310 04

#### ACCIDENT PREVENTION

Electroshock protection circuit 873-10261 02 JSC-14222

#### ACOUSTIC ATTENUATION

Ultrasonic calibration device

LANGLEY-11435 B73-10420 03 Improved method for design of expansion-chamber mufflers with application to operational helicopter

LANGLEY-11548 B73-10471 03

#### ACOUSTIC EXCITATION

Mechanical impedance and acoustic mobility measurement techniques of specifving vibration environments B73-10059 06 M-FS-22016

#### **ACOUSTIC MEASUREMENTS**

Acoustic-emission signal-processing analog unit for locating flaws in large tanks M-FS-24424 B73-10325 06

Porous surface microphone for measuring acoustic signals in turbulent windetroame

ARC-10776

B73-10490 03

# **ACTUATORS**

Magnetic latching valve NPO-11790 B73-10026 06

Redundant screwiack

JSC-19200 B73-10070 07 Gas-operated actuator: A concept NPO-11369 B73-10133 03

Thermally responsive mechanical actuator

GSFC-11697 B73-10208 04

Flex flap ARC-10771 B73-10502 06

#### **ADDING CIRCUITS**

High speed direct-binary to binary-codeddecimal converter and scaler

KSC-10326 873-10281 02

#### ADHESION TESTS

An improved technique for the use of zinc-rich coatings KSC-10766 B73-10149 04

ADHESIVE BONDING

#### Holographic nondestructive testing of laminates

JSC-19107 B73-10108 04

# ADHESIVES

Vacuum-stripped silicone binder for thermal-control paint M-FS-21397 R73-10060-04 Semi-organic structural adhesive for aluminum

B73-10071 04 M-FS-21328

Effects of environmental exposure on cryogenic thermal insulation materials B73-10213 04

LEWIS-12007 Manufacture of large, lightweight para-

bolic antennas ARC-10741 B73-10375 08

Ultraviolet reflective coating

B73-10469 04 GSFC-11786

#### ADSORBENTS

Dynamic technique for measuring adsorption in a gas chromatograph JSC-14083 B73-10339 04

Estimating sorber capacity for multiple contaminants

LANGLEY-11056 B73-10424 04

#### ADSORPTION

Dynamic technique for measuring adsorption in a gas chromatograph, B73-10339 04 JSC-14083

Estimating sorber capacity for multiple contaminants

LANGLEY-11056 B73-10424 04

#### **AERIAL PHOTOGRAPHY**

Improved discrimination in photographic density contouring JSC-12588 B73-10441 03

# AERODYNAMIC CHARACTERISTICS

Improved method for aerodynamic analysis of wing-body-tail configurations in subsonic and supersonic flow

LANGLEY-11305 B73-10470 06

#### AERODYNAMIC NOISE

A theoretical study of aerodynamic noise generation

M-FS-24167 B73-10209 03

#### **AERODYNAMICS**

Ascent control analysis for S.II derivative launch vehicles, digital computer program M-FS-24324 B73-10120 09

A real time moving-scene holographic camera

M-FS-21087 B73-10421 03

## **AEROSOLS**

Particulate and aerosol detector LANGLEY-11434 R73-10357 04

AEROSPACE ENGINEERING

Marshall system for aerospace simulation (MARSYAS) B73-10432 09

M-FS-22672

#### AEROSPACE ENVIRONMENTS Effects of environmental exposure on

cryogenic thermal insulation materials LEWIS-12007 B73-10213 04

# **AEROSPACE SYSTEMS**

A method for economic evaluation of redundancy levels for aerospace systems KSC-10754 B73-10067 09

## **AEROTHERMOCHEMISTRY**

... Aerotherm charring materials ablation computer program

#### LEWIS-11854 B73-10065 09 **AEROTHERMODYNAMICS**

Analyses of unsteady entropic-flow pro-M-FS-24475 B73-10482 03

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AIR CONDITIONING	Theory and calculus of cubical com-	AMPLIFIERS Operational slope-limiting circuit
lon-tracer anemometer M-FS-21399 B73-10151 04	plexes NPO-11491 B73-10165 09	NPO-11773 B73-10346 01
A practical solar energy heating and	A new algorithm for finding survival	Meter circuit for tuning RF emplifiers
cooling system	coefficients employed in reliability equa-	NPO-11865 873-10389 02
M-FS-22563 B73-10156 05	tions	AMPLITUDE MODULATION
AIR FLOW	M-FS-22295 B73-10256 09	Two-carrier command modulation sys-
Smoke generator	Low-cost coding techniques for digital	NPO-11548 B73-10273 02
LANGLEY-11433 B73-10414 06 AIR POLLUTION	fault diagnosis NPO-11701 B73-10344 09	RF to digital converter
Detection of nitric oxide pollution	ALIGNMENT	JSC-14419 B73-10306 02
ARC-10709 B73-10018 03	Measurement of dimensions and align-	ANALOG CIRCUITS
Gas chromotography of volatile organic	ment with optical instruments	Time-based priority selection for analog circuits
compounds	M-FS-22168 B73-10061 06	M-FS-24242 B73-10154 02
JSC-14428 B73-10406 04	LEAPS (Laser electro-optical alignment	ANALOG COMPUTERS
AIR SAMPLING Particulate and aerosol detector	pole for surveying) GSFC-11262 B73-10122 02	Simultaneous processing of vibration test
LANGLEY-11434 B73-10357 04	ALPHA PARTICLES	data
AIRBORNE EQUIPMENT	Safety monitoring system for radioiso-	NPO-11616 B73-10139 01 ANALOG DATA
True airspeed measured by airborne laser	tope thermoelectric generators	Automatic PCM guard-band selector and
Doppler velocimeter	NPO-13285 B73-10352 02	calibrator
ARC-10763 B73-10506 02	ALPHANUMERIC CHARACTERS	KSC-10812 B73-10510 02
AIRBORNE/SPACEBORNE COMPUTERS Braid read-only memory	Alphanumeric character generator for oscilloscope	Isolated transfer of analog signals
NPO-11570 B73-10136 01	GSFC-11582 B73-10370 02	LANGLEY-11312 B73-10513 02
AIRCRAFT COMPARTMENTS	ALUMINUM	ANALOG TO DIGITAL CONVERTERS  Digital TV image enhancement system
Leak detector-measurer	Semi-organic structural adhesive for	GSFC-11256 873-10285 02
M-FS-21761 B73-10203 07	aluminum	Versatile, analog-to-digital, power-
AIRCRAFT DESIGN	M-FS-21328 873-10071 04	regulator controller
Radial honeycomb core ARC-10727 B73-10340 08	Fatigue of boron-aluminum composites bonds and joints	NPO-13178 B73-10467 02
ARC-10727 B73-10340 08 AIRCRAFT INSTRUMENTS	M-FS-22325 B73-10079 04	ANALYZERS
Reliable low-cost battery voltage indica-	Effects of environmental exposure on	High-temperature-radiation analyzer ARC-10565 B73-10017 03
tor for light aircraft and automobiles	cryogenic thermal insulation materials	Programmable random interval genera-
LEWIS-12020 B73-10249 01	LEWIS-12007 B73-10213 04	tor
AIRCRAFT NOISE	Applying high-emittance and solar-	JSC-14131 B73-10367 02
A theoretical study of aerodynamic noise generation	absorptance coating to aluminum LANGLEY-10151 B73-10238 04	Pseudotachometer for mobile metabolic
M-FS-24167 B73-10209 03	Manufacture of large, lightweight para-	analyzer
Improved method for design of expa-	bolic antennas	M-FS-22909 B73-10480 02 ANEMIAS
nsion-chamber mufflers with application to	ARC-10741 B73-10375 08	Improved design of electrophoretic equip-
operational helicopter	Grain refinement control in gas-shielded	ment for rapid sickle-cell-anemia screen-
LANGLEY-11548 B73-10471 03 AIRCRAFT PERFORMANCE	arc welding of aluminum tubing JSC-19095 B73-10508 O8	ing
A computer program for calculating	ALUMINUM ALLOYS	GSFC-11794 B73-10225 02
design and off-design performance for	Oxidation resistant, thoria-dispersed	ANEMOMETERS lon-tracer anemometer
turbojet and turbofan engines	nickel-chromium-aluminum alloy	M-FS-21399 B73-10151 04
LEWIS-12010 B73-10232 09	LEWIS-11541 B73-10077 04	ANGULAR ACCELERATION
AIRCRAFT STRUCTURES Lightweight inflatable material with low	Materials data handbooks on aluminum alloys	New motor shaft angular accelerometer
permeability	M-FS-22798 B73-10373 04	concept
LANGLEY-10928 B73-10400 04	Welding high-strength aluminum alloys	LANGLEY-11030 B73-10119 02
Improved method for aerodynamic analy-	M-FS-22918 B73-10481 04	ANISOTROPIC PLATES  Computer program to compute buckling
sis of wing-body-tail configurations in	X-ray opaque additive for inspection of	loads of simply supported anisotropic
subsonic and supersonic flow LANGLEY-11305 B73-10470 06	weld joints M-F\$-22896 B73-10528 O8	plates
Flex flap	M-FS-22896 B73-10528 08 ALUMINUM COATINGS	LEWIS-11961 B73-10247 09
ARC-10771 B73-10502 06	Selective coating for collecting solar	Annohing high amittanes and solar
AIRFOILS	energy on aluminum	Applying high-emittance and solar- absorptance coating to aluminum
Flex flap	M-FS-22562 B73-10527 04	LANGLEY-10151 B73-10238 04
	ALUMINUM OXIDES  Eutectic bonding of sapphire to sap-	ANTENNA ARRAYS
AIRFRAME MATERIALS A self-supporting strain transducer	phire	Microstrip antennas
LANGLEY-11263 B73-10201 06	GSFC-11577 873-10284 08	LANGLEY-11284 B73-10179 01
AIRSPEED	Improved masers for X-band and Ku	Scanning beacon locator system: A concept
True airspeed measured by airborne laser	band NPO-11437 B73-10293 02	JSC-12593 B73-10318 02
Doppler velocimeter	Single crystal tubes of beta alumina	Improved 135.6-MHz antenna
ARC-10763 B73-10506 02	LEWIS-11844 873-10316 04	ARC-10743 B73-10500 02
ALGAE	New concept in brazing metallic honey-	ANTENNA COMPONENTS
Dye laser remote sensing of marine plankton	comb panels	Combined diplexer and harmonic fifter
LANGLEY-11382 B73-10359 05	LANGLEY-10957 B73-10358 08 New standoffs provide high-reliability	LEWIS-12059 B73-10410 02
ALGORITHMS	component mounting for printed wiring	High-gain antenna with singly-curved
Computer-controlled vibration testing	boards	reflector
NPO-11612 B73-10138 02	LANGLEY-11176 B73-10512 01	NPO-11361 B73-10291 02
5 . 16 12 275 16 166 02	D4460E1-11170 B75-10312 01	

Multiple-reflection conical microwave		
		AUTOMATION
antenna NPO-11661 873-10299 02	Use of multivariable asymptotic expan-	Automatic microbial transfer
	sions in a satellite theory NPO-11750 B73-10303 09	LANGLEY-11354 B73-10229 05
Flared-cone turnstile antenna LANGLEY-10970 B73-10425 02	ATMOSPHERIC ELECTRICITY	AUTOMOBILES
Improved 135.6-MHz antenna	Measuring the electric field of a cloud	Brake waar warning device: A concept JSC-19157 B73-10123 02
ARC-10743 B73-10500 02	KSC-10731 B73-10074 02	System for measuring passenger reaction
ANTENNA RADIATION PATTERNS	Rocket borne instrument to measure	to transportation-vehicle vibration
RF antenna-pattern visual aids for field	electric fields inside electrified clouds KSC-10730 873-10176 03	LANGLEY-11353 B73-10436 05
use	ATMOSPHERIC TEMPERATURE	AUXILIARY PROPULSION
KSC-10821 B73-10426 02	Atmospheric temperature measurements	Satellite auxiliary propulsion systems
Means for mapping radiated fields and		NPO-11744 B73-10023 06
for measuring differential movement of		AVALANCHE DIODES
antenna elements NPO-13053 873-10452 02	ATMOSPHERIC TURBULENCE	Oven temperature controller for elec-
ANTENNAS	Laser system detects air turbulence M-FS-21244 B73-10210 03	tronic components GSFC-11466 B73-10052 02
Improved 135.6-MHz antenna	ATMOSPHERICS	Operational slope-limiting circuit
ARC-10743 873-10500 02	An automatic lightning detection and	NPO-11773 B73-10346 01
ANTHINFECTIVES AND ANTIBACTERI-	photographic system .	AXIAL COMPRESSION LOADS
ALS	KSC-10728 B73-10043 02	Fatigue testing device
Chemical pretreatment for the distillation	Measuring the electric field of a cloud	LANGLEY-10426 B73-10047-07
of urine	KSC-10731 B73-10074 02 ATOMIZERS	AXIAL FLOW TURBINES
JSC-14225 B73-10224 04	Atomizens Air-atomizing splash-cone fuel nozzle	Computer program for preliminary design
ANTISEPTICS	reduces pollutant emissions from turbojet	analysis of axial-flow turbines
Self-sterilizing polymers M-FS-22054 873-10090 04	engines	LEWIS-11815 B73-10066 09
Chemical pretreatment for the distillation	LEWIS-11918 873-10200 06	AXIAL LOADS
of urine	ATOMIZING	Improved fiberglass-to-metal joint pro- duces lighter stronger fiberglass strut
JSC-14225 B73-10224 04	Experimental verification of computer	LEWIS-11661 B73-10258 08
ANVILS	spray-combustion models . ARC-10689 B73-10031 03	AXISYMMETRIC BODIES
Apparatus for measuring electrical prop-	ATTITUDE CONTROL	Computer program for stress, vibration,
erties of materials	Solar aspect determination system	and buckling characteristics of general
NPO-11749 B73-10025 03	GSFC-11444 B73-10129 02	shells of revolution
APPLICATIONS OF MATHEMATICS	Hybrid coordinate formulation used for	LANGLEY-11369 B73-10363 09
A nonlinear-coherence receiver NPO-11921 873-10144 02	the design of attitude control systems for	AXISYMMETRIC FLOW
	HONDID SPECCIOIT	Computer program for the prediction of
ARC SPRAYING High-friction mechanical grips		reorientation flow dynamics LEWIS-11816 873-10307 09
JSC-19260 B73-10234 06	Combined sun-acquisition and sun gate- sensor system for spacecraft attitude	
ARC WELDING	control	LEAPS (Laser electro-optical alignment
Grain refinement control in gas-shielded	NPO-13051 B73-10460 02	pale for surveying)
arc welding of aluminum tubing	Solid-state controller	GSFC-11262 B73-10122 02
JSC-19095 873-10508 08		· · · · · · · · · · · · · · · · · · ·
ARGON LASERS	AUSTENITIC STAINLESS STEELS	_
Laser addressed holographic memory system	Materials data handbooks on stainless steels	B
	atons .	
	. M-FS-22797 873-10397 04	
M-FS-22565 873-10155 03		BACTERIA
		BACTERIA Rapid detection of bacteria in foods and
M-FS-22565 873-10155 03 Laser-actuated holographic storage de-	AUTOCLAVING Autoclave heat treatment for prealloyed powder products	Rapid detection of bacteria in foods and biological fluids
M-FS-22565 873-10155 03 Laser-actuated holographic storage de- vice M-FS-22768 873-10423 03 ARM (ANATOMY)	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05
M-FS-22585 873-10155 03 Laser-actuated holographic storage de- vice M-FS-22788 873-10423 03 ARM (ANATOMY) Master/slave manipulator system	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04 AUTOMATIC CONTROL	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor
M-FS-22585 673-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04 AUTOMATIC CONTROL Automatic speed control of highway	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05
M-FS-22585 673-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04 AUTOMATIC CONTROL Automatic speed control of highway traffic	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES
M-FS-22585 673-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04 AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers
M-FS-22585 673-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04 AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers
M-FS-22585 673-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCI transport of ele-	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04
M-FS-22585 673-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS	AUTOCLAVING  Autoclave heat treatment for prealloyed powder products  LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL  Automatic speed control of highway traffic  M-FS-21791 B73-10100 02  Automatic quadrature control and measuring system  M-FS-21660 B73-10127 02  Automatic focus control for facsimile	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 873-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05
M-FS-22585 673-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An economical arterial-pulse-wave trans-	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04 AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system M-FS-21660 B73-10127 02 Automatic focus control for facsimile camera	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY
M-FS-22585 873-10155 03 Laser-actuated holographic storage device M-FS-22788 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An aconomical arterial-pulse-wave transducer	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system M-FS-21660 B73-10127 02 Automatic focus control for facsimile camera LANGLEY-11213 B73-10361 02	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY Automatic microbial transfer
M-FS-22585 873-10155 03 Laser-actuated holographic storage device M-FS-22788 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An economical arterial-pulse-wave transducer GSFC-11531 873-10046 05	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system M-FS-21660 B73-10127 02 Automatic focus control for facsimile camera LANGLEY-11213 873-10361 02 Accelerometer-controlled automatic	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY Automatic microbial transfer LANGLEY-11354 B73-10229 05
M-FS-22585 873-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An economical arterial-pulse-wave transducer GSFC-11531 873-10046 05 ASSAYING	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system M-FS-21660 B73-10127 02 Automatic focus control for, facsimile camera LANGLEY-11213 B73-10361 02 Accelerometer-controlled automatic braking system	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY Automatic microbial transfer LANGLEY-11354 B73-10229 05 Measuring micro-organism gas produc-
M-FS-22585 873-10155 03 Laser-actuated holographic storage device M-FS-22788 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An economical arterial-pulse-wave transducer GSFC-11531 873-10046 05	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL Automatic speed control of highway traffic. M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system M-FS-21660 B73-10127 02 Automatic focus control for: facsimile camera LANGLEY-11213 B73-10361 02 Accelerometer-controlled automatic braking system LANGLEY-11383 B73-10419 06	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY Automatic microbial transfer LANGLEY-11354 B73-10229 05 Measuring micro-organism gas production
M-FS-22585 873-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An economical arterial-pulse-wave transducer GSFC-11531 873-10046 05 ASSAYING Automated method for study of drug	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04 AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system M-FS-21660 B73-10127 02 Automatic focus control for, facsimile camera LANGLEY-11213 B73-10361 02 Accelerometer-controlled automatic braking system LANGLEY-11383 B73-10419 06 AUTOMATIC FREQUENCY CONTROL	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY Automatic microbial transfer LANGLEY-11354 B73-10229 05 Measuring micro-organism gas production
M-FS-22585 673-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An economical arterial-pulse-wave transducer GSFC-11531 873-10046 05 Automated method for study of drug metabolism	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system M-FS-21660 B73-10127 02 Automatic focus control for facsimile camera LANGLEY-11213 B73-10361 02 Accelerometer-controlled automatic braking system LANGLEY-11383 B73-10419 06  AUTOMATIC FREQUENCY CONTROL Frequency shifting with a solid-state switching capacitor	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY Automatic microbial transfer LANGLEY-11354 B73-10229 05 Measuring micro-organism gas production LANGLEY-11326 B73-10241 05
M-FS-22585 873-10155 03 Laser-actuated holographic storage device M-FS-22788 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An economical arterial-pulse-wave transducer GSFC-11531 873-10046 05 ASSAYING Automated method for study of drug metabolism ARC-10469 873-10030 04 ASTIGMATISM Fine guidance for a spaceborne tele-	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system M-FS-21660 B73-10127 02 Automatic focus control for facsimile camera LANGLEY-11213 B73-10361 02 Accelerometer-controlled automatic braking system LANGLEY-11383 B73-10419 06  AUTOMATIC FREQUENCY CONTROL Frequency shifting with a solid-state switching capacitor HQ-10812 B73-10259 01	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY Automatic microbial transfer LANGLEY-11354 B73-10229 05 Measuring micro-organism gas production LANGLEY-11326 B73-10241 05 Biodetection grinder M-FS-22833 B73-10474 05
M-FS-22585 873-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An economical arterial-pulse-wave transducer GSFC-11531 873-10046 05 ASSAYING Automated method for study of drug metabolism ARC-10469 873-10030 04 ASTIGMATISM Fine guidance for a spaceborne telescope	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL Automatic speed control of highway traffic. M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system M-FS-21660 B73-10127 02 Automatic focus control for: facsimile camera LANGLEY-11213 B73-10361 02 Accelerometer-controlled automatic braking system LANGLEY-11383 B73-10419 06 AUTOMATIC FREQUENCY CONTROL Frequency shifting with a solid-state switching capacitor HQ-10812 B73-10259 01 AUTOMATIC TEST EQUIPMENT	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY Automatic microbial transfer LANGLEY-11354 B73-10229 05 Measuring micro-organism gas production LANGLEY-11326 B73-10241 05 Biodetection grinder M-FS-22833 B73-10474 05 Detecting and measuring metabolic byproducts by electrochemical sensing
M-FS-22585 673-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An economical arterial-pulse-wave transducer GSFC-11531 873-10046 05 ASSAYING Automated method for study of drug metabolism ARC-10469 873-10030 04 ASTIGMATISM Fine guidance for a spaceborne telescope GSFC-11487 873-10468 03	AUTOCLAVING  Autoclave heat treatment for prealloyed powder products  LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL  Automatic speed control of highway traffic.  M-FS-21791 B73-10100 02  Automatic quadrature control and measuring system  M-FS-21660 B73-10127 02  Automatic focus control for: facsimile camera  LANGLEY-11213 B73-10361 02  Accelerometer-controlled automatic braking system  LANGLEY-11383 B73-10419 06  AUTOMATIC FREQUENCY CONTROL  Frequency shifting with a solid-state switching capacitor  HQ-10812 B73-10259 01  AUTOMATIC TEST EQUIPMENT  An ampere-hour meter for batteries	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY Automatic microbial transfer LANGLEY-11354 B73-10229 05 Measuring micro-organism gas production LANGLEY-11326 B73-10241 05 Biodetection grinder M-FS-22833 B73-10474 05 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05
M-FS-22585 873-10155 03 Laser-actuated holographic storage device M-FS-22788 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An economical arterial-pulse-wave transducer GSFC-11531 873-10046 05 ASSAYING Automated method for study of drug metabolism ARC-10469 873-10030 04 ASTIGMATISM Fine guidance for a spaceborne telescope GSFC-11487 873-10468 03	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system M-FS-21660 B73-10127 02 Automatic focus control for, facsimile camera LANGLEY-11213 B73-10361 02 Accelerometer-controlled automatic braking system LANGLEY-11383 B73-10419 06  AUTOMATIC FREQUENCY CONTROL Frequency shifting with a solid-state switching capacitor HQ-10812 B73-10259 01  AUTOMATIC TEST EQUIPMENT An ampere-hour meter for batteries M-FS-22067 B73-10118 02	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY Automatic microbial transfer LANGLEY-11354 B73-10229 05 Measuring micro-organism gas production LANGLEY-11326 B73-10241 05 Biodetection grinder M-FS-22833 B73-10474 05 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 BAFFLES
M-FS-22585 673-10155 03 Laser-actuated holographic storage device M-FS-22768 873-10423 03 ARM (ANATOMY) Master/slave manipulator system ARC-10756 873-10496 06 ARSENIC COMPOUNDS Vapor phase growth of group 3, 4, and 5 compounds by HCl transport of elements LANGLEY-11144 873-10056 04 ARTERIOSCLEROSIS An economical arterial-pulse-wave transducer GSFC-11531 873-10046 05 ASSAYING Automated method for study of drug metabolism ARC-10469 873-10030 04 ASTIGMATISM Fine guidance for a spaceborne telescope GSFC-11487 873-10468 03	AUTOCLAVING Autoclave heat treatment for prealloyed powder products LEWIS-11953 B73-10172 04  AUTOMATIC CONTROL Automatic speed control of highway traffic M-FS-21791 B73-10100 02 Automatic quadrature control and measuring system M-FS-21660 B73-10127 02 Automatic focus control for, facsimile camera LANGLEY-11213 B73-10361 02 Accelerometer-controlled automatic braking system LANGLEY-11383 B73-10419 06  AUTOMATIC FREQUENCY CONTROL Frequency shifting with a solid-state switching capacitor HQ-10812 B73-10259 01  AUTOMATIC TEST EQUIPMENT An ampere-hour meter for batteries M-FS-22067 B73-10118 02	Rapid detection of bacteria in foods and biological fluids GSFC-11738 B73-10045 05 Bacterial contamination monitor GSFC-10879 B73-10222 05 BACTERICIDES Self-sterilizing polymers M-FS-22054 B73-10090 04 Application of biological filters in water treatment systems JSC-14226 B73-10404 05 BACTERIOLOGY Automatic microbial transfer LANGLEY-11354 B73-10229 05 Measuring micro-organism gas production LANGLEY-11326 B73-10241 05 Biodetection grinder M-FS-22833 B73-10474 05 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05

BAGS	BINARY DATA	BLUNT BODIES
industrial filter bags cleaned by high-	Minimal hardware, binary sequence	Computer program to determine pressure
frequency vibration: A concept	pseudonoise generator and detector NPO-11406 B73-10292 01	distributions and forces on blunt bodies of revolution
M-FS-24445 B73-10398 06 BALL BEARINGS		LANGLEY-11197 B73-10362 09
Carbide factor predicts rolling-element	Processor for high-density digital tape- recorded signals	BODIES OF REVOLUTION
bearing fatigue life	NPO-11399 B73-10354 02	Computer program to determine pressure
LEWIS-11940 B73-10008 07	BINARY DIGITS	distributions and forces on blunt bodies of
Heated bimetal strip prevents damage	Minimum switching network for genera-	revolution
of bearings by vibration NPO-11870 B73-10348 06	ting the weight of a binary vector	LANGLEY-11197 B73-10362 09 Computer program for stress, vibration,
BALLS	NPO-11590 B73-10274 09	and buckling characteristics of general
Thermally actuated valve	BINARY FLUIDS Fluidic device for measuring constituent	shells of revolution
NPO-11846 B73-10347 06	masses of a flowing binary gas mixture	LANGLEY-11369 B73-10363 09
BALSA	LEWIS-11995 B73-10230 06	BODY FLUIDS
Balsa wood as an energy dissipator NPO-11839 873-10388 04	BINARY TO DECIMAL CONVERTERS	Rapid detection of bacteria in foods and biological fluids
BANDPASS FILTERS	High speed direct-binary to binary-coded-	GSFC-11738 B73-10045 05
Digital notch filter	decimal converter and scaler KSC-10326 B73-10281 02	BODY TEMPERATURE
KSC-10182 B73-10112 02	BINOCULAR VISION	Microminiaturized, biopotential condi-
Real time statistical analysis of acoustic	Miniaturized haploscope for testing bin-	tioning system (MBCS)
emission signals for flaw monitoring sys- tems	ocular vision	JSC-14180 B73-10236 02
M-FS-24402 B73-10212 03	ARC-10759 B73-10492 05	Flexible temperature probe for biological systems
Combined diplexer and harmonic filter	BINOCULARS	ARC-10796 B73-10498 05
LEWIS-12059 B73-10410 02	Miniaturized haploscope for testing bin-	BODY-WING AND TAIL CONFIGURA-
BARIUM COMPOUNDS	ocular vision ARC-10759 B73-10492 05	TIONS
Ultraviolet reflective coating GSFC-11786 873-10469 04		Improved method for aerodynamic analy-
BATHING	Automated method for study of drug	sis of wing-body-tail configurations in subsonic and supersonic flow
New system for bathing bedridden pa-	metabolism	LANGLEY-11305 B73-10470 06
tients	ARC-10469 B73-10030 04	BOLTS
ARC-10745 B73-10272 05	Zeta potential control for electrophoresis	Metallic composites as high-temperature
BATTERY CHARGERS An ampere-hour meter for batteries	cells M-FS-22333 B73-10260 04	fasteners
M-FS-22067 B73-10118 02	BIOINSTRUMENTATION	M-FS-22438 B73-10081 04
Rechargeable, silver-zinc battery condi-	Flexible electroencephalogram (EEG)	Fatigue of boron-aluminum composites
tioner/monitor unit and state-of-charge	headband	bonds and joints
indicator M-FS-22835 873-10486 02	LANGLEY-10927 B73-10048 05	M-FS-22325 B73-10079 04
M-FS-22835 B73-10486 02 BEARING (DIRECTION)	Microminiaturized, biopotential condit-	Self-adjusting assembly jig
LEAPS (Laser electro-optical alignment	ioning system (MBCS) JSC-14180 B73-10236 02	LEWIS-12034 B73-10250 07
pole for surveying)	Electroshock protection circuit	Eutectic bonding of sapphire to sap-
GSFC-11262 B73-10122 02	JSC-14222 B73-10261 02	phire GSFC-11577 B73-10284 08
BEARINGS \ An electric motor with magnetic bear-	BIOLOGY	Materials data handbook on titanium
ings: A concept	Biodetection grinder	6AI-4V
XGS-07805 B73-10304 01	M-FS-22833 B73-10474 05	M-FS-22796 B73-10372 04
BEDS (PROCESS ENGINEERING)	BIOMEDICAL DATA  Bipotential monitoring with inexpensive	Materials data handbooks on aluminum
Continuous catalytic decomposition of	office-type cassette recorders	alloys
methane ARC-10339 B73-10016 03	M-FS-22566 873-10167 02	M-F5-22798 B73-10373 04
BELLOWS B73-10016 03	BIOMETRICS	Manufacture of large, lightweight para- bolic antennas
Gas-operated actuator: A concept	A new dry biomedical electrode	ARC-10741 B73-10375 08
NPO-11369 B73-10133 03	JSC-14321 B73-10146 02	Adhesive coating eliminated in new
BELTS	BIOTELEMETRY Microminiaturized, biopotential condi-	honeycomb-core fabrication process
Instrument for measuring thin-film belt	tioning system (MBCS)	LANGLEY-11134 B73-10439 08
lengths NPO-13149 873-10455 06	JSC-14180 B73-10236 02	Strain arrestor plate for mounting rigid insulating tiles
BENDING BY3-10455 08	Eight-channel telephone telemetry sy-	JSC-14182 873-10465 06
Beam lead forming tool	stem P22 10220 05	BOOLEAN FUNCTIONS
M-FS-22133 B73-10098 07	JSC-14452 B73-10320 05 BIREFRINGENCE	Theory and calculus of cubical com-
BENDING FATIGUE	Light-direction sensor based on birefrin-	plexes
Carbide factor predicts rolling-element bearing fatique life	gency	NPO-11491 B73-10165 09
LEWIS-11940 B73-10008 07	NPO-11201 B73-10131 03	BORON  Large boron- spoxy filament-wound
BERYLLIUM	BISMUTH TELLURIDES  Thin film thermoelectric devices as ther-	pressure vessels
GaAs transistors formed by Be or Mg	mal control coatings: A study	NPO-11900 873-10038 08
ion implantation	M-FS-21384 B73-10153 04	Fatigue of boron-aluminum composites
LANGLEY-11204 B73-10442 01	BIT SYNCHRONIZATION	bonds and joints
BIMETALS Heated himetal strip provents demand	All-digital phase-lock loops for noise-free	M-FS-22325 B73-10079 04
Heated bimetal strip prevents damage of bearings by vibration	signals NPO-11914 873-10350 01	Boron- epoxy tubular structure mem- bers
NPO-11870 873-10348 06	8LOOD 873-10350 01	ARC-10737 B73-10265 08
BINARY CODES	Gas chromotography of volatile organic	
Binary concatenated coding system		
	compounds	Low cost uniform heat source
JSC-14082 B73-10083 09		Low cost uniform heat source LEWIS-11903 B73-10011 02

BRAKES (FOR ARRESTING MOTION)	CAMERA SHUTTERS	CARTRIDGES
Accelerometer-controlled automatic braking system	A high-speed spectrograph shutter	Catalytic reactor with disposable car-
LANGLEY-11383 B73-10419 06	HQ-10635 B73-10368 01	tridge
BRAKING	An automatic lightning detection and	ARC-10747 873-10376 04
Accelerometer-controlled automatic	photographic system	CASSEGRAIN ANTENNAS
braking system	KSC-10728 B73-10043 02	Low-noise microwave polarimeter NPO-11512 873-10134 02
LANGLEY-11383 B73-10419 06	Automatic focus control for facsimile	High-gain antenna with singly-curved
Variable-frequency inverter controls tor-	camera LANGLEY-11213 B73-10361 02	reflector
que, speed, and braking in ac induction motors	LANGLEY-11213 B73-10361 02 Motion compensator for holographic	NPO-11361 B73-10291 02
M-FS-22088 B73-10525 02	motion picture camera	CASTING
BRAZING	M-FS-22517 873-10434 03	Refractory inserts used to form cooling
Diffusion welding tool	Photography of random motion with a	passages in cast superalloy turbine vanes
LEWIS-11807 B73-10072 08	holographic camera M-FS-22537 873-10435-03	LEWIS-11169 B73-10013 08
Fatigue of boron-aluminum composites	M-FS-22537 873-10435 03 CAPACITANCE SWITCHES	Method for casting polyethylene pipe ARC-10706 B73-10032 08
/ bonds and joints M-FS-22325 873-10079 04	Frequency shifting with a solid-state	Metallic composites as high-temperature
Braze alloys for high temperature ser-	switching capacitor	fasteners
vice	HQ-10812 B73-10259 01	M-FS-22438 B73-10081,04
: LEWIS-11374 B73-10205 06	CAPACITORS	CATALYSTS
Self-adjusting assembly jig	Compact 20-kiloampere pulse-forming- network capacitor bank	Continuous catalytic decomposition of
LEWIS-12034 B73-10250 07	LEWIS-12009 B73-10171 01	methane ARC-10339 873-10016 03
New concept in brazing metallic honey-	Complementary MOS four-phase logic	ARC-10339 873-10016 03 CATALYTIC ACTIVITY
LANGLEY-10957 873-10358 08	circuits .	Catalytic reactor with disposable car-
BREATHING APPARATUS	JSC-14240 B73-10174 01	tridge
Artificial atmosphere control system	Carbide factor predicts rolling-element	ARC-10747 ' B73-10376 04
M-FS-22159 B73-10089 05	bearing fatigue life	CAVITIES
BROADBAND AMPLIFIERS	LEWIS-11940 B73-10008 07	SRC seal testing
Peak-holding circuit for extremely narrow	CARBON DIOXIDE	M-FS-22426 B73-10199 01
pulses ·	Catalytic reactor with disposable car-	COMPUTERS  Computer program for stress, vibration,
JSC-14129 B73-10317 02 BUCKLING	tridge ARC-10747 B73-10376 04	and buckling characteristics of general
Computer program to compute buckling	ARC-10747 B73-10376 04 Computer system for monitoring radio-	shells of revolution
loads of simply supported anisotropic	repirometry data	LANGLEY-11369 B73-10363 09
plates	ARC-10784 B73-10494 05	CDC 1604 COMPUTER
LEWIS-11961 B73-10247 09	CARBON DIOXIDE LASERS	Aerotherm charring materials ablation
BUS CONDUCTORS	Laser system detects air turbulence M-FS-21244 B73-10210 03	computer program LEWIS-11854 B73-10065 09
Digital data command bus NPO-11637 B73-10035 01	M-FS-21244 B73-10210 03 High-sensitivity receiver for CO2 laser	CDC 6000 SERIES COMPUTERS
B/3-10035 ()	communications	Theoretical prediction of interference
• • •	GSFC-11455 873-10223 02	loading on aircraft stores: Part II
C	True airspeed measured by airborne laser	Supersonic speeds
	Doppler velocimeter ARC-10763 B73-10506 02	LANGLEY-11250 873-10183 06
CABLES (ROPES)	ARC-10763 B73-10506-02 CARBON FIBERS	Theoretical prediction of interference loading on aircraft stores: Part I - Subsonic
Emergency-escape device	Preparation of prepreg graphite tape with	speeds
M-FS-22720 B73-10369 07	insoluble polymer	LANGLEY-11249 B73-10184 06
CALCULATORS	JSC-14313 873-10084 04	Characteristics of FORTRAN
Small portable speed calculator MFFS-22638 873-10329 07	Fabrication techniques for polybenzimid-	LANGLEY-11177 873-10322 09
CALCULUS	azole composites ARC-10724 873-10269 04	Dynamic nonlinear analysis of shells of
Theory and calculus of cubical com-	Millimeter-wave antenna system	revolution (DYNASOR II)  JSC-14496 B73-10443 09
plexes	GSFC-10949 B73-10333 01	Frequencies and modes for shells of
NPO-11491 B73-10165 09 CALIBRATING	CARBON 14	revolution (FAMSOR)
Traveling digital counters for microme-	Computer system for monitoring radio-	JSC-14497 B73-10444 09
ters	repirometry data	The static nonlinear analysis of shells
ters LANGLEY-11258 873-10042 06	repirometry data ARC-10784 873-10494 05	The static nonlinear analysis of shells of revolution (SNASOR II)
ters LANGLEY-11258 873-10042 06 Measurement of dimensions and align-	repirometry data ARC-10784 B73-10494 05 CARBONYL COMPOUNDS	The static nonlinear analysis of shells of revolution (SNASOR II) JSC-14495 B73-10445 09
ters LANGLEY-11258 B73-10042 06 Measurement of dimensions and alignment with optical instruments	repirometry data ARC-10784 B73-10494 05 CARBONYL COMPOUNDS Reductive cleavage of the peptide bond	The static nonlinear analysis of shells of revolution (SNASOR II)  JSC-14495  873-10445 09  Stiffness and mass matrices for shells
ters LANGLEY-11258 B73-10042 06 Measurement of dimensions and alignment with optical instruments M-FS-22168 B73-10061 06	repirometry data ARC-10784 B73-10494 05 CARBONYL COMPOUNDS Reductive cleavage of the peptide bond	The static nonlinear analysis of shells of revolution (SNASOR II)  JSC-14495  Stiffness and mass matrices for shells of revolution (SAMMSOR II)
ters LANGLEY-11258 B73-10042 06 Measurement of dimensions and alignment with optical instruments	repirometry data ARC-10784 873-10494 05 CARBONYL COMPOUNDS Reductive cleavage of the peptide bond LRL-10026 873-10194 04 CARDIOGRAPHY Improved format for radiocardiographic	The static nonlinear analysis of shells of revolution (SNASOR II)  JSC-14495  Stiffness and mass matrices for shells of revolution (SAMMSOR II)  JSC-14494  B73-10446 09  Improved method for design of expan-
ters LANGLEY-11258 B73-10042 06 Measurement of dimensions and alignment with optical instruments M-FS-22168 B73-10061 06 Calibration of dissolved oxygen standard for analysis with methylene blue M-FS-22353 B73-10147 04	repirometry data ARC-10784 873-10494 05 CARBONYL COMPOUNDS Reductive cleavage of the peptide bond LRL-10026 873-10194 04 CARDIOGRAPHY Improved format for radiocardiographic data	The static nonlinear analysis of shells of revolution (SNASOR II)  JSC-14495  Stiffness and mass matrices for shells of revolution (SAMMSOR II)  JSC-14494  Improved method for design of expansion-chamber mufflers with application to
ters LANGLEY-11258 B73-10042 06 Measurement of dimensions and alignment with optical instruments M-FS-22168 B73-10061 06 Calibration of dissolved oxygen standard for analysis with methylene blue M-FS-22353 B73-10147 04 Ultrasonic calibration device	repirometry data ARC-10784 873-10494 05 CARBONYL COMPOUNDS Reductive cleavage of the peptide bond LRL-10026 873-10194 04 CARDIOGRAPHY Improved format for radiocardiographic data ARC-10742 873-10270 05	The static nonlinear analysis of shells of revolution (SNASOR II)  JSC-14495  Stiffness and mass matrices for shells of revolution (SAMMSOR II)  JSC-14494  Improved method for design of expansion-chamber mufflers with application to operational helicopter
ters  LANGLEY-11258 B73-10042 06  Measurement of dimensions and alignment with optical instruments  M-FS-22168 B73-10061 06  Calibration of dissolved oxygen standard for analysis with methylene blue  M-FS-22353 B73-10147 04  Ultrasonic calibration device  LANGLEY-11435 B73-10420 03	repirometry data ARC-10784 873-10494 05 CARBONYL COMPOUNDS Reductive cleavage of the peptide bond LRL-10026 B73-10194 04 CARDIOGRAPHY Improved format for radiocardiographic data ARC-10742 B73-10270 05 CARDIOLOGY	The static nonlinear analysis of shells of revolution (SNASOR II)  JSC-14495  Stiffness and mass matrices for shells of revolution (SAMMSOR II)  JSC-14494  B73-10446 09  Improved method for design of expansion-chamber mufflers with application to operational helicopter  LANGLEY-11548  B73-10471 03
ters  LANGLEY-11258 B73-10042 06  Measurement of dimensions and alignment with optical instruments  M-FS-22168 B73-10061 06  Calibration of dissolved oxygen standard for analysis with methylene blue  M-FS-22353 B73-10147 04  Ultrasonic calibration device  LANGLEY-11435 B73-10420 03  Automatic PCM guard-band selector and	repirometry data ARC-10784 873-10494 05 CARBONYL COMPOUNDS Reductive cleavage of the peptide bond LRL-10026 873-10194 04 CARDIOGRAPHY Improved format for radiocardiographic data ARC-10742 873-10270 05	The static nonlinear analysis of shells of revolution (SNASOR II)  JSC-14495  Stiffness and mass matrices for shells of revolution (SAMMSOR II)  JSC-14494  B73-10446 09  Improved method for design of expansion-chamber mufflers with application to operational helicopter  LANGLEY-11548  CDC 6400 COMPUTER
ters  LANGLEY-11258 B73-10042 06  Measurement of dimensions and alignment with optical instruments  M-FS-22168 B73-10061 06  Calibration of dissolved oxygen standard for analysis with methylene blue  M-FS-22353 B73-10147 04  Ultrasonic calibration device  LANGLEY-11435 B73-10420 03	repirometry data ARC-10784 873-10494 05  CARBONYL COMPOUNDS Reductive cleavage of the peptide bond LRL-10026 873-10194 04  CARDIOGRAPHY Improved format for radiocardiographic data ARC-10742 873-10270 05  CARDIOLOGY Vectorcardiogram JSC-14427 873-10401 02	The static nonlinear analysis of shells of revolution (SNASOR II)  JSC-14495  Stiffness and mass matrices for shells of revolution (SAMMSOR II)  JSC-14494  B73-10446 09  Improved method for design of expansion-chamber mufflers with application to operational helicopter  LANGLEY-11548  B73-10471 03  CDC 6400 COMPUTER  N-body U and K matrix program
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	AUDAM ATAGRAPHY	Container seal for dusty environment
CDC 6600 COMPUTER	CHROMATOGRAPHY	LANGLEY-10962 B73-10416 07
Medical information management system	TLC determination of functionality in	CLEARANCES
(MfMS): An automated hospital informa-	prepolymers	
tion system	NPO-11731 B73-10037 04	Low-cost clearance indicator for high
GSFC-11540 B73-10073 09	'Dry-column' chromatography of plant	speed turbomachinery
Computer program to determine pressure	pigments	LEWIS-12128 B73-10411 02
distributions and forces on blunt bodies of	ARC-10780 B73-10271 04	CLOCKS
revolution	CHROMIUM ALLOYS	A fault-tolerant clock
LANGLEY-11197 B73-10362 09	Oxidation resistant, thoria-dispersed	JSC-12531 B73-10218 09
Improved method for aerodynamic analy-	nickel-chromium-aluminum alloy	inexpensive programmable computer
sis of wing-body-tail configurations in	LEWIS-11541 B73-10077 04	clock
SIS Of WING-DOUY-Tall Configurations in	CIRCUIT BOARDS	LEWIS-11797 B73-10308 02
subsonic and supersonic flow	A new packaging and testing concept	Small portable speed calculator
DANGEET	for microelectronic components	M-FS-22638 B73-10329 07
CELLS (BIOLOGY)	M-FS-20936 B73-10109 01	CLOTHING
Reproductive cell separation: A con-	11.75 20000	A versatile flammability test chamber
cept	Positive contact resistance soldering	KSC-10126 B73-10111 06
M-FS-22627 B73-10198 05	unit	CLOUDS (METEOROLOGY)
CELLULOSE	KSC-10242 B73-10145 02	Measuring the electric field of a cloud
Fire retardant cellulosic foam	Welded printed circuit (pc) stick	KSC-10731 873-10074 02
JSC-14336 B73-10085 04	GSFC-11773 873-10393 01	CLUTCHES
CENTRIFUGAL COMPRESSORS	New standoffs provide high-reliability	Magnetic particle clutch controls servo
Program for calculating total-efficiency	component mounting for printed wiring	system
of specific-speed characteristics of centrif-	boards	JSC-17136 B73-10041 06
udal compressors	LANGLEY-11176 B73-10512 01	COALESCING
LEWIS-12008 B73-10309 09	CIRCUIT BREAKERS	Separation of gas from liquid in a two-
201710 12222	Thermally responsive mechanical actua-	
CENTRIFUGES		phase flow system NPO-11556 B73-10383 03
Electrophoresis separator combining	tor	
centrifugal separation	GSFC-11697 B73-10208 04	COATINGS
M-FS-21396 B73-10328 04	Logic controlled solid state switchgear	Nonflammable potting-encapsulating and
CERAMICS	LEWIS-12044 B73-10408 02	conformal coating compounds
improved mold release for filled-silicone	CIRCUIT PROTECTION	JSC-14164 B73-10102 04
compounds	Electroshock protection circuit	Ultraviolet reflective coating
JSC-19300 B73-10338 04	JSC-14222 B73-10261 02	GSFC-11786 B73-10469 04
New standoffs provide high-reliability	Fail-safe bidirectional valve driver	X-ray opaque additive for inspection of
component mounting for printed wiring	NPO-11958 B73-10450 07	weld joints
boards	CIRCUITS	M-FS-22896 B73-10528 08
LANGLEY-11176 B73-10512 01	Complementary MOS four-phase logic	COAXIAL CABLES
CHARACTER RECOGNITION	circuits	Digital data command bus
Image formation in microwave hologra-	JSC-14240 B73-10174 01	NPO-11637 B73-10035 01
phy	CIRCULAR CYLINDERS	A vacuum chamber feedthrough
ARC-10773 B73-10378 03	Thermally actuated valve	M-FS-21133 B73-10152 01
CHARCOAL	NPO-11846 B73-10347 06	Design method for minimizing RF voltage
	CIRCULAR POLARIZATION	breakdown
Dynamic technique for measuring ad-	Microstrip antennas	NPO-13408 B73-10520 01
sorption in a gas chromatograph JSC-14083 873-10339 04	LANGLEY-11284 B73-10179 01	COBALT
• • • • • • • • • • • • • • • • • • • •	Circularly-polarized multiband telemetry	Continuous catalytic decomposition of
Estimating sorber capacity for multiple	tracking antenna	methane
contaminants	NPO-11264 B73-10288 02	ARC-10339 873-10016 03
LANGLEY-11056 B73-10424 04	CIRCULAR SHELLS	COBALT ALLOYS
CHELATES	Production of circular polymer-glass	Autoclave heat treatment for prealloyed
Semi-organic structural adhesive for	fabric composites	powder products
aluminum	M-FS-22125 B73-10069 04	LEWIS-11953 B73-10172 04
M-FS-21328 B73-10071 04	CIRCULATION	Angular magnetic field beam improves
CHEMICAL BONDS	Bimetallic devices for stirring fluids	efficiency in klystrons and traveling wave
Reductive cleavage of the peptide bond	ARC-10441 B73-10029 06	
LRL-10026 B73-10194 04	CLAYS	tubes LEWIS-11610 B73-10206 03
CHEMICAL REACTIONS	Rubber composition compatible with	
معند کم متحملات به استنجم طوی البحق	Rubber composition compatible with	00002
Radiochemical synthesis of pure an-	hydrazine	Automated data management informa-
hydrous metal halides	hydrazine NPO-11440 B73-10019 04	Automated data management informa- tion system (ADMIS)
	hydrazine NPO-11440 B73-10019 04 CLEANING	Automated data management informa- tion system (ADMIS) KSC-10619 B73-10053 09
hydrous metal halides	hydrazine NPO-11440 B73-10019 04 CLEANING Handbook of cleaning requirements.	Automated data management informa- tion system (ADMIS)
hydrous metal halides LEWIS-11860 B73-10407 04	hydrazine NPO-11440 B73-10019 04 CLEANING Handbook of cleaning requirements, procedures, and verification techniques for	Automated data management informa- tion system (ADMIS) KSC-10619 B73-10053 09 Logistics hardware and services control system
hydrous metal halides LEWIS-11860 B73-10407 04 CHEMICAL REACTORS Catalytic reactor with disposable cartridge	hydrazine NPO-11440 B73-10019 04 CLEANING Handbook of cleaning requirements. procedures, and verification techniques for oxygen systems	Automated data management informa- tion system (ADMIS) KSC-10619 B73-10053 09 Logistics hardware and services control system KSC-10819 B73-10418 09
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hydrous metal halides LEWIS-11860 B73-10407 04 CHEMICAL REACTORS Catalytic reactor with disposable cartridge ARC-10747 B73-10376 04	hydrazine NPO-11440 B73-10019 04 CLEANING Handbook of cleaning requirements. procedures, and verification techniques for oxygen systems LEWIS-11963 Industrial filter bags cleaned by high-	Automated data management informa- tion system (ADMIS) KSC-10619 B73-10053 09 Logistics hardware and services control system KSC-10819 B73-10418 09
hydrous metal halides LEWIS-11860 B73-10407 04 CHEMICAL REACTORS Catalytic reactor with disposable cartridge ARC-10747 B73-10376 04 CHEMICAL STERILIZATION	hydrazine NPO-11440 B73-10019 04 CLEANING Handbook of cleaning requirements. procedures, and verification techniques for oxygen systems LEWIS-11963 B73-10188 04 Industrial filter bags cleaned by high- frequency vibration: A concept	Automated data management information system (ADMIS) KSC-10619 B73-10053 09 Logistics hardware and services control system KSC-10819 B73-10418 09 CODING Binary concatenated coding system
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hydrous metal halides LEWIS-11860 B73-10407 04  CHEMICAL REACTORS Catalytic reactor with disposable cartridge ARC-10747 B73-10376 04  CHEMICAL STERILIZATION Chemical pretreatment for the distillation of urine JSC-14225 B73-10224 04	hydrazine NPO-11440 B73-10019 04 CLEANING Handbook of cleaning requirements, procedures, and verification techniques for oxygen systems LEWIS-11963 Industrial filter bags cleaned by high-frequency vibration: A concept M-FS-24445 B73-10398 06 Backflushing system rapidly cleans fluid filters	Automated data management information system (ADMIS) KSC-10619 B73-10053 09 Logistics hardware and services control system KSC-10819 B73-10418 09 CODING Binary concatenated coding system JSC-14082 B73-10083 09 Flexible format, computer accessed telemetry system
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hydrous metal halides LEWIS-11860 B73-10407 04  CHEMICAL REACTORS Catalytic reactor with disposable cartridge ARC-10747 B73-10376 04  CHEMICAL STERILIZATION Chemical pretreatment for the distillation of urine JSC-14225 B73-10224 04  CHLOROPHYLLS Dye laser remote sensing of marine	hydrazine NPO-11440 B73-10019 04 CLEANING Handbook of cleaning requirements. procedures, and verification techniques for oxygen systems LEWIS-11963 Industrial filter bags cleaned by high-frequency vibration: A concept M-FS-24445 B73-10398 06 Backflushing system rapidly cleans fluid filters JSC-14273 B73-10405 06 Procedure for dispersing fiber bundles	Automated data management information system (ADMIS) KSC-10619 B73-10053 09 Logistics hardware and services control system KSC-10819 B73-10418 09 CODING Binary concatenated coding system JSC-14082 B73-10083 09 Flexible format, computer accessed telemetry system NPO-11358 B73-10290 02 COHERENT LIGHT
hydrous metal halides LEWIS-11860 B73-10407 04  CHEMICAL REACTORS Catalytic reactor with disposable cartridge ARC-10747 873-10376 04  CHEMICAL STERILIZATION Chemical pretreatment for the distillation of urine JSC-14225 B73-10224 04  CHLOROPHYLLS Dye laser remote sensing of marine plankton	hydrazine NPO-11440 B73-10019 04 CLEANING Handbook of cleaning requirements. procedures, and verification techniques for oxygen systems LEWIS-11963 B73-10188 04 Industrial filter bags cleaned by high- frequency vibration: A concept M-FS-24445 B73-10398 06 Backflushing system rapidly cleans fluid filters JSC-14273 Procedure for dispersing fiber bundles LANGLEY-11224 B73-10438 08	Automated data management information system (ADMIS) KSC-10619 B73-10053 09 Logistics hardware and services control system KSC-10819 B73-10418 09 CODING Binary concatenated coding system JSC-14082 B73-10083 09 Flexible format, computer accessed telemetry system NPO-11358 B73-10290 02 COHERENT LIGHT Laser velocimeter for simultaneous two-
hydrous metal halides LEWIS-11860 B73-10407 04  CHEMICAL REACTORS Catalytic reactor with disposable cartridge ARC-10747 B73-10376 04  CHEMICAL STERILIZATION Chemical pretreatment for the distillation of urine JSC-14225 B73-10224 04  CHLOROPHYLLS Dye laser remote sensing of marine	hydrazine NPO-11440 B73-10019 04  CLEANING  Handbook of cleaning requirements, procedures, and verification techniques for oxygen systems  LEWIS-11963 B73-10188 04 Industrial filter bags cleaned by high-frequency vibration: A concept M-FS-24445 B73-10398 06 Backflushing system rapidly cleans fluid filters  JSC-14273 B73-10405 06 Procedure for dispersing fiber bundles LANGLEY-11224 B73-10438 08  CLEANLINESS	Automated data management information system (ADMIS) KSC-10619 B73-10053 09 Logistics hardware and services control system KSC-10819 B73-10418 09 CODING Binary concatenated coding system JSC-14082 B73-10083 09 Flexible format, computer accessed telemetry system NPO-11358 B73-10290 02 COHERENT LIGHT Laser velocimeter for simultaneous two-dimensional velocity measurements
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hydrous metal halides LEWIS-11860 B73-10407 04  CHEMICAL REACTORS Catalytic reactor with disposable cartridge ARC-10747 873-10376 04  CHEMICAL STERILIZATION Chemical pretreatment for the distillation of urine JSC-14225 B73-10224 04  CHLOROPHYLLS Dye laser remote sensing of marine plankton LANGLEY-11382 B73-10359 05	hydrazine NPO-11440 B73-10019 04 CLEANING Handbook of cleaning requirements, procedures, and verification techniques for oxygen systems LEWIS-11963 Industrial filter bags cleaned by high-frequency vibration: A concept M-FS-24445 B73-10398 06 Backflushing system rapidly cleans fluid filters JSC-14273 B73-10405 06 Procedure for dispersing fiber bundles LANGLEY-11224 B73-10438 08 CLEANINESS Handbook of cleaning requirements.	Automated data management information system (ADMIS) KSC-10619 B73-10053 09 Logistics hardware and services control system KSC-10819 B73-10418 09 CODING Binary concatenated coding system JSC-14082 B73-10083 09 Flexible format, computer accessed telemetry system NPO-11358 B73-10290 02 COHERENT LIGHT Laser velocimeter for simultaneous two-dimensional velocity measurements ARC-10637 B73-10267 02 COHERENT RADIATION
hydrous metal halides LEWIS-11880 B73-10407 04  CHEMICAL REACTORS Catalytic reactor with disposable cartridge ARC-10747 873-10376 04  CHEMICAL STERILIZATION Chemical pretreatment for the distillation of urine JSC-14225 B73-10224 04  CHLOROPHYLLS Dye laser remote sensing of marine plankton LANGLEY-11382 B73-10359 05  CHLOROPRENE RESINS	hydrazine NPO-11440 B73-10019 04 CLEANING Handbook of cleaning requirements, procedures, and verification techniques for oxygen systems LEWIS-11963 Industrial filter bags cleaned by high-frequency vibration: A concept M-FS-24445 B73-10398 06 Backflushing system rapidly cleans fluid filters JSC-14273 B73-10405 06 Procedure for dispersing fiber bundles LANGLEY-11224 B73-10438 08 CLEANINESS Handbook of cleaning requirements.	Automated data management information system (ADMIS) KSC-10619 B73-10053 09 Logistics hardware and services control system KSC-10819 B73-10418 09 CODING Binary concatenated coding system JSC-14082 B73-10083 09 Flexible format, computer accessed telemetry system NPO-11358 B73-10290 02 COHERENT LIGHT Laser velocimeter for simultaneous two-dimensional velocity measurements ARC-10637 B73-10267 02 COHERENT RADIATION A nonlinear-coherence receiver
hydrous metal halides LEWIS-11860 B73-10407 04  CHEMICAL REACTORS Catalytic reactor with disposable cartridge ARC-10747 B73-10376 04  CHEMICAL STERILIZATION Chemical pretreatment for the distillation of urine JSC-14225 B73-10224 04  CHLOROPHYLLS Dye laser remote sensing of marine plankton LANGLEY-11382 B73-10359 05  CHLOROPRENE RESINS Manufacture of large, lightweight para-	hydrazine NPO-11440 B73-10019 04 CLEANING Handbook of cleaning requirements. procedures, and verification techniques for oxygen systems LEWIS-11963 B73-10188 04 Industrial filter bags cleaned by high-frequency vibration: A concept M-FS-24445 B73-10398 06 Backflushing system rapidly cleans fluid filters JSC-14273 B73-10405 06 Procedure for dispersing fiber bundles LANGLEY-11224 B73-10438 08 CLEANLINESS Handbook of cleaning requirements, procedures, and verification techniques for oxygen systems	Automated data management information system (ADMIS) KSC-10619 B73-10053 09 Logistics hardware and services control system KSC-10819 B73-10418 09 CODING Binary concatenated coding system JSC-14082 B73-10083 09 Flexible format, computer accessed telemetry system NPO-11358 B73-10290 02 COHERENT LIGHT Laser velocimeter for simultaneous two-dimensional velocity measurements ARC-10637 B73-10267 02 COHERENT RADIATION A nonlinear-coherence receiver

Coherence-length extender

Strain arrestor plate for mounting rigid

M-FS-22434 B73-10399 03 system insulating tiles NPO-11776 873-10385 04 COLLISIONS JSC-14182 B73-10465 06 COMPONENT RELIABILITY A real time moving-scene holographic Polyimide fiber-glass composite resists An improved method for obtaining a camera high temperatures normalized junction temperature for semi-M-FS-21097 B73-10421 03 ARC-10782 B73-10505 04 conductors: A concept COLLOIDING COMPOSITE STRUCTURES JSC-14136 R73-10196-01 Automatic device for shell freezing of Adhesive coating eliminated in new COMPOSITE MATERIALS limuide honeycomb-core fabrication process Production of small diameter high-GSFC-11737 B73-10263 04 LANGLEY-11134 B73-10439 08 temperature-strength refractory metal COLOR TELEVISION COMPOSITE WRAPPING wires Television noise-reduction device Large boron- epoxy filament-wound LEWIS-11802 B73-10003 08 JSC-12607 B73-10431 02 pressure vessels Fiber composite materials: A survey of NPO-11900 COLORIMETRY R73-10038 08 fiber matrix interface mechanics Filament winding technique produces Automated method for study of drug LEWIS-11924 B73-10007 04 metabolism strong lightweight oxygen tanks Technique for the polymerization of ARC-10469 M-FS-22470 873-10082 08 B73-10030 04 monomers for PPQ/graphite fiber com-COMBUSTION CHAMBERS COMPRESSIBLE FLOW posites Experimental verification of computer Computer program for compressible flow I FWIS-11879 R73-10014 04 spray-combustion models An inexpensive and effective method for network analysis ARC-10689 B73-10031 03 calculating the strength of randomly rein-LEWIS-11859 B73-10246 09 Computer program to determine the forced fiber composites Computer program calculates quasi-oneirrotational nozzle admittance LEWIS-11985 B73-10039 04 dimensional flow across face seals and Residual stress effects on the impact LEWIS-12019 B73-10233 09 narrow slots resistance and strength of fiber com-LFWIS-11996 R73-10248 09 Design handbook for gaseous fuel engine nosites injectors and combustion chambers Computer program for predicting symme-I FWIS-11984 R73-10063-04 LEWIS-12154 B73-10412 07 tric jet mixing of compressible flow in jets Metal-metal reinforced (aminar com-COMBUSTION EFFICIENCY ARC-10730 B73-10263 00 Design handbook for gaseous fuel engine COMPRESSOR EFFICIENCY LEWIS-11790 B73-10068 04 injectors and combustion chambers Program for calculating total-efficiency Production of circular polymer-glass LEWIS-12154 of specific-speed characteristics of centrif-R73-10412 07 fabric composites COMBUSTION PRODUCTS ugal compressors M-FS-22125 B73-10069 04 Autoignition test cell with flexible at-LEWIS-12008 B73-10309 09 Fatigue of boron-aluminum composites COMPUTER COMPONENTS mosobere control bonds and joints KSC-10198 B73-10113 04 A fault-tolerant clock M-FS-22325 R73-10079 04 COMFORT JSC-12531 873-10218 09 Metallic composites as high-temperature Integral aircraft passenger seat Inexpensive programmable computer fasteners ARC-10799 R73-10495 05 clock M-FS-22438 R73-10081 04 LEWIS-11797 B73-10308 02 COMMAND AND CONTROL Preparation of prepreg graphite tape with Logistics hardware and services control Electro-optical device for monitoring wire insoluble polymer siza system JSC-14313 873-10084-04 KSC-10819 B73-10418 09 LANGLEY-11358 B73-10321 02 Lightweight graphite/polyimide panels COMMERCIAL AIRCRAFT COMPUTER DESIGN JSC-14375 873-10121 04 Integral aircraft passenger seat Image data rate converter: A concept A new concept for joining dissimilar ARC-10799 B73-10495 05 NPO-11659 B73-10277 02 composites COMMUNICATION M-FS-24307 B73-10148 04 COMPUTER GRAPHICS Motivation techniques for supervision Digital video display system Computer program to compute buckling JSC-19187 B73-10448 05 loads of simply supported anisotropic NPO-11342 B73-10132 02 plates COMMUNICATION CABLES Numerical interactive controller LEWIS-11961 B73-10247 09 NPO-11497 Flat conductor cable survey B73-10294 02 Graphite/polyimide laminates with near-M-FS-22493 B73-10055 01 Stereoscopic computer graphics display zero thermal expansion COMMUNICATION EQUIPMENT system JSC-17662 B73-10254 04 M-FS-22322 A closed, digital telephone system 873-10526 09 Boron--epoxy tubular structure mem-JSC-13912 B73-10226 02 COMPUTER PROGRAMS bers Eight-channel telephone telemetry sys-N-body U and K matrix program ARC-10737 B73-10265 08 LEWIS-11438 tem B73-10012 09 Fabrication techniques for polybenzimid-JSC-14452 873-10320 05 Large boron- epoxy filament-wound COMMUTATION azole composites pressure vessels ARC-10724 B73-10269 04 Flexible format, computer accessed NPO-11900 B73-10038 08 Design Guide for glass fiber reinforced telemetry system A comprehensive program for textual NPO-11358 873-10290 02 metal pressure vessel concordances and statistics LEWIS-12042 B73-10311 08 COMMUTATORS JSC-17484 B73-10049-09 .Preparing thermoplastic aromatic poly-Impulse commutating circuit with trans-Automated data management informaformer to limit reapplied voltage mirtoe tion system (ADMIS) LANGLEY-11372 LEWIS-11849 B73-10004 01 B73-10319 04 KSC-10619 B73-10053 09 Articulated elastic-loop roving vehicles Data multiplexer using a tree switch Computer program for transient response M-FS-22691 NPO-11333 B73-10289 02 B73-10326 06 of structural rings subjected to fragment COMPARATOR CIRCUITS Millimeter-wave antenna system impact GSFC-10949 Gated compressor, distortionless signal B73-10333 01 LEWIS-11926 B73-10064 09 limiter Manufacture of large, lightweight parab-Aerotherm charring materials ablation NPO-11820 B73-10387 01 ofic antennas computer program COMPATIBILITY ARC-10741 B73-10375 08 LEWIS-11854 B73-10065 09 Rubber composition compatible with Backflushing system rapidly cleans fluid Computer program for preliminary design hydrazine filters analysis of axial-flow turbines NPO-11440 873-10019 04 JSC-14273 B73-10405 06 LEWIS-11815 B73-10066 09

Long-term material compatibility testing

873-10073 09

R73-10087 09

R73-10088 09

B73-10091 09

B73-10114 09

B73-10115 09

B73-10120 09

B73-10138 02

B73-10162 09

R73-10183 06

B73-10184 06

B73-10186 09

B73-10214 09

B73-10227 09

B73-10231 09

Part II ··

COMPUTER STORAGE DEVICES Medical information management system (MIMS): An automated hospital information system GSFC-11540 PPUAS--photopeak unfolding and selfshielding program NPO-13188 A general purpose maneuver turns computer program NPO-13213 A linear circuit analysis program with stiff systems capability LANGLEY-11184 Eigenvalue routine by Sturm sequence method NPO-11805 Automated Shell Theory for Rotating Structures (ASTROS) M-FS-21970 Ascent control analysis for S-II derivative launch vehicles, digital computer program M-ES-24324 Computer-controlled vibration testing NPO-11612 GREMEX update (Goddard research engineering management exercise) GSFC-11512 Theoretical prediction of interference loading on aircraft stores: Supersonic speeds LANGLEY-11250 Theoretical prediction of interference loading on aircraft stores: Part I - Subsonic speeds LANGLEY-11249 Pressure drop and pumping power for fluid flow through round tubes M-FS-24172 Computer program for the design of toroidal transformers LEWIS-11878 Spectral analysis program (SAP) JSC-14310 Computer program for calculation of thermodynamic and transport properties of complex chemical systems LFWIS-11997 A computer program for calculating LEWIS-12010 LEWIS-12019

design and off-design performance for turbojet and turbofan angines B73-10232 09 Computer program to determine the

irrotational nozzle admittance B73-10233 09

Method for predicting rotor free-wake

positions and the resulting rotor blade airloads

LANGLEY-10674 B73-10239 06

Computer program to determine roots of polynomials by ratio of successive derivatives

LEWIS-11809 B73-10244 09

A computer program for calculating design and off-design performance of twoand three-spool turbofans with as many as three nozzles

LEWIS-12011 B73-10245 09 Computer program for compressible flow

network analysis B73-10246 09 LEWIS-11859

Computer program to compute buckling loads of simply supported anisotropic plates

LEWIS-11961 B73-10247 09

Computer program calculates quasi-onedimensional flow across face seals and narrow slots

LEWIS-11996 B73-10248 09

Computer program for predicting symmetric jet mixing of compressible flow in iets R73-10263 09

ARC-10730 Node-recording method for stiffness

matrix wavefront reduction in structural B73-10296 09 NPO-11620

Computer program for the prediction of reorientation flow dynamics

B73-10307 09 LEWIS-11816

Program for calculating total-efficiency of specific-speed characteristics of centrifugal compressors B73-10309 09

LEWIS-12008 Characteristics of FORTRAN

LANGLEY-11177 B73-10322 09

Computer program to determine pressure distributions and forces on blunt bodies of revolution

R73.10362 09 LANGLEY-11197 Computer program for stress, vibration,

and buckling characteristics of general shells of revolution B73-10363 09

LANGLEY-11369 Logistics hardware and services control system

B73-10418 09 KSC-10819 Marshall system for aerospace simulation

(MARSYAS)

M-FS-22672 873-10432 09 Dynamic nonlinear analysis of shells of

revolution (DYNASOR II) B73-10443 09 JSC-14496

Frequencies and modes for shells of revolution (FAMSOR)

B73-10444 09 JSC-14497 The static nonlinear analysis of shells

of revolution (SNASOR II) B73-10445 09 JSC-14495

Stiffness and mass matrices for shells of revolution (SAMMSOR II) B73-10446 09

JSC-14494 Improved method for aerodynamic analysis of wing-body-tail configurations in

subsonic and supersonic flow B73-10470 06 LANGLEY-11305

improved method for design of expansion-chamber mufflers with application to operational helicopter

B73-10471 03 LANGLEY-11548

Stereoscopic computer graphics display system

B73-10526 09 M-FS-22322

#### COMPUTER STORAGE DEVICES

Braid read-only memory

B73-10136 01 NPO-11570 Tetrad bubble domain chip arrangement for multiplexing

B73-10202 02 M-FS-22296 Hologram recording tubes

B73-10330 03 M-FS-22590

## COMPUTER TECHNIQUES

A generalized approach to computer synthesis of digital holograms

M-FS-21973 B73-10101 09 Improved noise-adding radiometer for microwave receivers

B73-10345 02 NPO-11706 Computer system for monitoring radio-

repirometry data B73-10494 05 ARC-10784

# COMPUTERIZED SIMULATION

GREMEX update (Goddard research engineering management exercise) B73-10162 09 GSEC-11512

Marshall system for aerospace simulation (MARSYAS)

B73-10432 09 M-FS-22672

#### CONDENSATES

Condensate-removal device for heat exchangers B73-10429 06 JSC-14143

# CONDENSERS (LIQUIFIERS)

Condensate-removal device for heat exchangers B73-10429 06

#### JSC-14143 CONDUCTIVE HEAT TRANSFER

Thermal contact resistance in a non-ideal ioint

B73-10105 03 M-FS-21775

#### CONICAL NOZZLES

Air-atomizing splash-cone fuel nozzle reduces pollutant emissions from turbojet engines

B73-10200 06 LEWIS-11918

# CONICAL SCANNING

High-gain antenna with singly-curved reflector

B73-10291 02 NPO-11361 Multiple-reflection conical microwave antenna

B73-10299 02 NPO-11661

# CONTAMINANTS

Estimating sorber capacity for multiple contaminants

B73-10424 04 LANGLEY-11056

#### CONTAMINATION

Bacterial contamination monitor

GSFC-10879 B73-10222 05 Chemical pretreatment for the distillation

of urine B73-10224 04 JSC-14225

#### CONTINUOUS WAVE RADAR

Junction range finder

KSC-10108 B73-10191 02

# CONTOURS

Improved discrimination in photographic density contouring

B73-10441 03 JSC-12588 CONTRACT MANAGEMENT

GREMEX update (Goddard research engineering management exercise) B73-10162 09 GSFC-11512

#### CONTROL BOARDS

Rechargeable, silver-zinc battery conditioner/monitor unit and state-of-charge indicator R73-10486-02 M-FS-22835

# CONTROL EQUIPMENT

Automatic quadrature control and meas-

uring system M-FS-21660 B73-10127 02

Fail-safe bidirectional valve driver B73-10450 07 NPO-11958

Variable-frequency inverter controls torque, speed, and braking in ac induction motors

M-FS-22088 B73-10525 02

# CONTROLLED ATMOSPHERES

Artificial atmosphere control system B73-10089 05 M-FS-22159

Autoignition test cell with flexible at-

mosphere control R73-10113 04 KSC-10198

### CONTROLLERS

Logic controlled solid state switchgear R73-10408 02 LEWIS-12044

Solid-state controller	CRACKS	D
JSC-12394 B73-10466 06	Prototype ultrasonic instrument for quan-	_
regulator controller	titative testing M-FS-22350 B73-10051 02	DAMAGE
NPO-13178 B73-10467 02 CONVERSION TABLES	CREATININE	Recovery of recordings from heat dam- aged magnetic tapes
Design parameters for toroidal and	Increasing the sensitivity of the Jaffe reaction for creatinine	JSC-14219 B73-10173 02
bobbin magnetics NPO-13441 B73-10459 01	NPO-11587 B73-10021 04	DATA ACQUISITION Automatic carrier acquisition system for
CONVEYORS	CREEP STRENGTH  Creep-fatigue analysis by Strainrange	phase-lock-loop receivers
Ferrofluid separator for nonferrous scrap separation	Partitioning	NPO-11628 B73-10343 02 DATA CONVERTERS
LANGLEY-11523 B73-10463 07	LEWIS-12072 B73-10314 04 CRYOGENIC EQUIPMENT	Image data rate converter: A concept
COOLANTS Gettering capsule for removing oxygen	Magnetocaloric pump	NPO-11659 873-10277 02  DATA MANAGEMENT
from liquid lithium systems	LEWIS-11672 B73-10124 07 Self-powered mixer for pressurized con-	Automated data management informa-
COOLING B73-10002 04	tainers	tion system (ADMIS) KSC-10619 B73-10053 09
A practical solar energy heating and cooling system	LEWIS-12054 B73-10312 03  Monel-shot and screen regenerators	Medical information management system
M-FS-22563 B73-10156 05	GSFC-11593 B73-10462 03	(MIMS): An automated hospital informa- tion system
COPPER X-ray opaque additive for inspection of	CRYOGENIC FLUID STORAGE	GSFC-11540 873-10073 09
weld joints	Bimetallic devices for stirring fluids ARC-10441 B73-10029 06	Synchronous ten-megabit biphase detec- tor
M-FS-22896 B73-10528 08 CORE STORAGE	Geysering inhibitor pipe	M-FS-22546 B73-10323 02
Braid read-only memory	KSC-10615 B73-10110 07	Binary concatenated coding system
NPO-11570 B73-10136-01 Tetrad bubble domain chip arrangement	Effects of environmental exposure on cryogenic thermal insulation materials	JSC-14082 B73-10083 09
for multiplexing	LEWIS-12007 B73-10213 04	Simultaneous processing of vibration test data
M-FS-22296 B73-10202 02 Hologram recording tubes	CRYOGENIC ROCKET PROPELLANTS Geysering inhibitor pipe	NPO-11616 B73-10139 01
M-FS-22590 B73-10330 03	KSC-10615 B73-10110 07	Processor for high-density digital tape- recorded signals
CORRELATION DETECTION Single-channel digital command-	Vapor phase growth of group 3, 4, and	NPO-11399 B73-10354 02
detection system NPO-11302 B73-10342 02	5 compounds by HCl transport of ele-	Data-matched filter JSC-14264 873-10449 02
CORROSION RESISTANCE	ments LANGLEY-11144 B73-10056 04	Stereoscopic computer graphics display
Materials data handbook on titanium 6AI-4V	Fabrication of magnetic bubble memory	system M-FS-22322 B73-10526 09
M-FS-22796 B73-10372 04	overlay M-FS-22377 B₹3-10096 01	DATA RECORDERS  Traveling digital counters for microme-
Materials data handbooks on aluminum alloys	CRYSTAL OSCILLATORS	ters
M-FS-22798 B73-10373 04	Oven temperature controller for elec- tronic components	LANGLEY-11258 873-10042 06 Automatic PCM guard-band selector and
Materials data handbook on Inconel Alloy 718	GSFC-11466 873-10052 02	calibrator
M-FS-22793 B73-10396 04	All-digital phase-lock loops for noise-free signals	KSC-10812 B73-10510 02 DATA RECORDING
Materials data handbooks on stainless steels	NPO-11914 873-10350 01	A new optical recording medium
M-FS-22797 B73-10397 04 CORRUGATED PLATES	Frequency control circuit for all-digital	M-FS-22348 873-10095 03 An improved holographic recording me-
Corrugated battery electrode	phase-lock loops NPO-11936 B73-10351 01	dium
GSFC-11368 B73-10515 01 Honeycomb battery plaque	CRYSTALS	Sampling command generator corrects
GSFC-11367 B73-10519 01	A new optical recording medium M-FS-22348 B73-10095 03	for noise and dropouts in recorded data NPO-11886 873-10390 01
COSMIC DUST Cosmic dust or other similar outer-space	CURRENT AMPLIFIERS	DATA REDUCTION
particles location detector	A new dry biomedical electrode JSC-14321 B73-10146 02	Digital slope-threshold data compressor NPO-11630 B73-10355 02
GSFC-11291 B73-10282 02 COST ANALYSIS	CURRENT REGULATORS	Data compression by a decreasing slope-
A method for economic evaluation of redundancy levels for aerospace systems	Versatile, analog-to-digital, power- regulator controller	threshold test NPO-10769 B73-10382 02
KSC-10754 873-10067 09	NPO-13178 B73-10467 02	DATA SAMPLING
Satellite auxiliary propulsion systems	Apparatus for cutting claster and	Sampling command generator corrects for noise and dropouts in recorded data
NPO-11744 873-10023 06 COUNTERS	Apparatus for cutting elastomeric materi- als	NPO-11886 B73-10390 01
Traveling digital counters for microme-	NPO-13146 B73-10521 07	Patrication of magnetic bubble memory
ters LANGLEY-11258 B73-10042 06	Apparatus for cutting elastomeric materi-	overlay M-FS-22377 B73-10096 01
CRACK PROPAGATION	als NPO-13146 B73-10521 07	Laser addressed holographic memory
Fatigue testing device LANGLEY-10426 B73-10047 07	CYLINDERS	system M-FS-22565 B73-10155 03
Probability of stress-corrosion fracture under random loading	Analysis of nonlinear vibrations of cylin-	Bipotential monitoring with inexpensive
NPO-13113 B73-10453 04	ders NPO-11736 B73-10302 09	office-type cassette recorders M-FS-22566 873-10167 02
		=

	DEOXYGENATION	A generalized approach to computer
Flexible format, computer accessed	Gettering capsule for removing oxygen	synthesis of digital holograms
telemetry system NPO-11358 B73-10290 02	from liquid lithium systems	M-FS-21973 B73-10101 09
	LEWIS-11509 B73-10002 04	Digital video display system
Laser-actuated holographic storage dev-	DEPTH MEASUREMENT	NPO-11342 B73-10132 02
ice M-FS-22768 B73-10423 03	A simple, accurate depth check guage	Digital TV image enhancement system
W-1 3-227 00	JSC-17166 B73-10150 06	GSFC-11256 873-10285 02
Pre-emphasis determination for an S-	DETECTION	Flexible format, computer accessed
band constant bandwidth FM/FM station	Bacterial contamination monitor	telemetry system
M-FS-22135 B73-10170 02	GSFC-10879 B73-10222 05	NPO-11358 B73-10290 02
Data multiplexer using a tree switch	DIAGNOSIS	RF to digital converter JSC-14419 B73-10306 02
NPO-11333 B73-10289 02	Low-cost coding techniques for digital	Processor for high-density digital tape-
Digital slope-threshold data compressor	fault diagnosis	recorded signals
NPO-11630 B73-10355 02	NPO-11701 B73-10344 09	NPO-11399 B73-10354 02
Data compression by a decreasing slope-	DIALYSIS	Digital slope-threshold data compressor
threshold test	Automated method for study of drug	NPO-11630 B73-10355 02
NPO-10769 B73-10382 02	metabolism	Cardiotachometer displays heart rate on
Digital transmitter for data bus com-	ARC-10469 B73-10030 04	a beat-to-beat basis
munications system	DIAPHRAGMS (MECHANICS)	M-FS-20284 B73-10477 05
JSC-14558 B73-10511 02	Embossed metal diaphragm has two-way	Subminiature micropower digital recor-
DECISION MAKING	stretch NPO-11635 B73-10298 08	der
GREMEX update (Goddard research		ARC-10746 B73-10491 02
engineering management exercise)	DIELECTRICS Insulated ECG electrodes	DIGITAL FILTERS
GSFC-11512 B73-10162 09	JSC-14339 B73-10220 05	Digital notch filter KSC-10182 B73-10112 02
DECODING		KSC-10182 B73-10112 02 DIGITAL SYSTEMS
Four-phase differential phase shift re-	Potassium food supplement	A remote test parameter profile display
solver	JSC-14391 B73-10177 05	LEWIS-11872 B73-10006 02
JSC-14065 B73-10093 02	DIFFERENTIAL AMPLIFIERS	A closed, digital telephone system
Synchronous ten-megabit biphase detec-	Integrable power gyrator	JSC-13912 B73-10226 02
tor M-FS-22546 B73-10323 02	M-FS-22342 B73-10159 02	High speed direct-binary to binary-coded-
101.10 2.00 10	Gyrator circuit using field effect transis-	decimal converter and scaler
DECOMPOSITION  Continuous catalytic decomposition of	tors	KSC-10326 B73-10281 02
methane	M-FS-21433 B73-10161 02	Numerical interactive controller
ARC-10339 B73-10016 03	DIFFERENTIAL EQUATIONS	NPO-11497 B73-10294 02
Catalytic reactor with disposable car-	Use of multivariable asymptotic expan-	Digital servo control of random sound
tridge	sions in a satellite theory	fields
ARC-10747 B73-10376 04	NPO-11750 B73-10303 09	NPO-11623 B73-10297 02
DEEP SPACE NE YORK	Marshall system for aerospace simulation	All-digital phase-lock loops for noise-free
Improved noise adding radiometer for	(MARSYAS)	signals
microwave receivus	M-FS-22672 B73-10432 09	NPO-11914 B73-10350 01
NPO-11706 B73-10345 02	DIFFERENTIAL PRESSURE	Frequency control circuit for all-digital
Probes for measuring noise current in	Leak detector-measurer	phase-lock loops
an electronic cable	M-FS-21761 873-10203 07	NPO-11936 B73-10351 01
NPO-13123 B73-10454 02	DIFFUSION	Digital transmitter for data bus com-
DEFLECTION	Stable palladium alloys for diffusion of	munications system JSC-14558 873-10511 02
Laser system detects tower deflections	hydrogen NPO-11747 B73-10024 04	
LEWIS-11870 B73-10243 02		DIGITAL TECHNIQUES  Ascent control analysis for S-II derivative
DEHYDRATED FOOD	DIFFUSION WELDING Improved diffusion welding and roll	launch vehicles, digital computer program
Preservation of flavor in freeze dried	welding of titanium alloys	M-FS-24324 B73-10120 09
green beans	LEWIS-11852 B73-10005 08	Digital random-number generator
JSC-14149 B73-10092 05	Diffusion welding tool	ARC-10096 B73-10266 09
DEHYDRATION	LEWIS-11807 B73-10072 08	Minimal hardware, binary sequence
Preservation of flavor in freeze dried	Fatigue of boron-aluminum composites	pseudonoise generator and detector
green beans JSC-14149 B73-10092 05	bonds and joints	NPO-11406 873-10292 01
DEMODULATION	M-FS-22325 B73-10079 04	Low-cost coding techniques for digital
Four-phase differential phase shift resol-	DIGITAL COMMAND SYSTEMS	fault diagnosis
ver	Digital servo controller behaves like	NPO-11701 B73-10344 09
JSC-14065 B73-10093 02		ter and analysis and distant power.
	synchro	Versatile, analog-to-digital, power-
Carrier extraction circuit	KSC-10769 B73-10337 02	regulator controller
Carrier extraction circuit JSC-14262 B73-10094 02	KSC-10769 B73-10337 02 Single-channel digital command-	regulator controller NPO-13178 B73-10467 02
JSC-14262 B73-10094 02	KSC-10769 B73-10337 02 Single-channel digital command- detection system	regulator controller NPO-13178 B73-10467 02 DIGITAL TO ANALOG CONVERTERS
	KSC-10769 B73-10337 02 Single-channel digital command- detection system NPO-11302 B73-10342 02	regulator controller NPO-13178 B73-10467 02 DIGITAL TO ANALOG CONVERTERS A remote test parameter profile display
JSC-14262 B73-10094 02 A technique to eliminate false lock in	KSC-10769 B73-10337 02 Single-channel digital command- detection system NPO-11302 B73-10342 02 DIGITAL COMPUTERS	regulator controller NPO-13178 B73-10467 02 DIGITAL TO ANALOG CONVERTERS A remote test parameter profile display LEWIS-11872 B73-10006 02
JSC-14262 B73-10094 02 A technique to eliminate false lock in PCM demodulation	KSC-10769 B73-10337 02 Single-channel digital command- detection system NPO-11302 B73-10342 02 DIGITAL COMPUTERS Computer-controlled vibration testing	regulator controller NPO-13178 B73-10467 02 DIGITAL TO ANALOG CONVERTERS A remote test parameter profile display LEWIS-11872 B73-10006 02
JSC-14262 B73-10094 02 A technique to eliminate false lock in PCM demodulation JSC-12494 B73-10108 02	KSC-10769 B73-10337 02 Single-channel digital command- detection system NPO-11302 B73-10342 02 DIGITAL COMPUTERS Computer-controlled vibration testing NPO-11812 B73-10138 02	regulator controller NPO-13178 B73-10467 02 DIGITAL TO ANALOG CONVERTERS A remote test parameter profile display LEWIS-11872 B73-10006 02 Time-based priority selection for analog circuits
JSC-14262 B73-10094 02 A technique to eliminate false lock in PCM demodulation JSC-12494 B73-10108 02 Phase shift keyed, pulse code modulated	KSC-10769 B73-10337 02 Single-channel digital command- detection system NPO-11302 B73-10342 02 DIGITAL COMPUTERS Computer-controlled vibration testing NPO-11812 B73-10138 02 Stereoscopic computer graphics display	regulator controller NPO-13178 B73-10467 02 DIGITAL TO ANALOG CONVERTERS A remote test parameter profile display LEWIS-11872 Time-based priority selection for analog circuits M-FS-24242 B73-10154 02
JSC-14262 B73-10094 02 A technique to eliminate felse lock in PCM demodulation JSC-12494 B73-10108 02 Phase shift keyed, pulse code modulated signal synchronizer	KSC-10769 B73-10337 02 Single-channel digital command- detection system NPO-11302 B73-10342 02 DIGITAL COMPUTERS Computer-controlled vibration testing NPO-11612 B73-10138 02 Stereoscopic computer graphics display system	regulator controller NPO-13178 B73-10467 02 DIGITAL TO ANALOG CONVERTERS A remote test parameter profile display LEWIS-11872 Time-based priority selection for analog circuits M-FS-24242 B73-10154 02 A closed, digital telephone system
JSC-14262 B73-10094 02 A technique to eliminate false lock in PCM demodulation JSC-12494 B73-10108 02 Phase shift keyed, pulse code modulated signal synchronizer JSC-12462 B73-10107 02	KSC-10769 B73-10337 02 Single-channel digital command- detection system NPO-11302 B73-10342 02 DIGITAL COMPUTERS Computer-controlled vibration testing NPO-11812 B73-10138 02 Stereoscopic computer graphics display system M-FS-22322 B73-10526 09	regulator controller NPO-13178 B73-10467 02 DIGITAL TO ANALOG CONVERTERS A remote test parameter profile display LEWIS-11872 Time-based priority selection for analog circuits M-FS-24242 B73-10154 02 A closed, digital telephone system JSC-13912 B73-10226 02
JSC-14262 B73-10094 02 A technique to eliminate false lock in PCM demodulation JSC-12494 B73-10108 02 Phase shift keyed, pulse code modulated signal synchronizer JSC-12462 B73-10107 02 DEMODULATORS	KSC-10769 B73-10337 02 Single-channel digital command- detection system NPO-11302 B73-10342 02 DIGITAL COMPUTERS Computer-controlled NPO-11812 B73-10138 02 Stereoscopic computer graphics display system M-FS-22322 B73-10526 09 DIGITAL DATA	regulator controller NPO-13178  B73-10467 02  DIGITAL TO ANALOG CONVERTERS A remote test parameter profile display LEWIS-11872 B73-10006 02 Time-based priority selection for analog circuits M-FS-24242 B73-10154 02 A closed, digital telephone system JSC-13912 B73-10226 02  DIODES
JSC-14262 B73-10094 02 A technique to eliminate felse lock in PCM demodulation JSC-12494 B73-10108 02 Phase shift keyed, pulse code modulated signal synchronizer JSC-12462 B73-10107 02 DEMODULATORS Data-aided carrier tracking loops	KSC-10769 B73-10337 02 Single-channel digital command- detection system NPO-11302 B73-10342 02 DIGITAL COMPUTERS Computer-controlled vibration testing NPO-11812 B73-10138 02 Stereoscopic computer graphics display system M-FS-22322 B73-10526 09 DIGITAL DATA Digital data command bus NPO-11637. B73-10035 01	regulator controller NPO-13178  B73-10467 02  DIGITAL TO ANALOG CONVERTERS  A remote test parameter profile display LEWIS-11872  B73-10006 02  Time-based priority selection for analog circuits M-FS-24242  A closed, digital telephone system JSC-13912  B73-10226 02  DIODES  Fail-safe bidirectional valve driver
JSC-14262 B73-10094 02 A technique to eliminate felse lock in PCM demodulation JSC-12494 B73-10108 02 Phase shift keyed, pulse code modulated signal synchronizer JSC-12462 B73-10107 02 DEMODULATORS Data-aided carrier tracking loops NPO-11282 B73-10356 01	KSC-10769 B73-10337 02 Single-channel digital command- detection system NPO-11302 B73-10342 02  DIGITAL COMPUTERS Computer-controlled vibration testing NPO-11812 B73-10138 02 Stereoscopic computer graphics display system M-FS-22322 B73-10526 09  DIGITAL DATA Digital data command bus NPO-11637. B73-10035 01	regulator controller NPO-13178 B73-10467 02 DIGITAL TO ANALOG CONVERTERS A remote test parameter profile display LEWIS-11872 B73-10006 02 Time-based priority selection for analog circuits M-FS-24242 B73-10154 02 A closed, digital telephone system JSC-13912 B73-10226 02 DIODES Fail-safe bidirectional valve driver NPO-11958 B73-10450 07
JSC-14262 B73-10094 02 A technique to eliminate false lock in PCM demodulation JSC-12494 B73-10106 02 Phase shift keyed, pulse code modulated signal synchronizer JSC-12462 B73-10107 02 DEMODULATORS Data-aided carrier tracking loops NPO-11282 B73-10356 01	KSC-10769 B73-10337 02 Single-channel digital command- detection system NPO-11302 B73-10342 02  DIGITAL COMPUTERS Computer-controlled vibration testing NPO-11812 B73-10138 02 Stereoscopic computer graphics display system M-FS-22322 B73-10526 09  DIGITAL DATA Digital data command bus NPO-11637. B73-10035 01	regulator controller NPO-13178  B73-10467 02  DIGITAL TO ANALOG CONVERTERS  A remote test parameter profile display LEWIS-11872  B73-10006 02  Time-based priority selection for analog circuits M-FS-24242  B73-10154 02  A closed, digital telephone system JSC-13912  B73-10226 02  DIODES Fail-safe bidirectional valve driver NPO-11958  B73-10450 07  High-power microstrip switch

DIPLEXERS	Three-dimensional gas turbulence meas-	EIGENVALUES
Combined diplexer and harmonic filter LEWIS-12059 873-10410 02	urement with a laser-Doppler velocimeter system	Eigenvalue routine by Sturm sequence
DIRECTIONAL ANTENNAS	M-FS-22713 B73-10371 04	method NPO-11805 B73-10114 09
Circularly-polarized multiband telemetry	Motion compensator for holographic	Improved procedures for mass matrix-
tracking antenna	motion picture camera	reductions in eigenvalue solutions
NPO-11264 B73-10288 02	M-FS-22517 873-10434 03	NPO-11619 B73-10384 09
- Digital servo controller behaves like	DOPPLER RADAR	ELASTIC SCATTERING
synchro	True airspeed measured by airborne laser	Elastic light-scattering modulator: A
KSC-10769 873-10337 02	Doppler velocimeter	concept
DISCONNECT DEVICES	ARC-10763 B73-10506 02	M-FS-22724 B73-10422 03
Thermally responsive mechanical actua-	DRILLING Universal drill jig	ELASTOMERS
tor	M-FS-24464 B73-10324 07	Manufacture and quality control of interc-
GSFC-11697 B73-10208 04	DROP SIZE	onnecting wire harnesses
DISCRIMINATION	Experimental verification of computer	M-FS-22511 873-10211 01
Improved discrimination in photographic density contouring	spray-combustion models	Low-resistivity homogeneous elastom- ers
JSC-12588 B73-10441 03	ARC-10689 B73-10031 03	NPO-11881 B73-10349 04
DISCRIMINATORS	DRUGS	Elastic light-scattering modulator: A
Peak-holding circuit for extremely narrow	Automated method for study of drug	concept
pulses	metabolism ARC-10469 B73-10030 04	M-FS-22724 B73-10422 03
JSC-14129 873-10317 02	DUCTED FLOW	High-temperature gas/liquid stress relax-
DISPERSING	A theoretical study of serodynamic noise	Ometers
Procedure for dispersing fiber bundles	generation	NPO-13168 B73-10457 04
LANGLEY-11224 B73-10438 08	M-FS-24167 B73-10209 03	Apparatus for cutting elastomeric materi-
DISPLAY DEVICES	DUST	als
A remote test parameter profile display	Container seal for dusty environment	NPO-13146 B73-10521 07
LEWIS-11872 873-10006 02	LANGLEY-10962 B73-10416 07	ELECTRIC BATTERIES
Video, enhancement of X-ray and neutron	DYE LASERS	Battery cell thermal-conductive coating
radiographs	A leser head for simultaneous optical	increases efficiency
LEWIS-1/1944 . B73-10009 03 Digital video display system	pumping of several dye lasers LANGLEY-11341 B73-10336 03	LANGLEY-10963 B73-10237 01
NPO-11342 B73-10132 02	Dye laser remote sensing of marine	Reliable low-cost battery voltage indica-
Numerical interactive controller	plankton	tor for light aircraft and automobiles LEWIS-12020 B73-10249 01
NPO-11497 B73-10294 02	LANGLEY-11382 B73-10359 05	ELECTRIC CHOPPERS
Alphanumeric character generator for	DYES .	Impulse commutating circuit with trans-
oscilloscope	Two new methods to increase the con-	former to limit reapplied voltage
GSFC-11582 B73-10370 02	trast of track-etch neutron radiographs	LEWIS-11849 B73-10004 01
RF antenna-pattern visual aids for field	LEWIS-11893 B73-10027 03	ELECTRIC CONNECTORS
use KSC-10821 B73-10426 02	DYNAMIC CHARACTERISTICS	Flat conductor cable survey
Cardiotachometer displays heart rate on	Dynamic nonlinear analysis of shells of revolution (DYNASOR II)	M-FS-22493 873-10055 01
a beat-to-beat basis	JSC-14496 B73-10443 09	A proposed adjustable RF cable connec-
M-FS-20284 B73-10477 05	DYNAMIC PROGRAMMING	tor
Stereoscopic computer graphics display	A summary report on system effective-	M-FS-24271. 873-10097 01
system	ness and optimization study	Electromagnetic connector JSC-17420 B73-10125 07
M-FS-22322 B73-10526 09	M-FS-22126 873-10104 09	
DISTANCE MEASURING EQUIPMENT	DYNAMIC RESPONSE	Flammability control for electrical cables and connectors
Determining distance to lightning strokes from a single station	Mathematical model for predicting hu-	M-FS-21584 B73-10235 02
KSC-10698 873-10178 02	man vertebral fracture	Safe electrical receptacle and modified
DISTILLATION	ARC-10691 B73-10033 05	plug
Chemical pretreatment for the distillation	Dynamic testing of complex structures JSC:12569 B73-10057-06	KSC-10817 B73-10366 01
of urine	Versatile electronic load	Plug-in integrated/hybrid circuit
JSC-14225 873-10224 04	NPO-13202 B73-10458 03	M-FS-24470 B73-10476 01
Design of a unit to produce hot distilled	DYNAMIC STRUCTURAL ANALYSIS	RF shielded connectors
water for the same power consumption as	Dynamic testing of complex structures	GSFC-11215 B73-10509 01
a water heater JSC-14224 B73-10402 04	JSC-12569 B73-10057 06	ELECTRIC CONTACTS
DISTILLATION EQUIPMENT	Thermal-dynamic modeling study	Liquid metal porous matrix sliding electri- cal contact: A concept
Design of a unit to produce hot distilled	LANGLEY-11309 B73-10076 06	LEWIS-11735 B73-10164 01
water for the same power consumption as	DYNAMOMETERS	ELECTRIC CURRENT
a water heater	Accelerometer-controlled automatic	Probes for measuring noise current in
JSC-14224 B73-10402 04	braking system	an electronic cable .
DOCUMENT STORAGE	LANGLEY-11383 873-10419 06	NPO-13123 873-10454 02
Laser-actuated holographic storage de-	·	ELECTRIC EQUIPMENT
Vice	<i>-</i>	Electroshock protection circuit
M-FS-22768 873-10423 03 DOPPLER EFFECT	. E	JSC-14222 873-10261 02
Laser system detects air turbulence	•	Suspension of objects in magnetic and
M-FS-21244 873-10210 03	ECONOMIC ANALYSIS	electric fields
Laser velocimeter with transverse and	A method for economic evaluation of	JSC-14170 873-10058 03
on-axis sensitivity	redundancy levels for aerospace systems	Measuring the electric field of a cloud
ARC-10642 B73-10282 03	KSC-10754 B73-10067 09	KSC-10731. B73-10074 02
Laser velocimeter for simultaneous two-	EDUCATION	Rocket borne instrument to measure
dimensional velocity measurements ARC-10637 B73-10267 02	Motivation techniques for supervision JSC-19187 B73-10448 OF	electric fields inside electrified clouds KSC-10730 873-10176 03
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Determining distance to lightning strokes	ELECTRICAL MEASUREMENT	Catalytic reactor with disposable car-
from a single station	Apparatus for measuring electrical prop-	tridge
KSC-10698 B73-10178 02	erties of materials NPO-11749 B73-10025 03	ARC-10747 B73-10376 04 ELECTROLYTIC CELLS
Ion masking improves resolution in quadrupole mass spectrometers	Measuring the electric field of a cloud	Gas-operated actuator: A concept
GSFC-11406 B73-10181 03	KSC-10731 B73-10074 02	NPO-11369 B73-10133 03
Elastic light-scattering modulator: A	Rocket borne instrument to measure	ELECTROMAGNETIC FIELDS
concept	electric fields inside electrified clouds	Ferrofluid separator for nonferrous scrap
M-FS-22724 B73-10422 03	KSC-10730 873-10176 03	separation
Corrier outrosting circuit	ELECTRICAL PROPERTIES	LANGLEY-11523 B73-10463 07 ELECTROMAGNETIC INTERFERENCE
Carrier extraction circuit JSC-14262 B73-10094 02	Apparatus for measuring electrical prop-	Probes for measuring noise current in
ELECTRIC MOTORS	erties of materials NPO-11749 B73-10025 03	an electronic cable
An electric motor with magnetic bear-	Silicon on sapphire for ion implantation	NPO-13123 B73-10454 02
ings: A concept	studies	ELECTROMAGNETIC NOISE
XGS-07805 B73-10304 01	LANGLEY-11415 873-10522 04	Sampling command generator corrects
An electrochemical engine M-FS-22542 B73-10473 07	ELECTRICAL RESISTIVITY	for noise and dropouts in recorded data NPO-11886 B73-10390 01
ELECTRIC NETWORKS	Apparatus for measuring electrical prop-	ELECTROMAGNETIC PROPERTIES
A linear circuit analysis program with	erties of materials	Electromagnetic connector
stiff systems capability	NPO-11749 B73-10025 03	JSC-17420 B73-10125 07
LANGLEY-11184 B73-10091 09	Low-resistivity homogeneous elasto- mers	ELECTROMAGNETIC PUMPS
ELECTRIC OUTLETS	NPO-11881 B73-10349 04	Magnetocaloric pump
Safe electrical receptacle and modified	ELECTRO-OPTICS	LEWIS-11672 B73-10124 07
plug KSC-10817 B73-10366 01	Design and fabrication of an experimental	ELECTROMAGNETIC RADIATION
ELECTRIC POWER	image forming light modulator	Proposed electromagnetic wave energy converter
Proposed electromagnetic wave energy	M-FS-22547 873-10182 03	GSFC-11394 B73-10185 01
converter	Electro-optical device for monitoring wire	Laser scanner for testing semiconductor
GSFC-11394 B73-10185 01	Size	chips
An electrochemical engine	LANGLEY-11358 B73-10321 02 ELECTROCARDIOGRAPHY	M-FS-22693 B73-10327 02
M-FS-22542 B73-10473 07	A new dry biomedical electrode	ELECTROMAGNETIC SHIELDING
Solar-energy conversion system provides electrical power and thermal control for	JSC-14321 B73-10146 02	RF shielded connectors
life-support systems	Insulated ECG electrodes	GSFC-11215 B73-10509 01
M-FS-21628 B73-10524 06	JSC-14339 B73-10220 05	ELECTROMAGNETS
ELECTRIC POWER TRANSMISSION	Microminiaturized, biopotential condit-	Ferrofluid separator for nonferrous scrap separation
Dynamic power load simulator	ioning system (MBCS) JSC-14180 B73-10236 02	LANGLEY-11523 B73-10463 07
JSC-14285 873-10305 02	Vectorcardiogram	ELECTROMECHANICAL DEVICES
Laser energy converted into electric	JSC-14427 B73-10401 02	Magnetic particle clutch controls servo
power NPO-13308 B73-10353 02	ELECTROCHEMICAL CELLS	system
NFU-13300 D/3-10333 02	Rapid detection of bacteria in foods and	JSC 17136 B73-10041 06
Probes for measuring noise current in	biological fluids	Master/slave manipulator system
	biological fluids GSFC-11738 B73-10045 05	ARC-10756 B73-10496 06
Probes for measuring noise current in an electronic cable	biological fluids GSFC-11738 873-10045 05 Battery cell thermal-conductive coating	ARC-10756 B73-10496 06 ELECTRON BEAM WELDING
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02 ELECTRIC PROPULSION An electrochemical engine	biological fluids GSFC-11738 B73-10045 05	ARC-10756 B73-10496 06 ELECTRON BEAM WELDING Angular magnetic field beam improves
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02 ELECTRIC PROPULSION An electrochemical engine M-FS-22542 B73-10473 07	biological fluids GSFC-11738 B73-10045 05 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode	ARC-10756 B73-10496 06 ELECTRON BEAM WELDING
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02 ELECTRIC PROPULSION An electrochemical engine M-FS-22542 B73-10473 07 ELECTRIC SWITCHES	biological fluids GSFC-11738 B73-10045 05 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION  An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES  Synchro phase selector aid	biological fluids GSFC-11738 B73-10045 05 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION  An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES  Synchro phase selector aid LANGLEY-11282 B73-10160 01	biological fluids GSFC-11738 B73-10045 05 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION  An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES  Synchro phase selector aid  LANGLEY-11282 B73-10160 01  Logic controlled solid state switchgear	biological fluids GSFC-11738 B73-10045 05 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION  An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES  Synchro phase selector aid LANGLEY-11282 B73-10160 01	biological fluids GSFC-11738 B73-10045 05 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION  An electrochemical engine B73-10473 07  ELECTRIC SWITCHES  Synchro phase selector aid  LANGLEY-11282 B73-10160 01  Logic controlled solid state switchgear LEWIS-12044 B73-10408 02	biological fluids GSFC-11738 B73-10045 05 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION  An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES  Synchro phase selector aid LANGLEY-11282 B73-10160 01  Logic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS  Flat conductor cable survey M-FS-22493 B73-10055 01	biological fluids GSFC-11738 B73-10045 05 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES Synchro phase selector aid LANGLEY-11282 B73-10160 01 tagic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS Flat conductor cable survey M-FS-22493 B73-10055 01  ELECTRIC WELDING	biological fluids GSFC-11738 B73-10045 06 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic byproducts by electrochemical sensing	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves efficiency in klystrons and traveling wave
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION  An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES  Synchro phase selector aid LANGLEY-11282 B73-10160 01 togic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS  Flat conductor cable survey M-FS-22493 B73-10055 01  ELECTRIC WELDING  Resistance spot welding of dispersion-	biological fluids GSFC-11738 B73-10045 06 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON DENSITY PROFILES
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES Synchro phase selector aid LANGLEY-11282 B73-10160 01 Logic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS Flat conductor cable survey M-FS-22493 B73-10055 01  ELECTRIC WELDING Resistance spot welding of dispersion-strengthened nickel alloys	biological fluids GSFC-11738 B73-10045 06 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTRODES	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON DENSITY PROFILES  High-speed spectrograph for shock tube
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION  An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES  Synchro phase selector aid LANGLEY-11282 B73-10160 01 Logic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS  Flat conductor cable survey M-FS-22493 B73-10055 01  ELECTRIC WELDING  Resistance spot welding of dispersion-strengthened nickel alloys LEWIS-12075 B73-10315 04	biological fluids GSFC-11738 B73-10045 06 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON DENSITY PROFILES  High-speed spectrograph for shock tube studies
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION  An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES  Synchro phase selector aid LANGLEY-11282 B73-10160 01  Logic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS  Flat conductor cable survey M-FS-22493 B73-10055 01  ELECTRIC WELDING  Resistance spot welding of dispersion-strengthened nickel alloys LEWIS-12075 B73-10315 04  ELECTRIC WIRE	biological fluids GSFC-11738 B73-10045 06 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTRODES A new dry biomedical electrode JSC-14321 B73-10146 02 Insulated ECG electrodes	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 873-10206 03  ELECTRON DENSITY PROFILES  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION  An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES  Synchro phase selector aid LANGLEY-11282 B73-10160 01 Logic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS  Flat conductor cable survey M-FS-22493 B73-10055 01  ELECTRIC WELDING  Resistance spot welding of dispersion-strengthened nickel alloys LEWIS-12075 B73-10315 04	biological fluids GSFC-11738 B73-10045 05 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCES A new dry biomedical electrode JSC-14321 B73-10146 02 Insulated ECG electrodes JSC-14339 B73-10220 05	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON DENSITY PROFILES  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03  ELECTRON DISTRIBUTION
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Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES Synchro phase selector aid LANGLEY-11282 B73-10160 01 Logic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS Flat conductor cable survey M-FS-22493 B73-10055 01  ELECTRIC WELDING Resistance spot welding of dispersionstrengthened nickel alloys LEWIS-12075 B73-10315 04  ELECTRIC WIRE Flammability control for electrical cables and connectors M-FS-21584 B73-10235 02  Multilayer flat electrical cable ARC-10734 B73-10264 01  ELECTRICAL FAULTS Nomograph for prediction of RF-breakdown voltages	biological fluids GSFC-11738 B73-10045 06 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTRODES A new dry biomedical electrode JSC-14321 B73-10146 02 Insulated ECG electrodes JSC-14339 B73-1020 05 Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01 ELECTROENCEPHALOGRAPHY Flexible electroencephalogram (EEG) headband	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON DENSITY PROFILES  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03  ELECTRON DISTRIBUTION  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03  ELECTRON EMISSION  Design method for minimizing RF voltage breakdown  NPO-13408 B73-10500 01
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES Synchro phase selector aid LANGLEY-11282 B73-10160 01 Logic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS Flat conductor cable survey M-FS-22493 B73-10055 01  ELECTRIC WELDING Resistance spot welding of dispersion-strengthened nickel alloys LEWIS-12075 B73-10315 04  ELECTRIC WIRE Flammability control for electrical cables and connectors M-FS-21584 B73-10235 02  Multilayer flat electrical cable ARC-10734 B73-10264 01  ELECTRICAL FAULTS Nomograph for prediction of RF-breakdown voltages NPO-11819 B73-10386 01	biological fluids GSFC-11738 B73-10045 06 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCES A new dry biomedical electrode JSC-14321 B73-10146 02 Insulated ECG electrodes JSC-14329 B73-10220 05 Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01 ELECTROCEPHALOGRAPHY Flexible electroencephalogram (EEG) headband LANGLEY-10927 B73-10048 05	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON DENSITY PROFILES  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03  ELECTRON DISTRIBUTION  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03  ELECTRON EMISSION  Design method for minimizing RF voltage breakdown  NPO-13408 B73-10520 01  ELECTRON TUBES
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Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES Synchro phase selector aid LANGLEY-11282 B73-10160 01 Logic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS Flat conductor cable survey M-FS-22493 B73-10055 01  ELECTRIC WELDING Resistance spot welding of dispersion-strengthened nickel alloys LEWIS-12075 B73-10315 04  ELECTRIC WIRE Flammability control for electrical cables and connectors M-FS-21584 B73-10235 02  Multilayer flat electrical cable ARC-10734 B73-10264 01  ELECTRICAL FAULTS Nomograph for prediction of RF-breakdown voltages NPO-11819 B73-10386 01  Design method for minimizing RF voltage	biological fluids GSFC-11738 B73-10045 06 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCES A new dry biomedical electrode JSC-14321 B73-10146 02 Insulated ECG electrodes JSC-14329 B73-10220 05 Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01 ELECTROCEPHALOGRAPHY Flexible electroencephalogram (EEG) headband LANGLEY-10927 B73-10048 05	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON DENSITY PROFILES  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03  ELECTRON DISTRIBUTION  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03  ELECTRON EMISSION  Design method for minimizing RF voltage breakdown  NPO-13408 B73-10520 01  ELECTRON TUBES  Event-sequence detector  NPO-11703 B73-10278 01
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES Synchro phase selector aid LANGLEY-11282 B73-10160 01 Logic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS Flat conductor cable survey M-FS-22493 B73-10055 01  ELECTRIC WELDING Resistance spot welding of dispersionstrengthened nickel alloys LEWIS-12075 B73-10315 04  ELECTRIC WIRE Flammability control for electrical cables and connectors M-FS-21584 B73-10235 02 Multilayer flat electrical cable ARC-10734 B73-10264 01  ELECTRICAL FAULTS Nomograph for prediction of RF-breakdown voltages NPO-11819 B73-10386 01 Design method for minimizing RF voltage breakdown NPO-13408 B73-10520 01	biological fluids GSFC-11738 B73-10045 06 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTRODES A new dry biomedical electrode JSC-14321 B73-10523 05 ELECTRODES A new dry biomedical electrode JSC-14321 B73-10146 02 Insulated ECG electrodes JSC-14339 B73-10220 05 Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01 ELECTROENCEPHALOGRAPHY Flexible electroencephalogram (EEG) headband LANGLEY-10927 B73-10048 05 Eight-channel telephone telemetry system JSC-14452 B73-10320 05	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON DENSITY PROFILES  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03  ELECTRON DISTRIBUTION  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03  ELECTRON EMISSION  Design method for minimizing RF voltage breakdown  NPO-13408 B73-10520 01  ELECTRON TUBES  Event-sequence detector  NPO-11703 B73-10278 01
Probes for measuring noise current in an electronic cable NPO-13123 B73-10454 02  ELECTRIC PROPULSION  An electrochemical engine M-FS-22542 B73-10473 07  ELECTRIC SWITCHES  Synchro phase selector aid LANGLEY-11282 B73-10160 01 Logic controlled solid state switchgear LEWIS-12044 B73-10408 02  ELECTRIC TERMINALS  Flat conductor cable survey M-FS-22493 B73-10055 01  ELECTRIC WELDING  Resistance spot welding of dispersion-strengthened nickel alloys LEWIS-12075 B73-10315 04  ELECTRIC WIRE  Flammability control for electrical cables and connectors  M-FS-21584 B73-10235 02  Multilayer flat electrical cable ARC-10734 B73-10264 01  ELECTRICAL FAULTS  Nomograph for prediction of RF-breakdown voltages  NPO-13408 B73-10520 01	biological fluids GSFC-11738 B73-10045 06 Battery cell thermal-conductive coating increases efficiency LANGLEY-10963 B73-10237 01 Corrugated battery electrode GSFC-11368 B73-10515 01 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTROCHEMISTRY An electrochemical engine M-FS-22542 B73-10473 07 Detecting and measuring metabolic byproducts by electrochemical sensing LANGLEY-11525 B73-10523 05 ELECTRODES A new dry biomedical electrode JSC-14321 B73-10523 05 ELECTROES JSC-14329 B73-10220 05 Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01 ELECTROENCEPHALOGRAPHY Flexible electroencephalogram (EEG) headband LANGLEY-10927 B73-10048 05 Eight-channel telephone telemetry system JSC-14452 B73-10320 05 ELECTROLYSIS Gas-operated actuator: A concept	ARC-10756 B73-10496 06  ELECTRON BEAM WELDING  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON BEAMS  Design and fabrication of an experimental image forming light modulator  M-FS-22547 B73-10182 03  Angular magnetic field beam improves efficiency in klystrons and traveling wave tubes  LEWIS-11610 B73-10206 03  ELECTRON DENSITY PROFILES  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03  ELECTRON DISTRIBUTION  High-speed spectrograph for shock tube studies  ARC-10772 B73-10501 03  ELECTRON EMISSION  Design method for minimizing RF voltage breakdown  NPO-13408 B73-10520 01  ELECTRON TUBES  Event-sequence detector  NPO-11703 B73-10278 01  ELECTRONIC CONTROL  An automatic lightning detection and photographic system

F1 F6		
Oven temperature controller for elect-	ELLIPSES	ENGINE DESIGN
ronic-components	Motion compensator for holographic motion picture camera	A computer program for calculating design and off-design performance of two-
GSFC-11466 B73-10052 02	M-FS-22517 B73-10434 03	and three-spool turbofans with as many
Positive contact resistance soldering	Photography of random motion with a	as three nozzles
unit	holographic camera	LEWIS-12011 873-10245 09
KSC-10242 B73-10145 02	M-FS-22537 B73-10435 03 ELONGATION	Design handbook for gaseous fuel engine injectors and combustion chambers
Determining distance to lightning strokes from a single station	Variable load indicator	LEWIS-12154 B73-10412 07
KSC-10698 B73-10178 02	M-FS-21728 B73-10335 07	
Junction range finder	EMBRITTLEMENT	A theoretical study of aerodynamic noise
KSC-10108 B73-10191 02	Hydrogen-environment embrittlement of	generation
Balloon-borne package temperature	metals: A study M-FS-22540 873-10168 04	M-FS-24167 B73-10209 03 ENGINES
controller	EMISSION SPECTRA	Metal tube used as solar engine
GSFC-11620 B73-10192 03	PPUASphotopeak unfolding and self-	ARC-10461 B73-10493 03
Manufacture and quality control of interc- onnecting wire harnesses	shielding program	ENTROPY
M-FS-22511 B73-10211 01	NPO-13188 B73-10087 09 ENAMELS	A theoretical study of aerodynamic noise
A fault-tolerant clock	Refractory porcelain enamel passive-	generation B73-10209 03
JSC-12531 873-10218 09	thermal-control coating for high-	Analyses of unsteady entropic-flow pro-
Dynamic power load simulator	temperature superalloys	cesses
JSC-14285 B73-10305 02	M-FS-22324 B73-10215 04	M-FS-24475 B73-10482 03
Nomograph for prediction of RF-	ENCAPSULATING Glass encapsulation provides extra prot-	ENVIRONMENTAL TESTS
breakdown voltages NPO-11819 873-10386 01	ection for IC semiconductor devices	Evaluation of thermal insulation materi- als
Versatile electronic load	M-FS-21310 B73-10054 01	NPO-11586 B73-10020 04
NPO-13202 B73-10458 03	Nonflammable potting-encapsulating and	Effects of environmental exposure on
Plug-in integrated/hybrid circuit	conformal coating compounds	Cryogenic thermal insulation materials
M-FS-24470 B73-10476 01	JSC-14164 B73-10102 04	LEWIS-12007 B73-10213 04
RF shielded connectors GSFC-11215 B73-10509 01	Silicon switching transistor with high power and low saturation voltage	Silicon on sapphire for ion implantation
ELECTRONIC FILTERS	NPO-11565 B73-10295 01	studies
Data-matched filter	RF shielded connectors	LANGLEY-11415 873-10522 04
JSC-14264 B73-10449 02	GSFC-11215 B73-10509 01	EPOXY RESINS
ELECTRONIC PACKAGING	ENERGY ABSORPTION FILMS Applying high-emittance and solar-	Large boron-epoxy filament-wound pressure vessels
A new packaging and testing concept	absorptance coating to aluminum	NPO-11900 B73-10038 08
for microelectronic components M-FS-20936 B73-10109 01	LANGLEY-10151 B73-10238 04	Vacuum-stripped silicone binder for
Welded printed circuit (pc) stick	ENERGY CONVERSION	thermal-control paint
GSFC-11773 873-10393 01	Proposed electromagnetic wave energy	M-FS-21397 B73-10060 04
Hermatic-coaxial package design for	converter GSFC-11394 B73-10185 01	Production of circular polymer-glass fabric composites
microwave transistors GSFC-10791 B73-10427 01	Laser energy converted into electric	M-FS-22125 B73-10069 04
Nondestructive leak testing	power chargy converted into electric	A new concept for joining dissimilar
LANGLEY-11561 B73-10464 08	NPO-13308 B73-10353 02	composites
New standoffs provide high-reliability	Solar-energy absorber: Active infrared	M-FS-24307 B73-10148 04
component mounting for printed wiring	(IR) trap	Battery cell thermal-conductive coating increases efficiency
boards LANGLEY-11176 B73-10512 01	M-FS-22743 B73-10484 06	LANGLEY-10963 B73-10237 01
ELECTRONICS	Solar-energy absorber: Active infrared (IR) trep without glass	Boron-epoxy tubular structure mem-
Beam lead forming tool	M-FS-22744 B73-10485 06	bers ARC-10737 B73-10265 08
M-FS-22133 B73-10098 07	Metal tube used as solar engine	ARC-10737 B73-10265 08 Transparent polymeric laminates
Reproductive cell separation: A con-	ARC-10461 B73-10493 03	ARC-10783 B73-10341 04
cept -	Solar-energy conversion system provides	Manufacture of large, lightweight parab-
M-FS-22627 873-10198 05	electrical power and thermal control for life-support systems	olic antennas
Improved design of electrophoretic equip-	M-FS-21628 B73-10524 06	ARC-10741 873-10375 08
ment for rapid sickle-cell-anemia screen-	ENERGY DISSIPATION	Strain arrestor plate for mounting rigid insulating tiles
ing GSFC-11794 B73-10225 02	Balsa wood as an energy dissipator	JSC-14182 B73-10465 06
Zeta potential control for electrophoresis	NPO-11839 B73-10388 04	EQUATIONS OF MOTION
cells	ENERGY STORAGE	A theoretical study of aerodynamic noise generation
M-FS-22333 873-10260 04	A practical solar energy heating and cooling system	M-FS-24167 B73-10209 03
Electrophoresis separator combining centrifugal separation	M-FS-22563 873-10156 05	Dynamic nonlinear analysis of shells of
M-FS-21396 873-10328 04	Compact 20-kiloampere pulse-forming-	revolution (DYNASOR II)
ELECTROPLATING	network capacitor bank	JSC-14496 B73-10443 09 EQUATIONS OF STATE
Selective coating for collecting solar	LEWIS-12009 B73-10171 01	An equation of state for oxygen and
energy on aluminum M-FS-22562 B73-10527 04	Monel-shot and screen regenerators GSFC-11593 873-10462 03	nitrogen ,
M-FS-22562 B73-10527 04 ELECTROSTATIC PROBES	GSFC-11593 873-10462 03 ENERGY TRANSFER	JSC-14465 B73-10394 04
Mechanical positioning device for Lang-	A practical solar energy heating and	EQUIPMENT SPECIFICATIONS  Measurement of dimensions and align-
muir probe	cooling system	ment with optical instruments
NPO-11626 B73-10034 06	M-FS-22563 B73-10156 05	M-FS-22168 B73-10061 06

ERROR ANALYSIS

Validity test for linear error analysis	CIES,	Metallic composites as high-temperature
JSC-14378 B73-10219 09	Pre-emphasis determination for an S	fasteners
ERROR CORRECTING DEVICES	band constant bandwidth FM/FM station	M-FS-22438 B73-10081 04 FATIGUE (MATERIALS)
Digital servo controller behaves like	M-FS-22135 B73-10170 02 EYE MOVEMENTS	Fatigue of boron-aluminum composites
synchro KSC-10769 B73-10337 02	Eye-controlled "teletypewriter"	bonds and joints
1.00 15150	LANGLEY-11564 B73-10514 02	M-FS-22325 B73-10079 04
ERROR DETECTION CODES  Minimal hardware, binary sequence	· -	A self-supporting strain transducer
pseudonoise generator and detector	_	LANGLEY-11263 B73-10201 06 Creep-fatigue analysis by Strainrange
NPO-11406 873-10292 01	F	Partitioning
Low-cost coding techniques for digital		LEWIS-12072 B73-10314 04
fault diagnosis	FABRICATION	FATIGUE LIFE
NPO-11701 B73-10344 09	Large boron-epoxy filament-wound	Carbide factor predicts rolling-element
ESCAPE SYSTEMS	pressure vessels	bearing fatigue life LEWIS-11940 B73-10008 07
Emergency-escape device M-FS-22720 B73-10369 07	NPO-11900 B73-10038 08  Densification of powder metallurgy billets	FATIGUE TESTS
	by a roll consolidation technique	Fatigue testing device
ETHYLENE COMPOUNDS  Moisture-resistant coatings for optical	LEWIS-11395 B73-10040 08	LANGLEY-10426 873-10047 07
components	Fabrication of magnetic bubble memory	FEEDBACK CIRCUITS
ARC-10749 B73-10507 04	overlay	Carrier extraction circuit JSC-14262 B73-10094 02
ETHYLENEDIAMINETETRAACETIC	M-FS-22377 673-10096 01	Integrable power gyrator
ACIDS	Beam lead forming tool M-FS-22133 B73-10098 07	M-FS-22342 B73-10159 02
Oxygen sensitive paper M.FS-22354 B73-10103 04	Fabrication techniques for polybenzimid-	FEEDBACK CONTROL
IN TO Extend	azole composites	Digital slope-threshold data compressor
Calibration of dissolved oxygen standard for analysis with methylene blue	ARC-10724 B73-10269 04	NPO-11630 B73-10355 02 FERRITES
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EUTECTIC ALLOYS	cept	NPO-11637 B73-10035 01
Metallic composites as high-temperature	M-FS-22458 B73-10374 01	FIBER STRENGTH
fasteners	Materials data handbook on Inconel Alloy 718	Silicon-fiber blanket solar-cell array con-
M-FS-22438 B73-10081 04	M-FS-22793 B73-10396 04	cept M-FS-22458 873-10374 01
EUTECTICS	Materials data handbooks on stainless	FIBERS
Eutectic bonding of sapphire to sap-	steels	Fiber composite materials: A survey of
phire GSFC-11577 B73-10284 08	M-FS-22797 B73-10397 04	fiber matrix interface mechanics
EXHAUST GASES	Adhesive coating eliminated in new	LEWIS-11924 B73-10007 04
Air-atomizing splash-cone fuel nozzle	honeycomb-core fabrication process LANGLEY-11134 B73-10439 08	Technique for the polymerization of monomers for PPQ/graphite fiber com-
reduces pollutant emissions from turbojet	Process for the production of star-	posites
engines	tracking reticles	LEWIS-11879 B73-10014 04
LEWIS-11918 B73-10200 06	GSFC-11188 B73-10488 03	Residual stress effects on the impact
Formaldehyde monitor for automobile exhausts	Fabrication of optical reflecting diffrac-	resistance and strength of fiber com- posites
LANGLEY-11352 B73-10228 04	tion gratings by light-interference phenom-	LEWIS-11984 B73-10063 04
Catalytic reactor with disposable car-	enon GSFC-11860 B73-10516 03	A new concept for joining dissimilar
tridge	FABRICS	composites
ARC-10747 B73-10376 04	A versatile flammability test chamber	M-FS-24307 B73-10148 04
EXHAUST SYSTEMS	KSC-10126 B73-10111 06	Silicon-fiber blanket solar-cell array con- cept
Improved method for design of expan-	FACSIMILE COMMUNICATION	M-FS-22458 B73-10374 01
sion-chamber mufflers with application to operational helicopter	Automatic focus control for facsimile	Procedure for dispersing fiber bundles
LANGLEY-11548 B73-10471 03	camera LANGLEY-11213 B73-10361 02	LANGLEY-11224 B73-10438 08
EXPLODING WIRES	FAILURE	Reusable silica surface-insulation ma-
A high-speed spectrograph shutter	Event-sequence detector	terial ARC-10721 B73-10504 04
HQ-10635 B73-10368 01	NPO-11703 B73-10278 01	FIELD EFFECT TRANSISTORS
EXPLORATION	FAILURE ANALYSIS	Low phase-noise digital frequency di-
Articulated elastic-loop roving vehicles M-FS-22691 B73-10326 06	An improved method for obtaining a normalized junction temperature for semi-	vider
	conductors: A concept	NPO-11569 B73-10135 01
EXPLOSIVE WELDING  New explosive seam welding concepts	JSC-14136 B73-10196 01	Gyrator circuit using field effect transis-
LANGLEY-11211 B73-10180 04	A new algorithm for finding survival	tors M-FS-21433 873-10161 02
EXTRACTION	coefficients employed in reliability equa-	P-channel silicone gate FET
Tool for installing or extracting small	tions M-FS-22295 873-10256 09	M-FS-22505 B73-10197 01
bulbs in limited-access spaces	Creep-fatigue analysis by Strainrange	Integrated p-channel MOS gyrator
LANGLEY-11543 B73-10433 07	Partitioning	M-FS-22343 B73-10217 02
EXTRATERRESTRIAL LIFE	LEWIS-12072 B73-10314 04	Insulated ECG electrodes
Unified life detection system: A con-	FARADAY EFFECT	JSC-14339 B73-10220 05
cept ARC-10769 B73-10377 05	Low-noise microwave polarimeter	Data multiplexer using a tree switch NPO-11333 B73-10289 02
EXTRATERRESTRIAL RADIATION	NPO-11512 B73-10134 02 FAST NEUTRONS	FILAMENT WINDING
Cosmic dust or other similar outer-space	Fast-neutron spectrometer develop-	Large boron- epoxy filament-wound
particles location detector	ments	pressure vessels
GSFC-11291 B73-10282 02	M-FS-22279 B73-10116 03	NPO-11900 B73-10038 08

EXTREMELY LOW RADIO FREQUEN- FASTENERS

Frequency control circuit for all-digital Rocket plume properties measured in Filament winding technique produces phase-lock loops space simulators strong lightweight oxygen tanks NPO-11608 B73-10137 03 B73-10082 08 NPO-11936 873-10351 01 M-FS-22470 FLOATS FILTRATION Dye laser remote sensing of marine Floating baffle to improve efficiency of Industrial filter bags cleaned by highplankton frequency vibration: A concept liquid transfer from tanks LANGLEY-11382 B73-10359 05 B73-10398 06 KSC-10639 B73-10190 07 M-FS-24445 **FLUORO COMPOUNDS** FLOW CHARACTERISTICS Application of biological filters in water Nonflammable potting-encapsulating and Computer program to determine the treatment systems conformal coating compounds irrotational nozzle admittance 873-10404-05 B73-10102 04 JSC-14228 JSC-14164 B73-10233 09 LEWIS-12019 Backflushing system rapidly cleans fluid Flammability control for electrical cables FLOW DISTRIBUTION filters and connectors Theoretical prediction of interference B73-10405 06 JSC-14273 873-10235 02 M-FS-21584 loading on aircraft stores: Part II --Sequential-strip and sequential-disk fil-**FLUOROCARBONS** Supersonic speeds ters A new intermediate for the production B73-10183 06 LANGLEY-11250 JSC-14592 B73-10430 06 of flexible stable polymers Theoretical prediction of interference -FINITE DIFFERENCE THEORY M-FS-22355 B73-10080 04 loading on aircraft stores: Part I - Subsonic Computer program for predicting Manufacture and quality control of interspeeds metric jet mixing of compressible flow in LANGLEY-11249 B73-10184-06 connecting wire harnesses FLOW MEASUREMENT 873-10211 01 M-FS-22511 B73-10263 09 AHC-10730 lon-tracer anemometer **FOAMS** FIRE CONTROL M-FS-21399 B73-10151 04 Fire retardant cellulosic foam Detector for inspection of fire alarms Laser velocimeter with transverse and JSC-14336 B73-10085 04 GSFC-11600 873-10128 06 on-axis sensitivity **FOCUSING** FIRE PREVENTION B73-10262 03 ARC-10642 Automatic focus control for facsimile A versatile flammability test chamber camera FLOW VELOCITY KSC-10126 B73-10111 06 B73-10361 02 LANGLEY-11213 Laser velocimeter for simultaneous two-FIREPROOFING FOOD dimensional velocity measurements Fire retardant cellulosic foam 873-10267 02 Rapid detection of bacteria in foods and ARC-10637 B73-10085 04 JSC-14336 biological fluids **FLOWMETERS** Flammability control for electrical cables GSFC-11738 B73-10045 05 Particle-fluid interactions for flow measand connectors FORCED VIBRATION urements B73-10235 02 M-FS-21584 M-FS-21727 B73-10117 06 Mechanical impedance and acoustic FIRES mobility measurement techniques of FLUID DYNAMICS Emergency-escape device Computer program for predicting symspecifying vibration environments M-FS-22720 B73-10369 07 B73-10059 06 M-FS-22016 metric jet mixing of compressible flow in FITTINGS FORMALDEHYDE iets Improved fiberglass-to-metal joint pro-ARC-10730 B73-10263 09 Self-sterilizing polymers duces lighter stronger fiberglass strut Computer program for the prediction of B73-10090 04 M-FS-22054 LEWIS-11661 B73-10258 08 reorientation flow dynamics Formaldehyde monitor for automobile FLAMMABILITY LEWIS-11816 B73-10307 09 exhausts A versatile flammability test chamber Improved syncom-type fluid damper LANGLEY-11352 B73-10228 04 873-10111 06 KSC-10126 B73-10478 06 GSFC-11205 FLAPS (CONTROL SURFACES) Analyses of unsteady entropic-flow FORMING TECHNIQUES Flex flap processes B73-10502 06 Autoclave heat treatment for prealloyed ARC-10771 M-FS-24475 B73-10482 03 powder products FLAT CONDUCTORS FLUID FILTERS LEWIS-11953 B73-10172 04 Flat conductor cable survey Backflushing system rapidly cleans fluid 873-10055-01 **FORTRAN** M-FS-22493 FLAT PLATES N-body U and K matrix program JSC-14273 Diffusion welding tool LEWIS-11438 B73-10012 09 Sequential-strip and sequential-disk fil-LEWIS-11807 B73-10072 08 A comprehensive program for textual ters **FLAT SURFACES** concordances and statistics JSC-14592 B73-10430 06 Improved technique for inspection of JSC-17484 873-10049 09 **FLUID FLOW** planar surfaces by microscopy and interfer-Computer program for transient response Bimetallic devices for stirring fluids ometry of structural rings subjected to fragment ARC-10441 B73-10029 06 NPO-11893 B73-10143 03 impact Geysering inhibitor pipe FLEXIBLE BODIES LEWIS-11926 B73-10064 09 873-10110-07 KSC-10615 Embossed metal diaphragm has two-way Aerotherm charring materials ablation stratch Particle-fluid interactions for flow meascomputer program R73-10298 08 NPO-11635 LEWIS-11854 873-10065-09 urements Hybrid coordinate formulation used for Computer program for preliminary design M-FS-21727 B73-10117 06 the design of attitude control systems for analysis of axial-flow turbines Pressure drop and pumping power for flexible spacecraft LEWIS-11815 873-10066-09 fluid flow through round tubes NPO 11714 B73-10300 09 M-FS-24172 B73-10186 09 Medical information management system FLIGHT MECHANICS : (MIMS): An automated hospital informa-Mach-Zehnder optical configuration with Ascent control analysis for S-II derivative tion system Brewster window and two quarter-wave launch vehicles, digital computer program GSFC-11540 B73-10073 09 plates M-FS-24324 873-10120 09 M-FS-22741 B73-10417 03 PPUAS--photopeak unfolding and self-FLIP-FLOPS FLUIDS shielding program Time-based priority selection for analog NPO-13188 873-10087-09 Long-term material compatibility testing circuits A general purpose maneuver turns M-FS-24242 system 873-10154 02 NPO-11776 873-10385 04 computer program Digital random-number generator-NPO-13213 B73-10266 09 B73-10088 09 ARC-10096 FLUORESCENCE Digital servo controller behaves like Two new methods to increase the con-A finear circuit analysis program with trast of track-etch neutron radiographs stiff systems capability synchro KSC-10769 B73-10337 02 B73-10027 03 LANGLEY-11184 B73-10091 09 LEWIS-11893

Marshall system for aerospace simulation FREQUENCY MODULATION Eigenvalue routine by Sturm sequence (MARSYAS) method Pre-emphasis determination for an S--NPO-11805 B73-10114 09 B73-10432-09 M-FS-22672 band constant bandwidth FM/FM station Automated shell theory for rotating M-FS-22135 B73-10170 02 Dynamic nonlinear analysis of shells of structures (ASTROS) revolution (DYNASOR II) Junction range finder M-FS-21970 873-10115 09 JSC-14496 B73-10443 09 KSC-10108 B73-10191 02 Ascent control analysis for S-II derivative High-sensitivity receiver for CO2 laser Frequencies and modes for shells of launch vehicles, digital computer program revolution (FAMSOR) communications M-FS-24324 B73-10120-09 GSEC-11455 B73-10223 02 JSC-14497 873-10444-09 GREMEX update (Goddard research Spectral analysis program (SAP) The static nonlinear analysis of shells engineering management exercise) JSC-14310 B73-10227 09 of revolution (SNASOR II) GSFC-11512 B73-10162 09 RF to digital converter JSC-14495 B73-10445 09 Theoretical prediction of interference JSC-14419 873-10306-02 loading on aircraft stores: Part II --Stiffness and mass matrices for shells Carrier suppression device for a hetero-Supersonic speeds of revolution (SAMMSOR II) dyne gas analyzer B73-10183 06 LANGLEY-11250 JSC-14494 B73-10446 09 ARC-10785 B73-10381 03 Theoretical prediction of interference Improved method for aerodynamic analy-FREQUENCY SCANNING loading on aircraft stores: Part 1 - Subsonic sis of wing-body-tail configurations in speeds Automatic carrier acquisition system for subsonic and supersonic flow LANGLEY-11249 phase-lock-loop receivers B73-10184 06 LANGLEY-11305 B73-10470 06 NPO-11628 Computer program for the design of B73-10343 02 Improved method for design of expantoroidal transformers FREQUENCY SHIFT sion-chamber mufflers with application to LEWIS-11878 B73-10214 09 Real time optical figure sensor operational helicopter Spectral analysis program (SAP) M-FS-22123 B73-10169 02 LANGLEY-11548 B73-10471 03 JSC-14310 B73-10227 09 Frequency shifting with a solid-state Stereoscopic computer graphics display Computer program for calculation of switching capacitor system thermodynamic and transport properties of HQ-10812 B73-10259 01 M-FS-22322 873-10526 09 complex chemical systems Laser velocimeter with transverse and B73-10231 09 LEWIS-11997 **FOURIER TRANSFORMATION** on-axis sensitivity A computer program for calculating Computer-controlled vibration testing ARC-10642 B73-10262 03 design and off-design performance for NPO-11612 873-10138 02 Laser velocimeter for simultaneous twoturbojet and turbofan engines Design and fabrication of an experimental dimensional velocity measurements LEWIS-12010 B73-10232 09 image forming light modulator ARC-10637 873-10267-02 Computer program to determine the M-FS-22547 B73-101B2 03 Three-dimensional gas turbulence measirrotational nozzle admittance FRACTURE MECHANICS urement with a laser-Doppler velocimeter LEWIS-12019 B73-10233 09 system Fiber composite materials: A survey of Method for predicting rotor free-wake fiber matrix interface mechanics M-FS-22713 B73-10371 04 positions and the resulting rotor blade LEWIS-11924 873-10007 04 Mach-Zehnder optical configuration with Brewster window and two quarter-wave Optimization of structures on the basis LANGLEY-10674 B73-10239 06 plates of fracture mechanics and reliability crit-Computer program to determine roots M-FS-22741 of polynomials by ratio of successive B73-10417 03 NPO-11645 Motion compensator for holographic B73-10276 06 derivatives motion picture camera LEWIS-11809 B73-10244 09 Design guide for glass fiber reinforced M-FS-22517 A computer program for calculating metal pressure vessel B73-10434 03 design and off-design performance of two-LEWIS-12042 FREQUENCY STABILITY B73-10311 08 FRACTURE STRENGTH A technique to eliminate false lock in and three-spool turbofans with as many as three nozzles PCM demodulation Probability of stress-corrosion fracture LEWIS-12011 JSC-12494 B73-10245 09 under random loading 873-10106 02 Computer program for compressible flow NPO-13113 B73-10453 04 Phase shift keyed, pulse code modulated network analysis FREEZING signal synchronizer LEWIS-11859 873-10246 09 Fluid insulation to prevent ice formation JSC-12462 B73-10107 02 in heat exchangers Computer program to compute buckling Stabilizing a gaseous optical laser loads of simply supported anisotropic LEWIS-11959 XGS-03644 R73-10028 06 873-10517 03 plates Preservation of flavor in freeze dried FREQUENCY STANDARDS LEWIS-11961 B73-10247 09 areen beans Time-synchronized VLF phase-tracking Computer program calculates quasi-one-JSC-14149 B73-10092 05 receiver dimensional flow across face seals and Automatic device for shell freezing of NPO-11600 B73-10275 02 narrow slots liquids Stabilizing a gaseous optical laser LEWIS-11996 B73-10248 09 GSFC-11737 XGS-03644 873-10253-04 B73-10517 03 Computer program for the prediction of FREQUENCY CONTROL FREQUENCY SYNCHRONIZATION reorientation flow dynamics Digital notch filter A technique to eliminate false lock in LEWIS-11816 B73-10307 09 KSC-10182 PCM demodulation B73-10112 02 Program for calculating total-efficiency Frequency control circuit for all-digital JSC-12494 873-10106-02 of specific-speed characteristics of centrifphase-lock loops Phase shift keyed, pulse code modulated ugai compressors NPO-11936 B73-10351 01 signal synchronizer LEWIS-12008 B73-10309 09 FREQUENCY CONVERTERS JSC-12462 B73-10107 02 Characteristics of FORTRAN RF to digital converter FUEL CELLS LANGLEY-11177 873-10322 09 JSC-14419 B73-10306-02 A methanol/air fuel call system Computer program to determine pressure FREQUENCY DIVIDERS M-FS-22541 873-10472 07 distributions and forces on blunt bodies of An electrochemical engine Low phase-noise digital frequency direvolution vider M-FS-22542 873-10473 07 LANGLEY-11197 873-10362 09 NPO-11569 B73-10135-01 Vapor-deposited platinum as a fuel-cell Computer program for stress, vibration, FREQUENCY DIVISION MULTIPLEXING catalyst and buckling characteristics of general Synchronous ten-megabit biphase detec-M-FS-21317 B73-10475 04 shells of revolution Fuel-cell heat and mass plate LANGLEY-11369 B73-10363 09 M-FS-22546 873-10323 02 M-FS-21318 B73-10489 07

		DA STOLLE BOOKET PROPELLANTS
FUEL INJECTION	GAS DETECTORS	GASEOUS ROCKET PROPELLANTS
Design handbook for gaseous fuel engine	Detection of nitric oxide pollution ARC-10709 B73-10018 03	Mass flow controller for gaseous pro- pellants
injectors and combustion chambers LEWIS-12154 B73-10412 07	ARC-10709 B73-10018 03 GAS DYNAMICS	JSC-14221 873-10207 06
Injector has no backsplash	Analyses of unsteady entropic-flow	GASOLINE
NPO-13208 B73-10461 07	processes	Floating baffle to improve efficiency of
FUEL OILS	M-FS-24475 B73-10482 03	liquid transfer from tanks
Floating baffle to improve efficiency of	GAS FLOW	KSC-10639 B73-10190 07
liquid transfer from tanks	Particle-fluid interactions for flow meas-	GATES (CIRCUITS)
KSC-10639 B73-10190 07	urements	P-channel silicone gate FET
FUEL SPRAYS	M-FS-21727 B73-10117 06	M-FS-22505 B73-10197 01
Injector has no backsplash	lon-tracer anemometer	Frequency control circuit for all-digital
NPO-13208 B73-10461 07	M-FS-21399 B73-10151 04 Mass flow controller for gaseous pro-	phase-lock loops
FUEL TANKS	pellants	NPO-11936 B73-10351 01
Filament winding technique produces	JSC-14221 B73-10207 06	Pulse stretcher for narrow pulses
strong lightweight oxygen tanks	Three-dimensional gas turbulence meas-	JSC-14130 B73-10365 02
M-FS-22470 B73-10082 08	urement with a laser-Doppler velocimeter	Gated compressor, distortionless signal
FUNCTION GENERATORS	system	limiter
Logical-function generator XLA-05099 B73-10360 09-	M-FS-22713 873-10371 04	NPO-11820 873-10387 01
•	High-speed spectrograph for shock tube	Combined sun-acquisition and sun gate-
FUSION WELDING Resistance spot welding of dispersion-	studies	sensor system for spacecraft attitude
strengthened nickel alloys	ARC-10772 B73-10501 03	control 873-10460 02
LEWIS-12075 B73-10315 04	GAS GENERATORS	
	Smoke generator	GE COMPUTERS
. \$	LANGLEY-11433 B73-10414 06	Automated data management informa- tion system (ADMIS)
G	GAS GUNS	KSC-10619 B73-10053 09
_	Collapsible pistons for light-gas guns	GEARS
	JSC-13789 B73-10413 07	Mechanical planetary compensating drive
GALLIUM ARSENIDES	GAS INJECTION  Design handbook for gaseous fuel engine	system
GaAs transistors formed by Be or Mg	injectors and combustion chambers	ARC-10462 B73-10497 06
ion implantation LANGLEY-11204 B73-10442 01	LEWIS-12154 B73-10412 07	GENETICS
GALLIUM COMPOUNDS	GAS IONIZATION	Reproductive cell separation: A con-
Vapor phase growth of group 3, 4, and	Design method for minimizing RF voltage	cept
5 compounds by HCI transport of ele-	breakdown	M-FS-22627 B73-10198 05
ments	NPO-13408 B73-10520 01	GETTERS
LANGLEY-11144 B73-10056 04	GAS LASERS	Gettering capsule for removing oxygen
GAMMA RAYS	Stabilizing a gaseous optical laser	from liquid lithium systems LEWIS-11509 873-10002 04
Reductive cleavage of the peptide bond	XGS-03644 B73-10517 03	
LRL-10026 B73-10194 04	GAS MIXTURES	GLASS Glass transition temperatures of liquid
Noncontacting devices to indicate deflec-	Fluidic device for measuring constituent	prepolymers obtained by thermal penetrom-
tion and vibration of turbopump internal	masses of a flowing binary gas mixture LEWIS-11995 B73-10230 06	etry
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Fabrication of magnetic bubble memory	tion	(IR) trap
overlay	LANGLEY-11326 B73-10241 05	M-FS-22743 B73-10484 06
M-FS-22377 B73-10096 01	GAS TRANSPORT	GLASS COATINGS
GAS ANALYSIS	Vapor phase growth of group 3, 4, and	Glass encapsulation provides extra pro-
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Biodetection grinder M-FS-22833 GUIDANCE (MOTION) Fine guidance for a s scope GSFC-11487 GYRATORS Integrable power gyrato M-FS-22342 Gyrator circuit using fie tors M-FS-21433 Integrated p-channel Mi M-FS-22343  H HABITABILITY Shuttle orbiter storage is study JSC-14448 HALL GENERATORS Solid-state controller JSC-12394 HANDBOOKS	B73-10468 03  B73-10159 02  Id effect transis- B73-10161 02  OS gyrator B73-10217 02  Ocker system: A B73-10287 08  B73-10466 06	HARNESSES  Manufacture and quality of interconnecting wire harnesses M-FS-22511 B73-1 Plug-in integrated/hybrid circu M-FS-24470 B73-1 HAZARDS  Safe electrical receptacle and plug KSC-10817 B73-1 HEART HATE  Vectorcardiogram  JSC-14427 B73-1 Cardiotachometer displays heat a beat-to-beat basis M-FS-20284 B73-1 HEAT  Recovery of recordings from haged magnetic tapes  JSC-14219 B73-1 HEAT EXCHANGERS  Fluid insulation to prevent ice in heat exchangers  LEWIS-11959 B73-1 Condensate-removal device exchangers  JSC-14143 B73-1	ontrol of 10211 01 it 10476 01 modified 10366 01 10477 05 meat dam-10173 02 formation 10028 06 for heat 10429 06	Fabrication techniques for azole composites ARC-10724 E HEAT SOURCES Low cost uniform heat so LEWIS-11903 E Detector for inspection GSFC-11600 New method for determ physical properties of test is LANGLEY-11053 E HEAT TRANSFER Aerotherm charring mate computer program LEWIS-11854 E Thermal-dynamic modeling LANGLEY-11309 Thin film thermoelectric d mal control coatings: A stu M-FS-21384 E Handbook on thermophys of oxygen LEWIS-11962 E Solar-energy absorber: (IR) trap M-FS-22743	173-10269 04 urce 173-10011 02 of fire alarmatics of fire alarmatic
Biodetection grinder M-FS-22833 GUIDANCE (MOTION) Fine guidance for a s scope GSFC-11487 GYRATORS Integrable power gyrato M-FS-22342 Gyrator circuit using fie tors M-FS-21433 Integrated p-channel Mit M-FS-22343  H HABITABILITY Shuttle orbiter storage is study JSC-14448 HALL GENERATORS Solid-state controller JSC-12394 HANDBOOKS Flat conductor cable sui M-FS-22493 Lubrication handbook	873-10468 03  7  873-10159 02  Id effect transis-  873-10161 02  OS gyrator  873-10217 02  Ocker system: A  873-10287 08  873-10466 06  Ocker System	HARNESSES  Manufacture and quality of interconnecting wire harnesses M-FS-22511 B73-1 Plug-in integrated/hybrid circu M-FS-24470 B73-1 HAZARDS Safe electrical receptacle and plug KSC-10817 B73-1 HEART RATE Vectorcardiogram JSC-14427 B73-1 Cardiotachometer displays hea a beat-to-beat basis M-FS-20284 B73-1 HEAT Recovery of recordings from haged magnetic tapes JSC-14219 B73-1 HEAT EXCHANGERS Fluid insulation to prevent ice in heat exchangers LEWIS-11959 B73-1 Condensate-removal device exchangers JSC-14143 B73-1 Monel-shot and screen regene	ontrol of 0211 01 it 0476 01 modified 0366 01 0401 02 rt rate on 0477 05 heat dam- 0173 02 formation 10028 06 for heat 0429 06 rators	Fabrication techniques for azole composites ARC-10724 EMEAT SOURCES Low cost uniform heat so LEWIS-11903 EMEAT SOURCES Low cost uniform heat so LEWIS-11903 EMEAT SOURCES Low cost uniform heat so LEWIS-11903 EMEAT FANGLEY-11053 EMEAT TRANSFER Aerotherm charring mate computer program LEWIS-11854 EMEAT Thermal-dynamic modeling LANGLEY-11309 EMEAT Thin film thermoelectric dimal control coatings: A stumple American American Solar-energy absorber: AMEM	173-10269 Original of the second of the seco
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HEAT TREATMENT	HOLOGRAPHY	HUMAN REACTIONS
Autoclave heat treatment for prealloyed	Vibration measurement by pulse dif-	System for measuring passenger reaction
powder products	ferential holographic interferometry LANGLEY-11092 B73-10075 03	to transportation-vehicle vibration LANGLEY-11353 B73-10436 05
LEWIS-11953 B73-10172 04	Holographic testing with a double refer-	HUMIDITY
HELICOPTER DESIGN Improved method for design of expan-	ence beam	A new method for the determination of
sion-chamber mufflers with application to	JSC-17959 B73-10086 03	thin film porosity
operational helicopter	A generalized approach to computer	HQ-10673 B73-10286 01
LANGLEY-11548 B73-10471 03	synthesis of digital holograms M-FS-21973 B73-10101 09	HUMIDITY MEASUREMENT
HELIUM	Holographic nondestructive testing of	Fluidic device for measuring constituent masses of a flowing binary gas mixture
SRC seal testing M-FS-22426 B73-10199 01	laminates	LEWIS-11995 873-10230 06
HELIUM-NEON LASERS	JSC-19107 B73-10108 04	HYDRAULIC EQUIPMENT
Laser addressed holographic memory	Laser addressed holographic memory system	Fail-safe bidirectional valve driver
system	M-FS-22565 B73-10155 03	NPO-11958 B73-10450 07
M-FS-22565 B73-10155 03	An improved holographic recording me-	HYDRAULIC FLUIDS
HEMOGLOBIN	dium	Lubrication handbook M-FS-22326 B73-10062 04
Improved design of electrophoretic equip- ment for rapid sickle-cell-anemia screen-	M-FS-22532 B73-10166 09 Bonded panel, flaw detection standards	
ing	LANGLEY-11399 873-10240 06	HYDRAZINES Rubber composition compatible with
GSFC-11794 B73-10225 02	Hologram recording tubes	hydrazine
HEMOLYSIS	M-FS-22590 B73-10330 03	NPO-11440 B73-10019 04
Improved design of electrophoretic equip-	Coherence-length extender M-FS-22434 B73-10399 03	HYDROCARBONS
ment for rapid sickle-cell-anemia screen-	A real time moving-scene holographic	Method for estimating solubility param-
ing GSFC-11794 B73-10225 02	camera	eter NPO-11647 B73-10022 04
HERMETIC SEALS	M-FS-21087 B73-10421 03	An improved holographic recording me-
SRC seal testing	Laser-actuated holographic storage de-	dium
M-FS-22426 B73-10199 01	vice. M-FS-22768 B73-10423 03	M-FS-22532 B73-10166 09
Nondestructive leak testing	Motion compensator for holographic	HYDROGEN
LANGLEY-11561 B73-10464 06	motion picture camera	Stable palladium alloys for diffusion of
HETERODYNING	M-FS-22517 B73-10434 03	hydrogen NPO-11747 873-10024 04
High-sensitivity receiver for CO2 laser communications	Photography of random motion with a	Gas-operated actuator: A concept
GSFC-11455 B73-10223 02	holographic camera	NPO-11369 B73-10133 03
Carrier suppression device for a hetero-	M-FS-22537 B73-10435 03 HOMOGENEITY	<ul> <li>Hydrogen-environment embrittlement of</li> </ul>
dyne gas analyzer	Low-resistivity homogeneous elasto-	metals: A study .
ARC-10785 873-10381 03	mers	M-P3-22940 873-10106 04
HEWLETT-PACKARD COMPUTERS  Pressure drop and pumping power for	NPO-11881 B73-10349 04	Fluidic device for measuring constituent masses of a flowing binary gas mixture
fluid flow through round tubes	HONEYCOMB CORES	LEWIS-11995 B73-10230 06
M-FS-24172 B73-10186 09	Radial honeycomb core ARC-10727 B73-10340 08	Detecting and measuring metabolic
HEXAGONS	Adhesive coating eliminated in new	byproducts by electrochemical sensing
Embossed metal diaphragm has two-way stretch	honeycomb-core fabrication process	LANGLEY-11525 B73-10523 05
NPO-11635 B73-10298 08	LANGLEY-11134 B73-10439 08	HYPERVELOCITY PROJECTILES  Collapsible pistons for light-gas guns
HIGH ALTITUDE BALLOONS	HONEYCOMB STRUCTURES	JSC-13789 873-10413 07
Balloon-borne package temperature	Lightweight graphite/polyimide panels JSC-14375 873-10121 04	
controller	New concept in brazing metallic honey-	
GSFC-11620 B73-10192 03 HIGH FREQUENCIES	comb panels	ı.
Industrial filter bags cleaned by high-	LANGLEY-10957 B73-10358 08	•
frequency vibration: A concept	Corrugated battery electrode	IBM 360 COMPUTER
M-FS-24445 B73-10398 06	GSFC-11368 B73-10515 01	A comprehensive program for textual
HIGH PRESSURE OXYGEN	Honeycomb battery plaque GSFC-11367 B73-10519 01	concordances and statistics J\$C-17484 B73-10049 09
Transfer of gaseous oxygen from high- pressure containers and the Joule-Thomson	HOSPITALS	Ascent control analysis for S-II derivative
inversion	Intensive care alarm system	launch vehicles, digital computer program
KSC-10721 B73-10483 04	GSFC-11377 B73-10126 02	M-FS-24324 873-10120 09
HIGH SPEED CAMERAS	New system for bathing bedridden pa-	GREMEX update (Goddard research
A real time moving-scene holographic	tients ARC-10745 B73-10272 05	engineering management exercise) GSFC-11512 B73-10162 09
camera M-FS-21087 873-10421 03		Method for predicting rotor free-wake
HIGH STRENGTH ALLOYS	JSC-14427 B73-10401 02	positions and the resulting rotor blade
Production of small diameter high-	HOT PRESSING	airloads
temperature-strength refractory metal	Improved diffusion welding and roll	LANGLEY-10674 B73-10239 06
wires LEWIS-11802 B73-10003 08	welding of titanium alloys LEWIS-11852 B73-10005 08	Computer program to determine roots of polynomials by ratio of successive
HIGH TEMPERATURE RESEARCH	HUMAN BODY	derivatives
A flexible all-temperature pressure ves-	Mathematical model for predicting hu-	LEWIS-11809 B73-10244 09
sel	man vertebral fracture	Characteristics of FORTRAN
M-FS-19196 B73-10158 03	· · · · · · · · · · · · · · · · · · ·	LANGLEY-11177 B73-10322 09
HIGH TEMPERATURE TESTS High-temperature-radiation analyzer	HUMAN FACTORS ENGINEERING Integral aircraft passenger seat	Logistics hardware and services control system
	ARC-10799 B73-10495 05	KSC-10819 B73-10418 09
ARC-10565 873-10017 03	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	

Dynamic nonlinear analysis of shells of IMAGE CONVERTERS Rechargeable, silver-zinc battery conrevolution (DYNASOR II) A magnetically focused image tube ditioner/monitor unit and state-of-charge JSC-14496 B73-10443 09 employing an opaque photocathode indicator Frequencies and modes for shells of GSFC-11602 B73-10255 02 M-FS-22835 B73-10486 02 revolution (FAMSOR) INDUCTANCE IMAGE DISSECTOR TUBES JSC-14497 B73-10444 09 Intensive care alarm system Light-direction sensor based on birefrin-GSFC-11377 The static nonlinear analysis of shells B73-10126 02 gency of revolution (SNASQR II) INDUCTION MOTORS NPO-11201 B73-10131 03 Variable-frequency JSC-14495 B73-10445 09 inverter controls **IMAGE ENHANCEMENT** torque, speed, and braking in ac induction Stiffness and mass matrices for shells Video enhancement of X-ray and neutron motors of revolution (SAMMSOR II) radiographs M-FS-22088 JSC-14494 B73-10525 02 B73-10446 09 LEWIS-11944 B73-10009 03 INDUSTRIAL SAFETY IBM 7090 COMPUTER Digital TV image enhancement system Pressurized lighting system Aerotherm charring materials ablation GSFC-11256 B73-10285 02 KSC-10644 B73-10280 02 computer program IMAGE MOTION COMPENSATION Liquid and gaseous oxygen safety re-LEWIS-11854 B73-10065 09 Motion compensator for holographic view Computer program for preliminary design LEWIS-12041 motion picture camera B73-10310 04 analysis of axial-flow turbines B73-10434 03 M-FS-22517 INERT ATMOSPHERE LEWIS-11815 B73-10066 09 **IMAGE TUBES** Pressurized lighting system **IBM 7094 COMPUTER** KSC-10644 B73-10280 02 A magnetically focused image tube Aerotherm charring materials ablation INFLATABLE STRUCTURES employing an opaque photocathode computer program GSFC-11602 B73-10255 02 Lightweight inflatable material with low LEWIS-11854 B73-10065 09 permeability IMAGERY Computer program for preliminary design LANGLEY-10928 B73-10400 04 Image formation in microwave holograanalysis of axial-flow turbines INFORMATION RETRIEVAL LEWIS-11815 phy B73-10066 09 ARC-10773 A comprehensive program for textual B73-10378 03 Automated shell theory for rotating concordances and statistics **IMAGING TECHNIQUES** structures (ASTROS) JSC-17484 B73-10049 09 M-FS-21970 B73-10115 09 Design and fabrication of an experimental Automated data management informaimage forming light modulator GREMEX update (Goddard research tion system (ADMIS) M-FS-22547 B73-10182 Q3 engineering management exercise) KSC-10619 R73-10053 09 Microwave holography for nondestructive GSFC-11512 B73-10162 09 Medical information management system Computer program for the design of testing (MIMS): An automated hospital informa-ARC-10774 B73-10379 03 toroidal transformers tion system LEWIS-11878 873-10214 09 IMPACT RESISTANCE GSFC-11540 B73-10073 09 Computer program for calculation of Residual stress effects on the impact INFORMATION SYSTEMS thermodynamic and transport properties of resistance and strength of fiber com-Automated data management informacomplex chemical systems posites tion system 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	GSFC-11406 B73-10181 03	Materials data handbook on Inconel Alloy
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KSC-10615 B73-10110 07 Automatic microbial transfer LANGLEY-11354 B73-10229 05 Liquid and gaseous oxygen safety re- view LEWIS-12041 B73-10310 04 MATERIALS RECOVERY Electrophoresis separator combining	MECHANICAL DRIVES  Mechanical planetary compensating drive system  ARC-10462  MECHANICAL IMPEDANCE  Mechanical impedance and acoustic mobility measurement techniques of specifying vibration environments  M-FS-22016  MECHANICAL IMPEDANCE  Mechanical impedance and acoustic mobility measurement techniques of specifying vibration environments  M-FS-22016  MEGHANICAL DRIVES	Compact 20-kiloampere pulse-forming- network capacitor bank LEWIS-12009 B73-10171 01 Process for the production of star- tracking reticles GSFC-11188 B73-10488 03  METAL FOILS Corrugated battery electrode
KSC-10615 B73-10110 07 Autometic microbial transfer LANGLEY-11354 B73-10229 05 Liquid and gaseous oxygen safety review LEWIS-12041 B73-10310 04 MATERIALS RECOVERY	MECHANICAL DRIVES  Mechanical planetary compensating drive system  ARC-10462  MECHANICAL IMPEDANCE  Mechanical impedance and acoustic mobility measurement techniques of specifying vibration environments  M-FS-22016  MECHANICAL PROPERTIES	Compact 20-kiloampere pulse-forming- network capacitor bank LEWIS-12009 B73-10171 01 Process for the production of star- tracking reticles GSFC-11188 B73-10488 03  METAL FOILS Corrugated battery electrode GSFC-11368 B73-10515 01
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Automatic microbial transfer LANGLEY-11354 B73-10229 05 Liquid and gaseous oxygen safety review LEWIS-12041 B73-10310 04  MATERIALS RECOVERY Electrophoresis separator combining centrifugal separation M-FS-21396 B73-10328 04  MATHEMATICAL MODELS Experimental verification of computer spray-combustion models ARC-10689 B73-10031 03 Mathematical model for predicting human vertebral fracture ARC-10691 B73-10033 05 Large boron - epoxy filament-wound pressure vessels NPO-11900 B73-10038 08 Computer program calculates quasi-one-dimensional flow across face seals and narrow slots LEWIS-11996 B73-10248 09 Marshall system for aerospace simulation (MARSYAS) M-FS-22672 B73-10432 09  MATRICES (MATHEMATICS)	MECHANICAL DRIVES  Mechanical planetary compensating drive system  ARC-10462  Mechanical impedance and acoustic mobility measurement techniques of specifying vibration environments  M-FS-22016  MECHANICAL PROPERTIES  An inexpensive and effective method for calculating the strength of randomly reinforced fiber composites  LEWIS-11985  LEWIS-11984  Autoclave heat treatment for prealloyed powder products  LEWIS-11983  M-FS-22793  M-FS-22793  M-FS-22793  M-FS-22797  MEDICAL ELECTRONICS  Insulated ECG electrodes  JSC-14339  M53-10220 05	Compact 20-kiloampere pulse-forming- network capacitor bank LEWIS-12009 B73-10171 01 Process for the production of star- tracking reticles GSFC-11188 B73-10488 03  METAL FOILS Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01  METAL HALIDES Radiochemical synthesis of pure an- hydrous metal halides LEWIS-11860 B73-10407 04  METAL JOINTS Improved fiberglass-to-metal joint pro- duces lighter stronger fiberglass strut LEWIS-11661 B73-10258 08 Low-closing-force seal ARC-10775 B73-10380 06  METAL MATRIX COMPOSITES Fiber composite materials: A survey of fiber matrix interface mechanics LEWIS-11924 B73-10007 04  METAL OXIDE SEMICONDUCTORS Complementary MOS four-phase logic circuits
KSC-10615 B73-10110 07 Automatic microbial transfer LANGLEY-11354 B73-10229 05 Liquid and gaseous oxygen safety review LEWIS-12041 B73-10310 04 MATERIALS RECOVERY Electrophoresis separator combining centrifugal separation M-FS-21396 B73-10328 04 MATHEMATICAL MODELS Experimental verification of computer spray-combustion models ARC-10689 B73-10031 03 Mathematical model for predicting human vertebral fracture ARC-10691 B73-10033 05 Large boron epoxy filament-wound pressure vessels NPO-11900 B73-10038 08 Computer program calculates quasi-one-dimensional flow across face seals and narrow slots LEWIS-11996 B73-10248 09 Marshall system for aerospace simulation (MARSYAS) M-FS-22672 B73-10432 09	MECHANICAL DRIVES  Mechanical planetary compensating drive system  ARC-10462  Mechanical impedance and acoustic mobility measurement techniques of specifying vibration environments  M-FS-22016  MECHANICAL PROPERTIES  An inexpensive and effective method for calculating the strength of randomly reinforced fiber composites  LEWIS-11985  LEWIS-11985  B73-10039 04  Residual stress effects on the impact resistance and strength of fiber composites  LEWIS-11984  B73-10063 04  Autoclave heat treatment for prealloyed powder products  LEWIS-11953  B73-10172 04  Materials data handbook on Inconel Alloy 718  M-FS-22793  Materials data handbooks on stainless steels  M-FS-22797  MEDICAL ELECTRONICS  Insulated ECG electrodes  JSC-14339  B73-10220 05	Compact 20-kiloampere pulse-forming- network capacitor bank LEWIS-12009 B73-10171 01 Process for the production of star- tracking reticles GSFC-11188 B73-10488 03  METAL FOILS Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01  METAL HALIDES Radiochemical synthesis of pure an- hydrous metal halides LEWIS-11860 B73-10407 04  METAL JOINTS Improved fiberglass-to-metal joint pro- duces lighter stronger fiberglass strut LEWIS-11661 B73-10258 08 Low-closing-force seal ARC-10775 B73-10380 06  METAL MATRIX COMPOSITES Fiber composite materials: A survey of fiber matrix interface mechanics LEWIS-11924 B73-10007 04  METAL OXIDE SEMICONDUCTORS Complementary MOS four-phase logic circuits JSC-14240 873-10174 01
Automatic microbial transfer LANGLEY-11354 B73-10229 05 Liquid and gaseous oxygen safety review LEWIS-12041 B73-10310 04  MATERIALS RECOVERY Electrophoresis separator combining centrifugal separation M-FS-21396 B73-10328 04  MATHEMATICAL MODELS Experimental verification of computer spray-combustion models ARC-10689 B73-10031 03 Mathematical model for predicting human vertebral fracture ARC-10691 B73-10033 05 Large boron - epoxy filament-wound pressure vessels NPO-11900 B73-10038 08 Computer program calculates quasi-one-dimensional flow across face seals and narrow slots LEWIS-11996 B73-10248 09 Marshall system for aerospace simulation (MARSYAS) M-FS-22672 B73-10432 09  MATHICES (MATHEMATICS) N-body U and K matrix program LEWIS-11438 B73-10012 09	MECHANICAL DRIVES  Mechanical planetary compensating drive system  ARC-10462  Mechanical impedance and acoustic mobility measurement techniques of specifying vibration environments  M-FS-22016  MECHANICAL PROPERTIES  An inexpensive and effective method for calculating the strength of randomly reinforced fiber composites  LEWIS-11985  LEWIS-11985  B73-10039 04  Residual stress effects on the impact resistance and strength of fiber composites  LEWIS-11984  B73-10063 04  Autoclave heat treatment for prealloyed powder products  LEWIS-11953  M-FS-22793  Materials data handbook on Inconel Alloy 718  M-FS-22797  Medical Electronics  Insulated ECG electrodes  JSC-14339  MEDICAL EQUIPMENT  An economical arterial-pulse-wave trans-	Compact 20-kiloampere pulse-forming- network capacitor bank LEWIS-12009 B73-10171 01 Process for the production of star- tracking reticles GSFC-11188 B73-10488 03  METAL FOILS Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01  METAL HALIDES Radiochemical synthesis of pure an- hydrous metal halides LEWIS-11860 B73-10407 04  METAL JOINTS Improved fiberglass-to-metal joint pro- duces lighter stronger fiberglass strut LEWIS-11661 B73-10258 08 Low-closing-force seal ARC-10775 B73-10380 06  METAL MATRIX COMPOSITES Fiber composite materials: A survey of fiber matrix interface mechanics LEWIS-11924 B73-10007 04  METAL OXIDE SEMICONDUCTORS Complementary MOS four-phase logic circuits JSC-14240 873-10174 01 P-channel silicone gate FET
KSC-10615 B73-10110 07 Automatic microbial transfer LANGLEY-11354 B73-10229 05 Liquid and gaseous oxygen safety review LEWIS-12041 B73-10310 04 MATERIALS RECOVERY Electrophoresis separator combining centrifugal separation M-FS-21396 B73-10328 04 MATHEMATICAL MODELS Experimental verification of computer spray-combustion models ARC-10689 B73-10031 03 Mathematical model for predicting human vertebral fracture ARC-10691 B73-10033 05 Large boron - epoxy filament-wound pressure vessels NPO-11900 B73-10038 08 Computer program calculates quasi-one-dimensional flow across face seals and narrow slots LEWIS-11996 B73-10248 09 Marshall system for aerospace simulation (MARSYAS) M-FS-22672 B73-10432 09 MATRICES (MATHEMATICS) N-body U and K matrix program LEWIS-11438 B73-10012 09 Node-recording method for stiffness matrix wavefront reduction in structural	MECHANICAL DRIVES  Mechanical planetary compensating drive system  ARC-10462  Mechanical impedance and acoustic mobility measurement techniques of specifying vibration environments  M-FS-22016  MECHANICAL PROPERTIES  An inexpensive and effective method for calculating the strength of randomly reinforced fiber composites  LEWIS-11985  LEWIS-11985  B73-10039 04  Residual stress effects on the impact resistance and strength of fiber composites  LEWIS-11984  B73-10063 04  Autoclave heat treatment for prealloyed powder products  LEWIS-11953  B73-10172 04  Materials data handbook on Inconel Alloy 718  M-FS-22793  Materials data handbooks on stainless steels  M-FS-22797  MEDICAL ELECTRONICS  Insulated ECG electrodes  JSC-14339  B73-10220 05	Compact 20-kiloampere pulse-forming- network capacitor bank LEWIS-12009 B73-10171 01 Process for the production of star- tracking reticles GSFC-11188 B73-10488 03  METAL FOILS Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01  METAL HALIDES Radiochemical synthesis of pure an- hydrous metal halides LEWIS-11860 B73-10407 04  METAL JOINTS Improved fiberglass-to-metal joint pro- duces lighter stronger fiberglass strut LEWIS-11661 B73-10258 08 Low-closing-force seal ARC-10775 B73-10380 06  METAL MATRIX COMPOSITES Fiber composite materials: A survey of fiber matrix interface mechanics LEWIS-11924 B73-10007 04  METAL OXIDE SEMICONDUCTORS Complementary MOS four-phase logic circuits JSC-14240 873-10174 01 P-channel silicone gate FET M-FS-22505 873-10197 01
Automatic microbial transfer LANGLEY-11354 B73-10229 05 Liquid and gaseous oxygen safety review LEWIS-12041 B73-10310 04 MATERIALS RECOVERY Electrophoresis separator combining centrifugal separation M-FS-21396 B73-10328 04 MATHEMATICAL MODELS Experimental verification of computer spray-combustion models ARC-10689 B73-10031 03 Mathematical model for predicting human vertebral fracture ARC-10691 B73-10033 05 Large boron - epoxy filament-wound pressure vessels NPO-11900 B73-10038 08 Computer program calculates quasi-one-dimensional flow across face seals and narrow slots LEWIS-11996 B73-10248 09 Marshall system for aerospace simulation (MARSYAS) M-FS-22672 B73-10432 09 MATRICES (MATHEMATICS) N-body U and K matrix program LEWIS-1143B B73-10012 09 Node-recording method for stiffness matrix wavefront reduction in structural analysis	MECHANICAL DRIVES  Mechanical planetary compensating drive system  ARC-10462  Mechanical impedance and acoustic mobility measurement techniques of specifying vibration environments  M-FS-22016  MECHANICAL PROPERTIES  An inexpensive and effective method for calculating the strength of randomly reinforced fiber composites  LEWIS-11985  LEWIS-11984  Autoclave heat treatment for prealloyed powder products  LEWIS-11953  M-FS-22793  M-FS-22793  M-FS-22793  M-FS-22797  MEDICAL ELECTRONICS  Insulated ECG electrodes  JSC-14339  MEDICAL EQUIPMENT  An economical arterial-pulse-wave transducer	Compact 20-kiloampere pulse-forming- network capacitor bank LEWIS-12009 B73-10171 01 Process for the production of star- tracking reticles GSFC-11188 B73-10488 03  METAL FOILS Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01  METAL HALIDES Radiochemical synthesis of pure an- hydrous metal halides LEWIS-11860 B73-10407 04  METAL JOINTS Improved fiberglass-to-metal joint pro- duces lighter stronger fiberglass strut LEWIS-11661 B73-10258 08 Low-closing-force seal ARC-10775 B73-10380 06  METAL MATRIX COMPOSITES Fiber composite materials: A survey of fiber matrix interface mechanics LEWIS-11924 B73-10007 04  METAL OXIDE SEMICONDUCTORS Complementary MOS four-phase logic circuits JSC-14240 873-10174 01 P-channel silicone gate FET
Automatic microbial transfer LANGLEY-11354 B73-10229 05 Liquid and gaseous oxygen safety review LEWIS-12041 B73-10310 04  MATERIALS RECOVERY Electrophoresis separator combining centrifugal separation M-FS-21396 B73-10328 04  MATHEMATICAL MODELS Experimental verification of computer spray-combustion models ARC-10689 B73-10031 03 Mathematical model for predicting human vertebral fracture ARC-10691 B73-10033 05 Large boron - epoxy filament-wound pressure vessels NPO-11900 B73-10038 08 Computer program calculates quasi-one-dimensional flow across face seals and narrow slots LEWIS-11996 B73-10248 09 Marshall system for aerospace simulation (MARSYAS) M-FS-22672 B73-10432 09  MATRICES (MATHEMATICS) N-body U and K matrix program LEWIS-1143B B73-10012 09 Node-recording method for stiffness matrix wavefront reduction in structural analysis NPO-11620 B73-10296 09	MECHANICAL DRIVES  Mechanical planetary compensating drive system  ARC-10462  Mechanical impedance and acoustic mobility measurement techniques of specifying vibration environments  M-FS-22016  MECHANICAL PROPERTIES  An inexpensive and effective method for calculating the strength of randomly reinforced fiber composites  LEWIS-11985  LEWIS-11985  B73-10039 04  Residual stress effects on the impact resistance and strength of fiber composites  LEWIS-11984  B73-10063 04  Autoclave heat treatment for prealloyed powder products  LEWIS-11953  M-FS-22793  Materials data handbook on Inconel Alloy 718  M-FS-22797  Materials data handbooks on stainless steels  M-FS-22797  MEDICAL ELECTRONICS  Insulated ECG electrodes  JSC-14339  B73-10220 05  MEDICAL EQUIPMENT  An economical arterial-pulse-wave transducer  GSFC-11531  B73-10046 05  Flexible electroencephalogram (EEG) headband	Compact 20-kiloampere pulse-forming- network capacitor bank LEWIS-12009 B73-10171 01 Process for the production of star- tracking reticles GSFC-11188 B73-10488 03  METAL FOILS Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01  METAL HALIDES Radiochemical synthesis of pure an- hydrous metal halides LEWIS-11860 B73-10407 04  METAL JOINTS Improved fiberglass-to-metal joint pro- duces lighter stronger fiberglass strut LEWIS-11661 B73-10258 08 Low-closing-force seal ARC-10775 B73-10380 06  METAL MATRIX COMPOSITES Fiber composite materials: A survey of fiber matrix interface mechanics LEWIS-11924 B73-10007 04  METAL OXIDE SEMICONDUCTORS Complementary MOS four-phase logic circuits JSC-14240 B73-10174 01 P-channel silicone gate FET M-FS-22505 R73-10197 01 Integrated p-channel MOS gyrator M-FS-22343 B73-10217 02
Automatic microbial transfer LANGLEY-11354 B73-10229 05 Liquid and gaseous oxygen safety review LEWIS-12041 B73-10310 04  MATERIALS RECOVERY Electrophoresis separator combining centrifugal separation M-FS-21396 B73-10328 04  MATHEMATICAL MODELS Experimental verification of computer spray-combustion models ARC-10689 B73-10031 03 Mathematical model for predicting human vertebral fracture ARC-10691 B73-10033 05 Large boron - epoxy filament-wound pressure vessels NPO-11900 B73-10038 08 Computer program calculates quasi-one-dimensional flow across face seals and narrow slots LEWIS-11996 B73-10248 09 Marshall system for aerospace simulation (MARSYAS) M-FS-22672 B73-10432 09  MATRICES (MATHEMATICS) N-body U and K matrix program LEWIS-11438 B73-10012 09 Node-recording method for stiffness matrix wavefront reduction in structural analysis NPO-11620 B73-10296 09 Stiffness and mass matrices for shells	MECHANICAL DRIVES  Mechanical planetary compensating drive system  ARC-10462  Mechanical impedance and acoustic mobility measurement techniques of specifying vibration environments  M-FS-22016  MECHANICAL PROPERTIES  An inexpensive and effective method for calculating the strength of randomly reinforced fiber composites  LEWIS-11985  LEWIS-11985  B73-10039 04  Residual stress effects on the impact resistance and strength of fiber composites  LEWIS-11984  B73-10063 04  Autoclave heat treatment for prealloyed powder products  LEWIS-11953  M-FS-22793  MATERIALS data handbook on Inconel Alloy 718  M-FS-22793  M-FS-22797  MEDICAL ELECTRONICS  Insulated ECG electrodes  JSC-14339  MEDICAL EQUIPMENT  An economical arterial-pulse-wave transducer  GSFC-11531  B73-10046 05  Flexible electroencephalogram (EEG) headband  LANGLEY-10927  B73-10048 05	Compact 20-kiloampere pulse-forming- network capacitor bank LEWIS-12009 B73-10171 01 Process for the production of star- tracking reticles GSFC-11188 B73-10488 03  METAL FOILS Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01  METAL HALIDES Radiochemical synthesis of pure an- hydrous metal halides LEWIS-11860 B73-10407 04  METAL JOINTS Improved fiberglass-to-metal joint pro- duces lighter stronger fiberglass strut LEWIS-11661 B73-10258 08 Low-closing-force seal ARC-10775 B73-10380 06  METAL MATRIX COMPOSITES Fiber composite materials: A survey of fiber matrix interface mechanics LEWIS-11924 B73-10007 04  METAL OXIDE SEMICONDUCTORS Complementary MOS four-phase logic circuits JSC-14240 B73-10174 01 P-channel silicone gate FET M-FS-22505 B73-10197 01 Integrated p-channel MOS gyrator M-FS-22343 B73-10217 02  METAL PLATES Strain arrestor plate for mounting rigid
Automatic microbial transfer LANGLEY-11354 B73-10229 05 Liquid and gaseous oxygen safety review LEWIS-12041 B73-10310 04  MATERIALS RECOVERY Electrophoresis separator combining centrifugal separation M-FS-21396 B73-10328 04  MATHEMATICAL MODELS Experimental verification of computer spray-combustion models ARC-10689 B73-10031 03 Mathematical model for predicting human vertebral fracture ARC-10691 B73-10033 05 Large boron - epoxy filament-wound pressure vessels NPO-11900 B73-10038 08 Computer program calculates quasi-one-dimensional flow across face seals and narrow slots LEWIS-11996 B73-10248 09 Marshall system for aerospace simulation (MARSYAS) M-FS-22672 B73-10432 09  MATRICES (MATHEMATICS) N-body U and K matrix program LEWIS-1143B B73-10012 09 Node-recording method for stiffness matrix wavefront reduction in structural analysis NPO-11620 B73-10296 09	MECHANICAL DRIVES  Mechanical planetary compensating drive system  ARC-10462  Mechanical impedance and acoustic mobility measurement techniques of specifying vibration environments  M-FS-22016  MECHANICAL PROPERTIES  An inexpensive and effective method for calculating the strength of randomly reinforced fiber composites  LEWIS-11985  LEWIS-11985  B73-10039 04  Residual stress effects on the impact resistance and strength of fiber composites  LEWIS-11984  B73-10063 04  Autoclave heat treatment for prealloyed powder products  LEWIS-11953  M-FS-22793  Materials data handbook on Inconel Alloy 718  M-FS-22797  Materials data handbooks on stainless steels  M-FS-22797  MEDICAL ELECTRONICS  Insulated ECG electrodes  JSC-14339  B73-10220 05  MEDICAL EQUIPMENT  An economical arterial-pulse-wave transducer  GSFC-11531  B73-10046 05  Flexible electroencephalogram (EEG) headband	Compact 20-kiloampere pulse-forming- network capacitor bank LEWIS-12009 B73-10171 01 Process for the production of star- tracking reticles GSFC-11188 B73-10488 03  METAL FOILS Corrugated battery electrode GSFC-11368 B73-10515 01 Honeycomb battery plaque GSFC-11367 B73-10519 01  METAL HALIDES Radiochemical synthesis of pure an- hydrous metal halides LEWIS-11860 B73-10407 04  METAL JOINTS Improved fiberglass-to-metal joint pro- duces lighter stronger fiberglass strut LEWIS-11661 B73-10258 08 Low-closing-force seal ARC-10775 B73-10380 06  METAL MATRIX COMPOSITES Fiber composite materials: A survey of fiber matrix interface mechanics LEWIS-11924 B73-10007 04  METAL OXIDE SEMICONDUCTORS Complementary MOS four-phase logic circuits JSC-14240 B73-10174 01 P-channel silicone gate FET M-FS-22505 R73-10197 01 Integrated p-channel MOS gyrator M-FS-22343 B73-10217 02

METAL SHEETS  Beam lead forming tool	MICROMETERS Traveling digital counters for microme-	MINIATURIZATION Miniaturized haploscope for testing bin-
M-FS-22133 B73-10098 07	ters LANGLEY-11258 B73-10042 06	ocular vision ARC-10759 B73-10492 05
Embossed metal diaphragm has two-way stretch NPO-11635 B73-10298 08	MICROMINIATURIZED ELECTRONIC DEVICES	MINIMUM VARIANCE ORBIT DETERMINATION
METAL STRIPS	Microminiaturized, biopotential condi-	Validity test for linear error analysis
Heated bimetal strip prevents damage	tioning system (MBCS)	JSC-14378 B73-10219 09
of bearings by vibration	JSC-14180 B73-10236 02 MICROORGANISMS	MIRRORS
NPO-11870 B73-10348 06	Automatic microbial transfer	Real time optical figure sensor
METAL WORKING	LANGLEY-11354 B73-10229 05	M-FS-22123 B73-10169 02
Densification of powder metallurgy billets	Measuring micro-organism gas produc-	MIXERS Self-powered mixer for pressurized con-
by a roll consolidation technique	tion P70 10011 05	tainers
LEWIS-11395 B73-10040 08	LANGLEY-11326 B73-10241 05 Detecting and measuring metabolic	LEWIS 12054 B73-10312 03
Autoclave heat treatment for prealloyed powder products	byproducts by electrochemical sensing	MIXING
LEWIS-11953 B73-10172 04	LANGLEY-11525 B73-10523 05	Experimental verification of computer
METAL-METAL BONDING	MICROPHONES	spray-combustion models
Metal-metal reinforced laminar com-	Porous surface microphone for measur-	ARC-10689 B73-10031 03
posites	ing acoustic signals in turbulent wind- streams	MIXING CIRCUITS Active tuning circuit
LEWIS-11790 B73-10068 04	ARC-10776 B73-10490 03	GSFC-11340 B73-10334 02
New explosive seam welding concepts	MICROSCOPY	MIXTURES
LANGLEY-11211 873-10180 04	Improved technique for inspection of	Computer program for calculation of
Bonded panel, flaw detection standards LANGLEY-11399 B73-10240 06	planar surfaces by microscopy and interfer-	thermodynamic and transport properties of
LANGLEY-11399 B73-10240 06 METALLOGRAPHY	ometry NPO-11893 B73-10143 03	complex chemical systems 1 FWIS-11997 873-10231 09
Video enhancement of X-ray and neutron		LEWIS-11997 B73-10231 09 Electrophoresis separator combining
radiographs	Microstrip antennas	centrifugal separation
LEWIS-11944 B73-10009 03	LANGLEY-11284 873-10179 01	M-FS-21396 B73-10328 04
METALLURGY	High-gain antenna with singly-curved	MODAL RESPONSE
Materials data handbook on titanium	reflector NPO-11361 B73-10291 02	Improved procedures for mass matrix-
6AI-4V	Multiple-reflection conical microwave	reductions in eigenvalue solutions
M-FS-22796 B73-10372 04	antenna	NPO-11619 B73-10384 09 Frequencies and modes for shells of
Materials data handbooks on aluminum alloys	NPO-11661 B73-10299 02	revolution (FAMSOR)
M-FS-22798 B73-10373 04	MICROWAVE ATTENUATION	JSC-14497 873-10444 09
Materials data handbook on Inconel Alloy	Microwave emission from granular sili- cates	MODULATION
718	NPO-11702 B73-10140 03	Stabilizing a gaseous optical laser
M-FS-22793 B73-10396 04		
	MICROWAVE EQUIPMENT	XGS-03644 B73-10517 03
Welding high-strength aluminum alloys	Low-noise microwave polarimeter	MODULES
Welding high-strength aluminum alloys M-FS-22918 B73-10481 04	Low-noise microwave polarimeter NPO-11512 B73-10134 02	MODULES Nondestructive leak testing
Welding high-strength aluminum alloys M-FS-22918 B73-10481 04 METALS	Low-noise microwave polarimeter NPO-11512 B73-10134 02 MICROWAVE FILTERS	MODULES Nondestructive leak testing
Welding high-strength aluminum alloys M-FS-22918 B73-10481 04 METALS Hydrogen-environment embrittlement of metals: A study	Low-noise microwave polarimeter NPO-11512 B73-10134 02	MODULES Nondestructive leak testing LANGLEY-11561 B73-10464 06
Welding high-strength aluminum alloys M-FS-22918 B73-10481 04  METALS Hydrogen-environment embrittlement of metals: A study M-FS-22540 B73-10168 04	Low-noise microwave polarimeter NPO-11512 B73-10134 02 MICROWAVE FILTERS Extended range harmonic filter LEWIS-12064 B73-10313 02 MICROWAVE HOLOGRAPHY	MODULES Nondestructive leak testing LANGLEY-11561 B73-10464 06 MODULUS OF ELASTICITY Fatigue of boron-aluminum composites bonds and joints
Welding high-strength aluminum alloys M-FS-22918 B73-10481 04  METALS Hydrogen-environment embrittlement of metals: A study M-FS-22540 B73-10168 04  METHANE	Low-noise microwave polarimeter NPO-11512 B73-10134 02 MICROWAVE FILTERS Extended range harmonic filter LEWIS-12064 B73-10313 02 MICROWAVE HOLOGRAPHY Image formation in microwave hologra-	MODULES Nondestructive leak testing LANGLEY-11561 B73-10464 06 MODULUS OF ELASTICITY Fatigue of boron-aluminum composites bonds and joints M-FS-22325 B73-10079 04
Welding high-strength aluminum alloys M-FS-22918 B73-10481 04  METALS Hydrogen-environment embrittlement of metals: A study M-FS-22540 B73-10168 04  METHANE Continuous catalytic decomposition of	Low-noise microwave polarimeter NPO-11512 B73-10134 02 MICROWAVE FILTERS Extended range harmonic filter LEWIS-12064 B73-10313 02 MICROWAVE HOLOGRAPHY Image formation in microwave holography	MODULES Nondestructive leak testing LANGLEY-11561 B73-10464 06 MODULUS OF ELASTICITY Fatigue of boron-aluminum composites bonds and joints M-FS-22325 B73-10079 04 MOISTURE CONTENT
Welding high-strength aluminum alloys M-FS-22918 B73-10481 04  METALS Hydrogen-environment embrittlement of metals: A study M-FS-22540 B73-10168 04  METHANE Continuous catalytic decomposition of methane	Low-noise microwave polarimeter NPO-11512 B73-10134 02 MICROWAVE FILTERS Extended range harmonic filter LEWIS-12064 B73-10313 02 MICROWAVE HOLOGRAPHY Image formation in microwave holography ARC-10773 B73-10378 03	MODULES Nondestructive leak testing LANGLEY-11561 B73-10464 06 MODULUS OF ELASTICITY Fatigue of boron-aluminum composites bonds and joints M-FS-22325 B73-10079 04 MOISTURE CONTENT Soil moisture by extraction and gas
Welding high-strength aluminum alloys M-FS-22918 B73-10481 04  METALS Hydrogen-environment embrittlement of metals: A study M-FS-22540 B73-10168 04  METHANE Continuous catalytic decomposition of	Low-noise microwave polarimeter NPO-11512 B73-10134 02 MICROWAVE FILTERS Extended range harmonic filter LEWIS-12064 B73-10313 02 MICROWAVE HOLOGRAPHY Image formation in microwave holography ARC-10773 B73-10378 03	MODULES Nondestructive leak testing LANGLEY-11561 B73-10464 06 MODULUS OF ELASTICITY Fatigue of boron-aluminum composites bonds and joints M-FS-22325 B73-10079 04 MOISTURE CONTENT
Welding high-strength aluminum alloys M-FS-22918 B73-10481 04  METALS Hydrogen-environment embrittlement of metals: A study M-FS-22540 B73-10168 04  METHANE Continuous catalytic decomposition of methane ARC-10339 B73-10016 03  METHODOLOGY Improved procedures for mass matrix-	Low-noise microwave polarimeter NPO-11512 B73-10134 02 MICROWAVE FILTERS Extended range harmonic filter LEWIS-12064 B73-10313 02 MICROWAVE HOLOGRAPHY Image formation in microwave holography ARC-10773 B73-10378 03 Microwave holography for nondestructive testing ARC-10774 B73-10379 03	MODULES Nondestructive leak testing LANGLEY-11561 B73-10464 06 MODULUS OF ELASTICITY Fatigue of boron-aluminum composites bonds and joints M-FS-22325 B73-10079 04 MOISTURE CONTENT Soil moisture by extraction and gas chromatography ARC-10748 B73-10503 04 MOLDING MATERIALS
Welding high-strength aluminum alloys M-FS-22918 B73-10481 04  METALS Hydrogen-environment embrittlement of metals: A study M-FS-22540 B73-10168 04  METHANE Continuous catalytic decomposition of methane ARC-10339 B73-10016 03  METHODOLOGY Improved procedures for mass matrix-reductions in eigenvalue solutions	Low-noise microwave polarimeter NPO-11512 B73-10134 02 MICROWAVE FILTERS Extended range harmonic filter LEWIS-12064 B73-10313 02 MICROWAVE HOLOGRAPHY Image formation in microwave holography ARC-10773 B73-10378 03 Microwave holography for nondestructive testing ARC-10774 B73-10379 03 MICROWAVE PROBES	MODULES  Nondestructive leak testing LANGLEY-11561 B73-10464 06  MODULUS OF ELASTICITY Fatigue of boron-aluminum composites bonds and joints M-FS-22325 B73-10079 04  MOISTURE CONTENT Soil moisture by extraction and gas chromatography ARC-10748 B73-10503 04  MOLDING MATERIALS Improved mold release for filled-silicone
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from liquid lithium systems LEWIS-11509 B73-10002 04 Filament winding technique produces		
from liquid lithium systems LEWIS-11509 B73-10002 04 Filament winding technique produces strong lightweight oxygen tanks	PARITY Input-output, expandable-parity network	NPO-11707 B73-10141 02 Automatic carrier acquisition system for
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mers NPO-11881 B73-10349 04 POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 Minimal hardware, binary sequence pseudonoise generator and detector	LEWIS-11903 B73-10011 02  PREAMPLIFIERS  Active tuning circuit GSFC-11340 B73-10334 02  PREPOLYMERS  Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 B73-10203 07
Mers NPO-11881 B73-10349 04 POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01	LEWIS-11903 B73-10011 02 PREAMPLIFIERS    Active tuning circuit GSFC-11340 B73-10334 02 PREPOLYMERS    Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 B73-10036 04    TLC determination of functionality in prepolymers NPO-11731 B73-10037 04	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 PRINTED CIRCUITS
Mers NPO-11881 POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 B73-10244 09 Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01 POLYQUINOXALINES	LEWIS-11903 B73-10011 02 PREAMPLIFIERS    Active tuning circuit    GSFC-11340 B73-10334 02 PREPOLYMERS    Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry    NPO-11730 B73-10036 04    TLC determination of functionality in prepolymers    NPO-11731 B73-10037 04 PRESSURE DISTRIBUTION	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 B73-10203 07
Mers NPO-11881 B73-10349 04 POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01 POLYQUINOXALINES Technique for the polymerization of monomers for PPQ/graphite fiber com-	LEWIS-11903 B73-10011 02  PREAMPLIFIERS  Active tuning circuit GSFC-11340 B73-10334 02  PREPOLYMERS  Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 B73-10036 04 TLC determination of functionality in prepolymers NPO-11731 B73-10037 04  PRESSURE DISTRIBUTION Thermal contact resistance in a non-ideal	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 B73-10453 04 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 B73-10203 07 PRINTED CIRCUITS A new packaging and testing concept for microelectronic components M-FS-20936 B73-10109 01
Mers NPO-11881 B73-10349 04 POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 B73-10244 09 Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01 POLYQUINOXALINES Technique for the polymerization of monomers for PPQ/graphite fiber composites	LEWIS-11903 B73-10011 02  PREAMPLIFIERS  Active tuning circuit GSFC-11340 B73-10334 02  PREPOLYMERS  Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 B73-10036 04 TLC determination of functionality in prepolymers NPO-11731 B73-10037 04  PRESSURE DISTRIBUTION  Thermal contact resistance in a non-ideal joint M-FS-21775 B73-10105 03	stretch NPO-11635 B73-10298 08 Self-powered mixer for pressurized containers LEWIS-12054 B73-10312 03 Probability of stress-corrosion fracture under random loading NPO-13113 B73-10453 04 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 B73-10203 07 PRINTED CIRCUITS A new packaging and testing concept for microelectronic components M-FS-20936 B73-10109 01 Welded printed circuit (pc) stick
Mers NPO-11881 B73-10349 04  POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 B73-10244 09 Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01  POLYQUINOXALINES Technique for the polymerization of monomers for PPQ/graphite fiber composites LEWIS-11879 B73-10014 04	LEWIS-11903 B73-10011 02  PREAMPLIFIERS  Active tuning circuit GSFC-11340 B73-10334 02  PREPOLYMERS  Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 B73-10036 04 TLC determination of functionality in prepolymers NPO-11731 B73-10037 04  PRESSURE DISTRIBUTION  Thermal contact resistance in a non-ideal joint M-FS-21775 B73-10105 03 Computer program to determine pressure	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 A new packaging and testing concept for microelectronic components M-FS-20936 B73-10109 01 Welded printed circuit (pc) stick GSFC-11773 B73-10298 08
Mers NPO-11881 B73-10349 04 POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 B73-10244 09 Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01 POLYQUINOXALINES Technique for the polymerization of monomers for PPQ/graphite fiber composites	PREAMPLIFIERS Active tuning circuit GSFC-11340 PREPOLYMERS Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 TLC determination of functionality in prepolymers NPO-11731 B73-10037 PRESSURE DISTRIBUTION Thermal contact resistance in a non-ideal joint M-FS-21775 B73-10105 Computer program to determine pressure distributions and forces on blunt bodies	stretch NPO-11635 B73-10298 08 Self-powered mixer for pressurized containers LEWIS-12054 B73-10312 03 Probability of stress-corrosion fracture under random loading NPO-13113 B73-10453 04 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 B73-10203 07 PRINTED CIRCUITS A new packaging and testing concept for microelectronic components M-FS-20936 B73-10109 01 Welded printed circuit (pc) stick
Mers NPO-11881 B73-10349 04 POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 B73-10244 09 Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01 POLYQUINOXALINES Technique for the polymerization of monomers for PPQ/graphite fiber composites LEWIS-11879 B73-10014 04 PORCELAIN Refractory porcelain enamel passive-thermal-control coating for high-	LEWIS-11903 B73-10011 02  PREAMPLIFIERS  Active tuning circuit GSFC-11340 B73-10334 02  PREPOLYMERS  Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 B73-10036 04 TLC determination of functionality in prepolymers NPO-11731 B73-10037 04  PRESSURE DISTRIBUTION  Thermal contact resistance in a non-ideal joint M-FS-21775 B73-10105 03 Computer program to determine pressure	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 B73-10453 04 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 B73-10203 07 PRINTED CIRCUITS A new packaging and testing concept for microelectronic components M-FS-20936 B73-10109 01 Walded printed circuit (pc) stick GSFC-11773 New standoffs provide high-reliability component mounting for printed wiring boards
Mers NPO-11881 B73-10349 04 POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 B73-10244 09 Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01 POLYQUINOXALINES Technique for the polymerization of monomers for PPQ/graphite fiber composites LEWIS-11879 B73-10014 04 PORCELAIN Refractory porcelain enamel passive-thermal-control coating for high-temperature superalloys	PREAMPLIFIERS Active tuning circuit GSFC-11340 PREPOLYMERS Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 TLC determination of functionality in prepolymers NPO-11731 B73-10037 PRESSURE DISTRIBUTION Thermal contact resistance in a non-ideal joint M-FS-21775 B73-10105 Computer program to determine pressure distributions and forces on blunt bodies of revolution LANGLEY-11197 PRESSURE DROP	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 A new packaging and testing concept for microelectronic components M-FS-20936 B73-10109 01 Welded printed circuit (pc) stick GSFC-11773 New standoffs provide high-reliability component mounting for printed wiring boards LANGLEY-11176 B73-10512 01
Mers NPO-11881 B73-10349 04 POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 B73-10244 09 Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01 POLYQUINOXALINES Technique for the polymerization of monomers for PPQ/graphite fiber composites LEWIS-11879 B73-10014 04 PORCELAIN Refractory porcelain enamel passive-thermal-control coating for high-temperature superalloy's M-FS-22324 B73-10215 04	PREAMPLIFIERS Active tuning circuit GSFC-11340 PREPOLYMERS Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 TLC determination of functionality in prepolymers NPO-11731 B73-10037 PRESSURE DISTRIBUTION Thermal contact resistance in a non-ideal joint M-FS-21775 B73-10105 Computer program to determine pressure distributions and forces on blunt bodies of revolution LANGLEY-11197 PRESSURE DROP Pressure drop and pumping power for	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 R73-10453 04 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 A new packaging and testing concept for microelectronic components M-FS-20936 B73-10109 01 Welded printed circuit (pc) stick GSFC-11773 R73-10393 01 New standoffs provide high-reliability component mounting for printed wiring boards LANGLEY-11176 B73-10512 01 PRINTING
Mers NPO-11881 B73-10349 04 POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 B73-10244 09 Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01 POLYQUINOXALINES Technique for the polymerization of monomers for PPQ/graphite fiber composites LEWIS-11879 B73-10014 04 PORCELAIN Refractory porcelain enamel passive-thermal-control coating for high-temperature superalloys	PREAMPLIFIERS Active tuning circuit GSFC-11340 PREPOLYMERS Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 TLC determination of functionality in prepolymers NPO-11731 B73-10037 PRESSURE DISTRIBUTION Thermal contact resistance in a non-ideal joint M-FS-21775 B73-10105 Computer program to determine pressure distributions and forces on blunt bodies of revolution LANGLEY-11197 PRESSURE DROP	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 B73-10203 07 PRINTED CIRCUITS A new packaging and testing concept for microelectronic components M-FS-20936 B73-10109 01 Welded printed circuit (pc) stick GSFC-11773 B73-10393 01 New standoffs provide high-reliability component mounting for printed wiring boards LANGLEY-11176 B73-10512 01 PRINTING Improved photographic prints with a linear radial transmission filter
POLYNOMIALS Computer program to determine roots of polynomials by ratio of successive derivatives LEWIS-11809 B73-10244 09 Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01 POLYQUINOXALINES Technique for the polymerization of monomers for PPQ/graphite fiber composites LEWIS-11879 B73-10014 04 PORCELAIN Refractory porcelain enamel passive-thermal-control coating for high-temperature superalloys M-FS-22324 B73-10215 04 POROSITY A new method for the determination of thin film porosity	PREAMPLIFIERS Active tuning circuit GSFC-11340 PREPOLYMERS Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 PREPOLYMERS TLC determination of functionality in prepolymers NPO-11731 PRESURE DISTRIBUTION Thermal contact resistance in a non-ideal joint M-FS-21775 B73-10105 Computer program to determine pressure distributions and forces on blunt bodies of revolution LANGLEY-11197 PRESSURE DROP Pressure drop and pumping power for fluid flow through round tubes M-FS-24172 B73-10186 09 PRESSURE EFFECTS	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 B73-10453 04 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 B73-10203 07 PRINTED CIRCUITS A new packaging and testing concept for microelectronic components M-FS-20936 B73-10109 01 Welded printed circuit (pc) stick GSFC-11773 B73-10393 01 New standoffs provide high-reliability component mounting for printed wiring boards LANGLEY-11176 B73-10512 01 PRINTING Improved photographic prints with a linear radial transmission filter LANGLEY-11221 B73-10242 03
NPO-11881 B73-10349 04  POLYNOMIALS  Computer program to determine roots of polynomials by ratio of successive derivatives  LEWIS-11809 B73-10244 09  Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01  POLYQUINOXALINES  Technique for the polymerization of monomers for PPQ/graphite fiber composites  LEWIS-11879 B73-10014 04  PORCELAIN  Refractory porcelain enamel passive-thermal-control coating for high-temperature superalloys  M-FS-22324 B73-10215 04  POROSITY  A new method for the determination of thin film porosity  HQ-10673 B73-10286 01	PREAMPLIFIERS Active tuning circuit GSFC-11340 PREPOLYMERS Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 TLC determination of functionality in prepolymers NPO-11731 B73-10037 PRESSURE DISTRIBUTION Thermal contact resistance in a non-ideal joint M-FS-21775 B73-10105 Computer program to determine pressure distributions and forces on blunt bodies of revolution LANGLEY-11197 PRESSURE DROP Pressure drop and pumping power for fluid flow through round tubes M-FS-24172 PRESSURE EFFECTS Structural analysis of viscoelastic materi-	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 A new packaging and testing concept for microelectronic components M-FS-20936 B73-10109 01 Welded printed circuit (pc) stick GSFC-11773 R73-10393 01 New standoffs provide high-reliability component mounting for printed wiring boards LANGLEY-11176 PRINTING Improved photographic prints with a linear radial transmission filter LANGLEY-11221 PROBABILITY THEORY
NPO-11881 B73-10349 04  POLYNOMIALS  Computer program to determine roots of polynomials by ratio of successive derivatives  LEWIS-11809 B73-10244 09  Minimal hardware, binary sequence pseudonoise generator and detector NPO-11406 B73-10292 01  POLYQUINOXALINES  Technique for the polymerization of monomers for PPQ/graphite fiber composites  LEWIS-11879 B73-10014 04  PORCELAIN  Refractory porcelain enamel passive-thermal-control coating for high-temperature superalloys  M-FS-22324 B73-10215 04  POROSITY  A new method for the determination of thin film porosity	PREAMPLIFIERS Active tuning circuit GSFC-11340 PREPOLYMERS Glass transition temperatures of liquid prepolymers obtained by thermal penetrometry NPO-11730 PREPOLYMERS TLC determination of functionality in prepolymers NPO-11731 PRESURE DISTRIBUTION Thermal contact resistance in a non-ideal joint M-FS-21775 B73-10105 Computer program to determine pressure distributions and forces on blunt bodies of revolution LANGLEY-11197 PRESSURE DROP Pressure drop and pumping power for fluid flow through round tubes M-FS-24172 B73-10186 09 PRESSURE EFFECTS	stretch NPO-11635 Self-powered mixer for pressurized containers LEWIS-12054 Probability of stress-corrosion fracture under random loading NPO-13113 B73-10453 04 PRESSURIZED CABINS Leak detector-measurer M-FS-21761 B73-10203 07 PRINTED CIRCUITS A new packaging and testing concept for microelectronic components M-FS-20936 B73-10109 01 Welded printed circuit (pc) stick GSFC-11773 B73-10393 01 New standoffs provide high-reliability component mounting for printed wiring boards LANGLEY-11176 B73-10512 01 PRINTING Improved photographic prints with a linear radial transmission filter LANGLEY-11221 B73-10242 03

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NPO-11749 873-10025 03 RANDOM LOADS Probability of stress-corrosion fracture under random loading	Braze alloys for high temperature service LEWIS-11374 B73-10205 06 REFRACTORY METALS	robots M-FS-22266 B73-10216 07 REMOTE SENSORS Remote measurements by telephone
NPO-11749 873-10025 03 RANDOM LOADS Probability of stress-corrosion fracture under random loading NPO-13113 873-10453 04	Braze alloys for high temperature service LEWIS-11374 B73-10205 06 REFRACTORY METALS Production of small diameter high-	robots M-FS-22266 B73-10216 07 <b>REMOTE SENSORS</b> Remote measurements by telephone LEWIS-11704 B73-10010 02
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RANDOM LOADS Probability of stress-corrosion fracture under random loading NPO-13113 B73-10453 04  RANDOM NUMBERS Digital random-number generator ARC-10096 B73-10266 09  RANDOM PROCESSES Programmable random interval generator JSC-14131 B73-10367 02  RANGE FINDERS Junction range finder KSC-10108 B73-10191 02	Braze alloys for high temperature service LEWIS-11374 B73-10205 O6 REFRACTORY METALS Production of small diameter high-temperature-strength refractory metal wires LEWIS-11802 REFRIGERATING MACHINERY Monel-shot and screen regenerators GSFC-11593 REGENERATIVE COOLING Monel-shot and screen regenerators GSFC-11593 REGENERATIVE COOLING AMOREL-Shot and screen regenerators GSFC-11593 REGENERATORS	robots M-FS-22266 M-FS-22266 REMOTE SENSORS Remote measurements by telephone LEWIS-11704 B73-10010 02 Limited tactile stimulus for prosthetic hands M-FS-16570 B73-10078 05 Dye laser remote sensing of marine plankton LANGLEY-11382 B73-10359 05 Mach-Zehnder optical configuration with Brewster window and two quarter-wave plates M-FS-22741 B73-10417 03
NPO-11749 873-10025 03 RANDOM LOADS Probability of stress-corrosion fracture under random foading NPO-13113 873-10453 04 RANDOM NUMBERS Digital random-number generator ARC-10096 873-10266 09 RANDOM PROCESSES Programmable random interval generator JSC-14131 873-10367 02 RANGE FINDERS Junction range finder KSC-10108 873-10191 02 RANGEFINDING	Braze alloys for high temperature service LEWIS-11374 B73-10205 06  REFRACTORY METALS Production of small diameter high-temperature-strength refractory metal wires LEWIS-11802 B73-10003 08  REFRIGERATING MACHINERY Monel-shot and screen regenerators GSFC-11593 B73-10462 03  REGENERATIVE COOLING Monel-shot and screen regenerators GSFC-11593 REGENERATORS Monel-shot and screen regenerators	robots M-FS-22266 B73-10216 07  REMOTE SENSORS Remote measurements by telephone LEWIS-11704 B73-10010 02 Limited tactile stimulus for prosthetic hands M-FS-16570 B73-10078 05 Dye laser remote sensing of marine plankton LANGLEY-11382 B73-10359 05 Mach-Zehnder optical configuration with Brewster window and two quarter-wave plates M-FS-22741 B73-10417 03  REMOVAL
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RANDOM LOADS Probability of stress-corrosion fracture under random loading NPO-13113 B73-10453 04  RANDOM NUMBERS Digital random-number generator ARC-10096 B73-10266 09  RANDOM PROCESSES Programmable random interval generator JSC-14131 B73-10367 02  RANGE FINDERS Junction range finder KSC-10108 B73-10191 02  RANGEFINDING Code-regenerative clean-up loop for a ranging transponder NPO-11707 B73-10141 02  Junction range finder KSC-10108 B73-10191 02  RANGEFINDING Code-regenerative clean-up loop for a ranging transponder NPO-11707 B73-10141 02  Junction range finder KSC-10108 B73-10191 02  RAYLEIGH-RITZ METHOD Improved procedures for mass matrix-reductions in eigenvalue solutions	Braze alloys for high temperature service LEWIS-11374 B73-10205 06  REFRACTORY METALS Production of small diameter high-temperature-strength refractory metal wires LEWIS-11802 B73-10003 08  REFRIGERATING MACHINERY Monel-shot and screen regenerators GSFC-11593 B73-10462 03  REGENERATIVE COOLING Monel-shot and screen regenerators GSFC-11593 B73-10462 03  REGENERATORS Monel-shot and screen regenerators GSFC-11593 B73-10462 03  REINFORCED PLASTICS Production of circular polymer-glass fabric composites M-FS-22125 B73-10069 04 Preparation of prepreg graphite tape with insoluble polymer JSC-14313 B73-10084 04 Millimeter-wave antenna system	robots M-FS-22266 B73-10216 07  REMOTE SENSORS  Remote measurements by telephone LEWIS-11704 B73-10010 02 Limited tactile stimulus for prosthetic hands M-FS-16570 B73-10078 05 Dye laser remote sensing of marine plankton LANGLEY-11382 B73-10359 05 Mach-Zehnder optical configuration with Brewster window and two quarter-wave plates M-FS-22741 B73-10417 03  REMOVAL Condensate-removal device for heat exchangers JSC-14143 B73-10429 06 Tool for installing or extracting small bulbs in limited-access spaces LANGLEY-11543 B73-10433 07  RESCUE OPERATIONS Scanning beacon locator system: A
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RANDOM LOADS Probability of stress-corrosion fracture under random loading NPO-13113 B73-10453 04  RANDOM NUMBERS Digital random-number generator ARC-10096 B73-10266 09  RANDOM PROCESSES Programmable random interval generator JSC-14131 B73-10367 02  RANGE FINDERS Junction range finder KSC-10108 B73-10191 02  RANGEFINDING Code-regenerative clean-up loop for a ranging transponder NPO-11707 B73-10141 02  Junction range finder KSC-10108 B73-10191 02  RAYLEIGH-RITZ METHOD Improved procedures for mass matrix-reductions in eigenvalue solutions NPO-11619 B73-10384 09  RC CIRCUITS Operational slope-limiting circuit NPO-11773 B73-10346 01	Braze alloys for high temperature service LEWIS-11374 B73-10205 06  REFRACTORY METALS Production of small diameter high-temperature-strength refractory metal wires LEWIS-11802 B73-10003 08  REFRIGERATING MACHINERY Monel-shot and screen regenerators GSFC-11593 B73-10462 03  REGENERATIVE COOLING Monel-shot and screen regenerators GSFC-11593 B73-10462 03  REGENERATORS Monel-shot and screen regenerators GSFC-11593 B73-10462 03  REINFORCED PLASTICS Production of circular polymer-glass fabric composites M-FS-22125 B73-10069 04 Preparation of prepreg graphite tape with insoluble polymer JSC-14313 B73-10084 04 Millimeter-wave antenna system GSFC-10949 B73-10333 01  REINFORCING FIBERS Technique for the polymerization of monomers for PPQ/graphite fiber com-	robots M-FS-22266 B73-10216 07  REMOTE SENSORS Remote measurements by telephone LEWIS-11704 B73-10010 02 Limited tactile stimulus for prosthetic hands M-FS-16570 B73-10078 05 Dye laser remote sensing of marine plankton LANGLEY-11382 B73-10359 05 Mach-Zehnder optical configuration with Brewster window and two quarter-wave plates M-FS-22741 B73-10417 03  REMOVAL Condensate-removal device for heat exchangers JSC-14143 B73-10429 06 Tool for installing or extracting small bulbs in limited-access spaces LANGLEY-11543 B73-10433 07  RESCUE OPERATIONS Scanning beacon locator system: A concept JSC-12593 B73-10318 02  RESEARCH MANAGEMENT GREMEX update (Goddard research
RANDOM LOADS Probability of stress-corrosion fracture under random loading NPO-13113 B73-10453 04  RANDOM NUMBERS Digital random-number generator ARC-10096 B73-10266 09  RANDOM PROCESSES Programmable random interval generator JSC-14131 B73-10367 02  RANGE FINDERS Junction range finder KSC-10108 B73-10191 02  RANGEFINDING Code-regenerative clean-up loop for a ranging transponder NPO-11707 B73-10141 02  Junction range finder KSC-10108 B73-10191 02  RAYLEIGH-RITZ METHOD Improved procedures for mass matrix-reductions in eigenvalue solutions NPO-11619 B73-10384 09  RC CIRCUITS Operational slope-limiting circuit	Braze alloys for high temperature service LEWIS-11374 B73-10205 06  REFRACTORY METALS Production of small diameter high-temperature-strength refractory metal wires LEWIS-11802 B73-10003 08  REFRIGERATING MACHINERY Monel-shot and screen regenerators GSFC-11593 B73-10462 03  REGENERATIVE COOLING Monel-shot and screen regenerators GSFC-11593 B73-10462 03  REGENERATORS Monel-shot and screen regenerators GSFC-11593 B73-10462 03  REINFORCED PLASTICS Production of circular polymer-glass fabric composites M-FS-22125 B73-10069 04 Preparation of prepreg graphite tape with insoluble polymer JSC-14313 B73-10084 04 Millimeter-wave antenna system GSFC-10949 B73-10333 01  REINFORCING FIBERS Technique for the polymerization of	robots M-FS-22266 B73-10216 07  REMOTE SENSORS Remote measurements by telephone LEWIS-11704 B73-10010 02 Limited tactile stimulus for prosthetic hands M-FS-16570 B73-10078 05 Dye laser remote sensing of marine plankton LANGLEY-11382 B73-10359 05 Mach-Zehnder optical configuration with Brewster window and two quarter-wave plates M-FS-22741 B73-10417 03  REMOVAL Condensate-removal device for heat exchangers JSC-14143 B73-10429 06 Tool for installing or extracting small bulbs in limited-access spaces LANGLEY-11543 B73-10433 07  RESCUE OPERATIONS Scanning beacon locator system: A concept JSC-12593 B73-10318 02

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RESIDUAL STRESS	ROCKET EXHAUST	S
Residual stress effects on the impact	Rocket plume properties measured in	
resistance and strength of fiber com-	space simulators	SAFETY
posites	NPO-11608 B73-10137 03	Integral aircraft passenger seat
LEWIS-11984 873-10063 04	ROCKET PROPELLANTS	ARC-10799 B73-10495 05
RESINS Self-sterilizing polymers	Mass flow controller for gaseous pro- pellants	SAFETY DEVICES
M-FS-22054 B73-10090 04	JSC-14221 B73-10207 06	Brake wear warning device: A concept
RESISTANCE HEATING	ROCKET-BORNE INSTRUMENTS	JSC-19157 B73-10123 02
Positive contact resistance soldering	Rocket borne instrument to measure	Electroshock protection circuit
unit	electric fields inside electrified clouds KSC-10730 B73-10176 03	JSC-14222 873-10261 02
KSC-10242 B73-10145 02	KSC-10730 B73-10176 03 ROLL FORMING	Pressurized lighting system KSC-10644 B73-10280 02
RESOLVERS	Improved diffusion welding and roll	
Four-phase differential phase shift re- solver	welding of titanium alloys	Thermally actuated valve NPO-11846 B73-10347 06
JSC-14065 B73-10093 02	LEWIS-11852 B73-10005 08	Safe electrical receptacle and modified
RESONANT FREQUENCIES	Densification of powder metallurgy billets by a roll consolidation technique	plug
Improved procedures for mass matrix-	LEWIS-11395 B73-10040 08	KSC-10817 B73-10366 01
reductions in eigenvalue solutions NPO-11619 B73-10384 09	ROLLER BEARINGS	SAMARIUM
NPO-11619 B73-10384 09 Flaw detection by mechanical resonant	Carbide factor predicts rolling-element	Angular magnetic field beam improves
measurement	bearing fatigue life	efficiency in klystrons and traveling wave
M-FS-19218 B73-10440 03	LEWIS-11940 B73-10008 07 ROOTS OF EQUATIONS	tubes LEWIS-11610 B73-10206 03
Frequencies and modes for shells of	Computer program to determine roots	SAMPLERS
revolution (FAMSOR)	of polynomials by ratio of successive	An automated remote marshland water-
JSC-14497 B73-10444 09	derivatives	sampling station
RESONANT VIBRATION	LEWIS-11809 B73-10244 09	LANGLEY-11503 B73-10437 04
Flaw detection by mechanical resonant measurement	Automated Shell Theory for Rotating	SAMPLING
M-FS-19218 B73-10440 03	Structures (ASTROS)	Flexible format, computer accessed telemetry system
RESONATORS	M-FS-21970 B73-10115 09	NPO-11358 B73-10290 02
Ultrasonic calibration device	ROTATING MIRRORS	Gas chromotography of volatile organic
LANGLEY-11435 B73-10420 03	Wide-field reflective scanning optical	compounds
RESPIRATORY PHYSIOLOGY	systems JSC-14096 B73-10279 03	JSC-14428 B73-10406 04
Computer system for monitoring radio- respirometry data	ROTATING SHAFTS	An automated remote marshland water-
ARC-10784 B73-10494 05	New motor shaft angular accelerometer	sampling station
RESTORATION	concept	LANGLEY-11503 B73-10437 04 Biodetection grinder
Recovery of recordings from heat dam-	LANGLEY-11030 B73-10119 02	M-FS-22833 B73-10474 05
aged magnetic tapes	Mechanical planetary compensating drive system	SANDWICH STRUCTURES
JSC-14219 B73-10173 02	ARC-10462 B73-10497 06	Lightweight graphite/polyimide panels
RETICLES  Process for the production of star-	ROTOR AERODYNAMICS	JSC-14375 B73-10121 04
tracking reticles	Method for predicting rotor free-wake	Manufacture of large, lightweight para- bolic antennas
GSFC-11188 B73-10488 03	positions and the resulting rotor blade airloads	ARC-10741 B73-10375 08
REVOLVING	LANGLEY-10674 B73-10239 06	Strain arrestor plate for mounting rigid
Dynamic nonlinear analysis of shells of revolution (DYNASOR II)	ROTORS	insulating tiles
JSC-14496 B73-10443 09	An electric motor with magnetic bear-	JSC-14182 873-10465 06
Frequencies and modes for shells of	ings: A concept	SAPPHIRE
revolution (FAMSOR)	XGS-07805 B73-10304 01	Eutectic bonding of sapphire to sap- phire
JSC-14497 B73-10444 09	ROVING VEHICLES  Articulated elastic-loop roving vehicles	GSFC-11577 B73-10284 08
Stiffness and mass matrices for shells	M-FS-22691 B73-10326 06	Silicon on sapphire for ion implantation
of revolution (SAMMSOR II) JSC-14494 B73-10446 09	RUBBER	studies
RIBBONS	Rubber composition compatible with	LANGLEY-11415 B73-10522 04
A spiraled niobium tin superconductive	hydrazine	SATELLITE ORIENTATION
ribbon	NPO-11440 B73-10019 04 RUBBER COATINGS	Solar aspect determination system GSFC-11444 B73-10129 02
LEWIS-11726 B73-10044 04	Nonflammable potting-encapsulating and	SATURN 5 LAUNCH VEHICLES
RING STRUCTURES	conformal coating compounds	Welding high-strength aluminum alloys
Computer program for transient response of structural rings subjected to fragment	JSC-14164 B73-10102 04	M-FS-22918 873-10481 04
impact	RUBY	SCALE MODELS
LEWIS-11926 - B73-10064-09	Eutectic bonding of sapphire to sap- phire	Thermal-dynamic modeling study LANGLEY-11309 B73-10076 06
RIVETING	GSFC-11577 B73-10284 08	SCALING LAWS
Fatigue of boron-aluminum composites bonds and joints	Improved masers for X-band and Ku	Thermal-dynamic modeling study
M-FS-22325 B73-10079 04	band	LANGLEY-11309 B73-10076 06
RIVETS	NPO-11437 B73-10293 02	SCATTERING CROSS SECTIONS
Metallic composites as high-temperature	RUBY LASERS	Measurement of X-ray scattering by
fasteners M-FS-22438 873-10081 04	LEAPS (Laser electro-optical alignment pole for surveying)	optical surfaces GSFC-11590 B73-10283 03
M-FS-22438 B73-10081 04 ROBOTS	GSFC-11262 B73-10122 02	
A proposed hand-tool assembly for	Laser energy converted into electric	Ferrofluid separator for nonferrous scrap
robots	power	separation
M-FS-22266 B73-10216 07	NPO-13308 B73-10353 02	LANGLEY-11523 B73-10463 07

SCREWS	SERIES (MATHEMATICS)	SHOCK ABSORBERS
Redundant screwjack	Use of multivariable asymptotic expan-	Emergency-escape device
JSC-19200 B73-10070 07	sions in a satellite theory	M-FS-22720 873-10369 07
SEALERS	NPO-11750 B73-10303 09	SHOCK TUBES High-speed spectrograph for shock tube
Vacuum-stripped silicone binder for thermal-control paint	SERVICES Logistics hardware and services control	studies
M-FS-21397 B73-10060 04	system	ARC-10772 B73-10501 03-
A new intermediate for the production	KSC-10819 B73-10418 09	SHORT TAKEOFF AIRCRAFT
of flexible stable polymers	SERVOCONTROL	Radial honeycomb core ARC-10727 B73-10340 08
M-FS-22355 B73-10080 04 SEALS (STOPPERS)	New motor shaft angular accelerometer	SHROUDS
Low-closing-force seal	concept LANGLEY-11030 B73-10119 02	Low-cost clearance indicator for high
ARC-10775 B73-10380 06		speed turbomachinery
Poppet valve tester	Automatic quadrature control and meas- uring system	LEWIS-12128 B73-10411 02 SIGNAL ANALYZERS
LEWIS-11655 B73-10415 07	M-FS-21660 B73-10127 02	Peak-holding circuit for extremely narrow
Container seal for dusty environment LANGLEY-10962 B73-10416 07	Advanced action manipulator system	pulses
SEATS	(ADAMS)	JSC-14129 B73-10317 02
Integral aircraft passenger seat	M-FS-22022 B73-10204 07	Pulse stretcher for narrow pulses
ARC-10799 B73-10495 05	Digital servo control of random sound	JSC-14130 B73-10365 02 SIGNAL DETECTION
SEEBECK EFFECT Apparatus for measuring electrical prop-	fields NPO-11623 B73-10297 02	All-digital phase-lock loops for noise-free
erties of materials	Digital servo controller behaves like	signals
NPO-11749 B73-10025 03	synchro	NPO-11914 B73-10350 01
SELECTORS	KSC-10769 B73-10337 02	SIGNAL GENERATORS
Automatic PCM guard-band selector and	SERVOMECHANISMS	Signal conditioner for potentiometer type transducers
calibrator KSC-10812 B73-10510 02	Linear kinematic air bearing NPO-13151 B73-10456 06	LEWIS-11822 B73-10015 01
SELENIUM COMPOUNDS	SERVOMOTORS	Signal conditioner test set
Vapor phase growth of group 3, 4, and	New motor shaft angular accelerometer	KSC-10750 B73-10189 02
5 compounds by HCl transport of ele-	concept	SIGNAL PROCESSING
ments	LANGLEY-11030 B73-10119 02	Acoustic-emission signal-processing an- alog unit for locating flaws in large tanks
LANGLEY-11144 B73-10056 04 SELF ADAPTIVE CONTROL SYSTEMS	SHAFTS (MACHINE ELEMENTS)	M-FS-24424 B73-10325 06
Fuel-cell heat and mass plate	Mechanical planetary compensating drive system	All-digital phase-lock loops for noise-free
M-FS-21318 B73-10489 07	ARC-10462 B73-10497 06	signals
SELF ALIGNMENT	SHAKERS	NPO-11914 B73-10350 01
Self-adjusting assembly jig	Dynamic testing of complex structures	SIGNAL STABILIZATION
LEWIS-12034 B73-10250 07	JSC-12569 B73-10057 06	A technique to eliminate false lock in PCM demodulation
Glass encapsulation provides extra pro-	A multidegree-of-freedom vibrational apparatus	JSC-12494 B73-10106 02
tection for IC semiconductor devices	GSFC-11302 B73-10332 06	Phase shift keyed, pulse code modulated
M-FS-21310 B73-10054 01	SHEAR STRESS	signal synchronizer
Thin film thermoelectric devices as ther-	Residual stress effects on the impact	JSC-12462 B73-10107 02
mal control coatings: A study M-FS-21384 B73-10153 04	resistance and strength of fiber com-	Data-aided carrier tracking loops
An improved method for obtaining a	posites LEWIS-11984 B73-10063 04	NPO-11282 B73-10356 01
normalized junction temperature for semi-	A flexible all-temperature pressure ves-	Television noise-reduction device
conductors: A concept	sel	JSC-12607 B73-10431 02
JSC-14136 B73-10196 01	M-FS-19196 873-10158 03	SIGNAL TRANSMISSION
Laser scanner for testing semiconductor	SHELL STABILITY	Isolated transfer of analog signals LANGLEY-11312 873-10513 02
chips M-FS-22693 B73-10327 02	Computer program for stress, vibration, and buckling characteristics of general	SILICATES 875-10313 02
Welded printed circuit (pc) stick	shells of revolution	Microwave emission from granular sili-
GSFC-11773 B73-10393 01	LANGLEY-11369 B73-10363 09	cates
SEMICONDUCTORS (MATERIALS)	SHELL THEORY	NPO-11702 B73-10140 03
Hermetic-coaxial package design for	Automated Shell Theory for Rotating	SILICON
microwave transistors GSFC-10791 B73-10427 01	Structures (ASTROS) M-FS-21970 B73-10115 09	Silicon-fiber blanket solar-cell array con- cept
SENSITIVITY	SHELLS (STRUCTURAL FORMS)	M-FS-22458 B73-10374 01
Method of predicting ionization-type	Dynamic nonlinear analysis of shells of	Silicon on sapphire for ion implantation
vacuum gage sensitivity for various gases	revolution (DYNASOR II)	studies
LEWIS-12056 B73-10409 03	JSC-14496 B73-10443 09	LANGLEY-11415 B73-10522 04
SEPARATORS  Electrophoresis separator combining	Frequencies and modes for shells of revolution (FAMSOR)	SILICON CONTROLLED RECTIFIERS  Impulse commutating circuit with trans-
centrifugal separation	JSC-14497 B73-10444 09	former to limit reapplied voltage
M-FS-21396 B73-10328 04	The static nonlinear analysis of shells	LEWIS-11849 B73-10004 01
Procedure for dispersing fiber bundles	of revolution (SNASOR II)	Compact 20-kiloampere pulse-forming-
LANGLEY-11224 B73-10438 08	JSC-14495 B73-10445 09	network capacitor bank LEWIS-12009 B73-10171 01
Ferrofluid separator for nonferrous scrap separation	Stiffness and mass matrices for shells of revolution (SAMMSOR II)	SRC seal testing
LANGLEY-11523 B73-10463 07	JSC-14494 B73-10446 09	M-FS-22426 B73-10199 01
SEQUENTIAL CONTROL	SHIFT REGISTERS	SILICON DIOXIDE
Sequential-strip and sequential-disk fil-	Minimal hardware, binary sequence	Rubber composition compatible with
ters JSC-14592 B73-10430 06	pseudonoise generator and detector NPO-11406 B73-10292 01	hydrazine NPO-11440\ 873-10019 04
200-1408F B10-10400 00	111 U-11700 073-10292 U I	111 3-11-10

Charles annually that the control of the		a company of the second of the second of
Strain arrestor plate for mounting rigid insulating tiles	SLIDING CONTACT Liquid metal porous matrix sliding electri-	Combined sun-acquisition and sun gate- sensor system for spacecraft attitude
JSC-14182 B73-10465 06	cal contact: A concept	control
Reusable silica surface-insulation ma-	LEWIS-11735 B73-10164 01	NPO-13051 B73-10460 02
terial	SMOG	SOLDERING
ARC-10721 B73-10504 04 SILICON TRANSISTORS	Smoke generator LANGLEY-11433 B73-10414 06	Positive contact resistance soldering unit
P-channel silicone gate FET	SMOKE	KSC-10242 B73-10145 02
M-FS-22505 B73-10197 01	Smoke generator	SOLENOID VALVES
Silicon switching transistor with high	LANGLEY-11433 B73-10414 06	Magnetic latching valve
power and low saturation voltage NPO-11565 B73-10295 01	SODIUM CHLORIDES	NPO-11790 B73-10026 06
SILICONE RESINS	Integrating-sphere coating GSFC-11214 873-10403 04	SOLID LUBRICANTS Lubrication handbook
Improved mold release for filled-silicone	the state of the s	M-FS-22326 B73-10062 04
compounds	Single crystal tubes of beta alumina	SOLID PROPELLANT ROCKET ENGINES
JSC-19300 873-10338 04	LEWIS-11844 873-10316 04	Structural analysis of viscoelastic materi-
Adhesive coating eliminated in new honeycomb-core fabrication process	SOIL SCIENCE Soil moisture by extraction and gas	als under thermal and pressure loading NPO-11727 B73-10301 09
LANGLEY-11134 873-10439 08	chromatography	SOLID PROPELLANTS
RF shielded connectors	ARC-10748 B73-10503 04	Monitor for physical property changes
GSFC-11215 B73-10509 01		in solid propellants
SILICONE RUBBER	Soil moisture by extraction and gas chromatography	ARC-10702 B73-10130 03 SOLID STATE DEVICES
Vacuum-stripped silicone binder for thermal-control paint	ARC-10748 B73-10503 04	Impulse commutating circuit with trans-
M-FS-21397 B73-10060 04	SOLAR CELLS	former to limit reapplied voltage
Nonflammable potting-encapsulating and	Silicon-fiber blanket solar-cell array con-	LEWIS-11849 B73-10004 01
conformal coating compounds JSC-14164 873-10102 04	cept . B73-10374 01	Automatic quadrature control and meas-
Thermally responsive mechanical actua-	SOLAR COLLECTORS	uring system M-FS-21660 B73-10127 Q2
tor	Solar-energy absorber: Active infrared	Solar aspect determination system
GSFC-11697 B73-10208 04	(IR) trap	GSFC-11444 B73-10129 02
Elastic light-scattering modulator: A concept	M-FS-22743 B73-10484 06	Light-direction sensor based on birefrin-
M-FS-22724 873-10422 03	Solar-energy absorber: Active infrared (IR) trap without glass	gency NPO-11201 B73-10131 03
Strain arrestor plate for mounting rigid	M-FS-22744 B73-10485 06	Signal conditioner test set
insulating tiles JSC-14182 B73-10465 06	Selective coating for collecting solar	KSC-10750 B73-10189 02
JSC-14182 B73-10465 06 SILICONES	energy on aluminum	Reliable low-cost battery voltage indica-
Evaluation of thermal insulation materi-	M-FS-22562 B73-10527 04 SOLAR ENERGY	tor for light aircraft and automobiles LEWIS-12020 B73-10249 01
als	Proposed electromagnetic wave energy	Fast recharge circuit for q-switched
NPO-11586 B73-10020 04 Method for casting polyethylene pipe	converter	lasers
ARC-10706 873-10032 08	GSFC-11394 B73-10185 01 Metal tube used as solar engine	GSFC-11510 B73-10257 02
Apparatus for cutting elestomeric materi-	ARC-10461 B73-10493 03	Frequency shifting with a solid-state switching capacitor
als NPO-13146 B73-10521 07	Solar-energy conversion system provides	HQ-10812 B73-10259 01
SILK	electrical power and thermal control for	Logic controlled solid state switchgear
Effects of environmental exposure on	life-support systems M-FS-21628 B73-10524 06	LEWIS-12044 B73-10408 02
cryogenic thermal insulation materials LEWIS-12007 B73-10213 04	Selective coating for collecting solar	Solid-state controller JSC-12394 B73-10466 06
SILVER	energy on aluminum	SOLID-SOLID INTERFACES
A new method for the determination of	M-FS-22562 B73-10527 04	Fiber composite materials: A survey of
thin film porosity HQ-10673 B73-10286 01	SOLAR ENERGY ABSORBERS Solar-energy absorber: Active infrared	fiber matrix interface mechanics
SILVER ALLOYS	(IR) trap	LEWIS-11924 873-10007 04 Thermal contact resistance in a non-ideal
Stable palladium alloys for diffusion of	M-FS-22743 B73-10484 06	joint
hydrogen	Solar-energy absorber: Active infrared	M-FS-21775 B73-10105 03
NPO-11747 B73-10024 04 SILVER CHLORIDES	(IR) trap without glass M-FS-22744 873-10485 06	SOLIDS  Long-term material compatibility testing
Application of biological filters in water	SOLAR HEATING	system
treatment systems	A practical solar energy heating and	NPO-11776 B73-10385 04
JSC-14226 B73-10404 05 SILVER ZINC BATTERIES	cooling system M-FS-22563 B73-10156 05	Mathod for estimation reliability
Rechargeable, silver-zinc battery con-	M-FS-22563 B73-10156 05 Balloon-borne package temperature	Method for estimating solubility parame- ter
ditioner/monitor unit and state-of-charge	controller	NPO-11647 873-10022 04
indicator / B73-10486 Q2	GSFC-11620 B73-10192 03	SOLVENT EXTRACTION
SIMULATORS	Structural heat pipe	Soil moisture by extraction and gas chromatography
Dynamic power load simulator	GSFC-11619 873-10364 06	ARC-10748 873-10503 04
JSC-14285 B73-10305 02	SOLAR REFLECTORS  Refractory porcelain enamel passive-	SORBENTS
SINGLE CRYSTALS Single crystal tubes of beta alumina	thermal-control coating for high-	Estimating sorber capacity for multiple contaminants
LEWIS-11844 873-10316 04	temperature superalloys	LANGLEY-11056 B73-10424 04
SIZE DETERMINATION	M-FS-22324 B73-10215 04	SOUND FIELDS
Electro-optical device for monitoring wire size	SOLAR SENSORS Solar aspect determination system	Digital servo control of random sound fields
LANGLEY-11358 873-10321 02	GSFC-11444 B73-10129 02	NPO-11623 873-10297 02

SOUND TRANSDUCERS	SPACECRAFT POWER SUPPLIES	Small portable speed calculator M-FS-22638 B73-10329 07
Acoustic-emission signal-processing an- alog unit for locating flaws in large tanks	Design and material selection for inverter transformer cores	SPEED REGULATORS
M-FS-24424 B73-10325 06	NPO-11726 B73-10142 04	Automatic speed control of highway
Porous surface microphone for measuring	SPACECRAFT STABILITY	traffic
acoustic signals in turbulent windstreams	Improved syncom-type fluid damper	M-FS-21791 B73-10100 02 SPERMATOZOA
ARC-10776 B73-10490 03	GSFC-11205 B73-10478 06	Reproductive cell separation: A con-
SOUND WAVES	SPACECRAFT TRACKING Fine guidance for a spaceborne tele-	cept
Real time statistical analysis of acoustic emission signals for flaw monitoring sys-	scope	M-FS-22627 B73-10198 05
tems	GSFC-11487 B73-10468 03	SPHERICAL SHELLS
M-FS-24402 B73-10212 03	SPACECRAFT TRAJECTORIES	Integrating-sphere coating GSFC-11214 B73-10403 04
Gated compressor, distortionless signal	N-body U and K matrix program	SPIN STABILIZATION
limiter	LEWIS-11438 B73-10012 09	Improved syncom-type fluid damper
NPO-11820 B73-10387 01 Porous surface microphone for measuring	Use of multivariable asymptotic expansions in a satellite theory	GSFC-11205 B73-10478 06
acoustic signals in turbulent windstreams	NPO-11750 B73-10303 09	SPINE Mathematical model for predicting hu-
ARC-10776 B73-10490 03	SPARE PARTS	man vertebral fracture
SPACE EXPLORATION	Logistics hardware and services control	ARC-10691 B73-10033 05
Microwave emission from granular sili-	system KSC-10819 B73-10418 09	SPIRAL WRAPPING
cates NPO-11702 B73-10140 03	KSC-10819 B73-10418 09 SPATIAL DISTRIBUTION	A spiraled niobium tin superconductive
NPO-11702 B73-10140 03 SPACE SHUTTLES	High-speed spectrograph for shock tube	ribbon LEWIS-11726 B73-10044 04
Shuttle orbiter storage locker system: A	studies	SPONTANEOUS COMBUSTION
study	ARC-10772 B73-10501 03	Autoignition test cell with flexible at-
JSC-14448 B73-10287 08	SPECIFIC HEAT	mosphere control
SPACE SIMULATORS	Fluidic device for measuring constituent	KSC-10198 B73-10113 04
Rocket plume properties measured in	masses of a flowing binary gas mixture LEWIS-11995 B73-10230 06	SPOT WELDS
space simulators NPO-11608 B73-10137 03	New method for determining thermo-	Resistance spot welding of dispersion- strengthened nickel alloys
SPACE STORAGE	physical properties of test specimens	LEWIS-12075 B73-10315 04
Shuttle orbiter storage locker system: A	LANGLEY-11053 B73-10447 04	SPRAYED COATINGS
study	SPECIFICATIONS	Integrating-sphere coating
JSC-14448 B73-10287 08	Handbook of cleaning requirements,	GSFC-11214 B73-10403 04
SPACEBORNE TELESCOPES	procedures, and verification techniques for oxygen systems	Filament winding technique produces
Fine guidance for a spaceborne tele-	LEWIS-11963 B73-10188 04	strong lightweight oxygen tanks
scope GSFC-11487 B73-10468 03	SPECIMENS	M-F\$-22470 B73-10082 08
SPACECRAFT CABINS	Biodetection grinder	Materials data handbooks on stainless
Leak detector-measurer	M-FS-22833 873-10474 05 SPECTROMETERS	steels M-FS-22797 B73-10397 04
M-FS-21761 B73-10203 07	Programmable random interval genera-	Backflushing system rapidly cleans fluid
SPACECRAFT COMMUNICATION	tor	filters
High-sensitivity receiver for CO2 laser	JSC-14131 873-10367 02	JSC-14273 B73-10405 06
communications GSFC-11455 B73-10223 02	A high-speed spectrograph shutter	STAR TRACKERS
	HQ-10635 B73-10368 01 High-speed spectrograph for shock tube	Process for the production of star- tracking reticles
Extended range harmonic filter LEWIS-12064 B73-10313 02	studies	GSFC-11188 B73-10488 03
Automatic carrier acquisition system for	ARC-10772 B73-10501 03	STATIC INVERTERS
phase-lock-loop receivers	SPECTRORADIOMETERS	Design and material selection for inverter
NPO-11628 B73-10343 02	Wide-field reflective scanning optical	transformer cores NPO-11726 873-10142 04
High-power microstrip switch	systems JSC-14096 B73-10279 03	NPO-11726 873-10142 04 STATIC LOADS
NPO-11965 B73-10451 02	SPECTROSCOPY	The static nonlinear analysis of shells
SPACECRAFT CONTROL	A new method for the determination of	of revolution (SNASOR II)
Ascent control analysis for S-II derivative launch vehicles, digital computer program	thin film porosity	JSC-14495 B73-10445 09
M-FS-24324 873-10120 09	HQ-10673 B73-10286 01 Fabrication of optical reflecting diffrac-	STATISTICAL ANALYSIS
Solar aspect determination system	tion gratings by light-interference phenom-	Real time statistical analysis of acoustic emission signals for flaw monitoring sys-
GSFC-11444 B73-10129 02	enon	tems
Hybrid coordinate formulation used for	GSFC-11860 B73-10516 03	M-FS-24402 B73-10212 03
the design of attitude control systems for	SPECTRUM ANALYSIS	Validity test for linear error analysis
flexible spacecraft	Spectral analysis program (SAP) JSC-14310 B73-10227 09	JSC-14378 B73-10219 09
NPO-11714 B73-10300 09	RF to digital converter	STATISTICAL DISTRIBUTIONS
Combined sun-acquisition and sun gate- sensor system for spacecraft attitude	JSC-14419 B73-10306 02	A comprehensive program for textual concordances and statistics
control	SPEED CONTROL	JSC-17484 B73-10049 09
NPO-13051 B73-10460 02	Automatic speed control of highway traffic	Digital random-number generator
SPACECRAFT GUIDANCE	M-FS-21791 B73-10100 02	ARC-10096 B73-10266 09
Process for the production of star-	Mariable-frequency inverter controls	STEELS
tracking reticles	torque, speed, and braking in ac induction	Emergency-escape device
GSFC-11188 B73-10488 03	motors M-FS-22088 B73-10525 O2	M-FS-22720 B73-10369 07 STEREOSCOPIC VISION
SPACECRAFT MANEUVERS A general purpose maneuver turns		Stereoscopic computer graphics display
computer program	An inexpensive vehicle speed detector	system
NPO-13213 B73-10088 09	M-FS-22601 873-10157 02	M-FS-22322 873-10526 09

STEREOTELEVISION

Stereoscopic television system

Fabrication of optical reflecting diffraction

gratings by light-interference phenomenon

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matrix wavefront reduction in structural

High-power microstrip switch	Subminiature micropower digital re-	TEMPERATURE EFFECTS
NPO-11965 B73-10451 02	corder	Glass transition temperatures of liquid prepolymers obtained by thermal penetrom-
Versatile, analog-to-digital, power-	ARC-10746 B73-10491 02 TEFLON (TRADEMARK)	etry
regulator controller NPO-13178 B73-10467 02	Flammability control for electrical cables	NPO-11730 873-10036 04
NPO-13178 B73-1046/ 02 Binary-selectable detector holdoff cir-	and connectors	Structural analysis of viscoelastic materi-
cuit	M-FS-21584 873-10235 02	als under thermal and pressure loading NPO-11727 B73-10301 09
M-FS-22898 B73-10487 02	TELECOMMUNICATION	TEMPERATURE MEASUREMENT
Automatic PCM guard-band selector and	A nonlinear-coherence receiver NPO-11921 873-10144 02	A flexible all-temperature pressure ves-
calibrator KSC-10812 B73-10510 02	A closed, digital telephone system	sei
Isolated transfer of analog signals	JSC-13912 B73-10226 02	M-FS-19196 B73-10158 03 An improved method for obtaining a
LANGLEY-11312 B73-10513 02	Spectral analysis program (SAP)	normalized junction temperature for semi-
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Minimum switching network for gen-	Flared-cone turnstile antenna LANGLEY-10970 B73-10425 02	JSC-14136 873-10196 01
erating the weight of a binary vector NPO-11590 B73-10274 09	RF antenna-pattern visual aids for field	Atmospheric temperature measurements by Raman laser scattering
SYNCHRONISM	use	LEWIS-12065 B73-10251 03
Time-synchronized VLF phase-tracking	KSC-10821 B73-10426 02	Flexible temperature probe for biological
receiver	Digital transmitter for data bus com-	systems #73 10499 05
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Synchro phase selector aid	TELEMETRY	MENTS
LANGLEY-11282 B73-10160 01	Data multiplexer using a tree switch	Limited tactile stimulus for prosthetic
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Satellite auxiliary propulsion systems NPO-11744 B73-10023 06	Flexible format, computer accessed telemetry system	Thermally responsive mechanical actua-
NPO-11744 B73-10023 06 A summary report on system effective-	NPO-11358 873-10290 02	tor
ness and optimization study	Automatic carrier acquisition system for	GSFC-11697 B73-10208 04
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A practical solar energy heating and	signals	ARC-10796 B73-10498 05
cooling system M-FS-22563 B73-10156 05	NPO-11914 B73-10350 01	TEMPERATURE SENSORS
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A summary report on system effective-	NPO-11282 B73-10356 Q1 Data compression by a decreasing slope-	JSC-14180 B73-10236 02
ness and optimization study M-FS-22126 B73-10104 09	threshold test	Safety monitoring system for radio-
M-FS-22126 B73-10104 09 Dynamic power load simulator	NPO-10769 E73-10382 02	isotope thermoelectric generators NPO-13285 873-10352 02
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speed turbomachinery

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LEWIS-12128

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B73-10458 03

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Porous surface microphone for measuring	UNSTEADY FLOW  Total-pressure measurement in pulsating	on-axis sensitivity ARC-10642 B73-10262 03
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LANGLEY-10970 B73-10425 02 TWO PHASE FLOW	ARC-10637 B73-10267 02	particles location detector GSFC-11291 B73-10282 02
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U	of urine	M-FS-22713 B73-10371 04
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DALLAS, S. S. Use of multivariable asymptotic expansions in a satellite theory NPO-11750 B73-10303 09	Spectral analysis program (SAP) JSC-14310 B73-10227 09  DEUEL. C. L. Dynamic technique for measuring	Formaldehyde monitor for automobile exhausts
DALLAS, S. S. Use of multivariable asymptotic expansions in a satellite theory	Spectral analysis program (SAP) JSC-14310 B73-10227 09 DEUEL, C. L.	Formaldehyde monitor for automobile exhausts LANGLEY-11352 B73-10228 04 EASTERLING, M. F. Two-carrier command modulation system
DALLAS, S. S. Use of multivariable asymptotic expansions in a satellite theory NPO-11750 B73-10303 09 DANE, D. H. Advanced action manipulator system (ADAMS)	Spectral analysis program (SAP) JSC-14310 B73-10227 09 DEUEL, C. L. Dynamic technique for measuring adsorption in a gas chromatograph JSC-14083 B73-10339 04 DIAMANT, L. S.	Formaldehyde monitor for automobile exhausts LANGLEY-11352 B73-10228 04 EASTERLING, M. F. Two-carrier command modulation system NPO-11548 B73-10273 02
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DALLAS, S. S.  Use of multivariable asymptotic expansions in a satellite theory NPO-11750 B73-10303 09  DANE, D. H.  Advanced action manipulator system (ADAMS) M-FS-22022 B73-10204 07  A proposed hand-tool assembly for robots	Spectral analysis program (SAP) JSC-14310 B73-10227 09  DEUEL, C. L.  Dynamic technique for measuring adsorption in a gas chromatograph JSC-14083 B73-10339 04  DIAMANT, L. S.  Validity test for linear error analysis JSC-14378 B73-10219 09  DIBBLE, A. C.	Formaldehyde monitor for automobile exhausts LANGLEY-11352 B73-10228 04 EASTERLING, M. F. Two-carrier command modulation system NPO-11548 B73-10273 02 EASTON, R. A. Data multiplexer using a tree switch
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DALLAS, S. S.  Use of multivariable asymptotic expansions in a satellite theory NPO-11750 B73-10303 09  DANE, D. H.  Advanced action manipulator system (ADAMS) M-FS-22022 B73-10204 07 A proposed hand-tool assembly for robots M-FS-2266 B73-10216 07  DANNENMUELLER, R. J.  Filament winding technique produces strong lightweight oxygen tanks	Spectral analysis program (SAP) JSC-14310 B73-10227 09  DEUEL, C. L.  Dynamic technique for measuring adsorption in a gas chromatograph JSC-14083 B73-10339 04  DIAMANT, L. S.  Validity test for linear error analysis JSC-14378 B73-10219 09  DIBBLE, A. C.  System for measuring passenger reaction to transportation-vehicle vibration LANGLEY-11353 B73-10436 05	Formaldehyde monitor for automobile exhausts LANGLEY-11352 B73-10228 04  EASTERLING, M. F. Two-carrier command modulation system NPO-11548 B73-10273 02  EASTON, R. A. Data multiplexer using a tree switch NPO-11333 B73-10289 02 Flexible format, computer accessed telemetry system NPO-11358 B73-10290 02  EBIHARD, B. T.
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FABIK, R. H. Laser system detects tower deflections LEWIS-11870 873-10243 02 FAGEOL, J. D. Time-based priority selection for analog circuits M-FS-24242 873-10154 02 Acoustic-emission signal-processing analog unit for locating flaws in large tanks M-FS-24424 873-10325 06 FARTHING, W. H. Solar aspect determination system GSFC-11444 873-10129 02 FARWELL, R. P. High-temperature-radiation analyzer ARC-10565 873-10017 03 FEALEY, R. D. Rapid detection of bacteria in foods and biological fluids	Hybrid coordinate formulation used for the design of attitude control systems for flexible spacecraft NPO-11714 B73-10300 09  FOGAL, G. L.  Zeta potential control for electrophoresis cells M-FS-22333 B73-10260 04  FOHLEN, G. M.  Transparent polymeric laminates ARC-10783 B73-10341 04  FOSTER, B. J.  Automated Shell Theory for Rotating Structures (ASTROS) M-FS-21970 B73-10115 09  FOUNTAIN, W.  Q-switched, cavity-dumped, modelocked laser GSFC-11509 B73-10175 03  FOW, P. B.  Magnetic particle clutch controls servo system	GALVAS, M. R. Program for calculating total-efficiency of specific-speed characteristics of centrifugal compressors LEWIS-12008 873-10309-09 GANGE, R. A. Laser addressed holographic memory system M-FS-22565 873-10155-03 An improved holographic recording medium M-FS-22532 873-10166-09 Laser-actuated device
FABIK, R. H. Laser system detects tower deflections LEWIS-11870 873-10243 02 FAGEOL, J. D. Time-based priority selection for analog circuits M-FS-24242 873-10154 02 Acoustic-emission signal-processing an- alog unit for locating flaws in large tanks M-FS-24424 873-10325 06 FARTHING, W. H. Solar aspect determination system GSFC-11444 873-10129 02 FARWELL, R. P. High-temperature-radiation analyzer ARC-10565 873-10017 03 FEALEY, R. D. Rapid detection of bacteria in foods and biological fluids	Hybrid coordinate formulation used for the design of attitude control systems for flexible spacecraft NPO-11714 B73-10300 09  FOGAL, G. L.  Zeta potential control for electrophoresis cells M-FS-22333 B73-10260 04  FOHLEN, G. M.  Transparent polymeric laminates ARC-10783 B73-10341 04  FOSTER, B. J.  Automated Shell Theory for Rotating Structures (ASTROS) M-FS-21970 B73-10115 09  FOUNTAIN, W.  Q-switched, cavity-dumped, modelocked laser GSFC-11509 B73-10175 03  FOW, P. B.  Magnetic particle clutch controls servo system JSC-17136 B73-10041 06	GALVAS, M. R. Program for calculating total-efficiency of specific-speed characteristics of centrifugal compressors LEWIS-12008 873-10309 09 GANGE, R. A. Laser addressed holographic memory system M-FS-22565 873-10155 03 An improved holographic recording medium M-FS-22532 873-10166 09 Laser-actuated device holographic storage device M-FS-22768 873-10423 03
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KURAL, M. H. Strain arrestor plate for	r mounting rigid	New concept in brazing	metallic honey-	Alphanumeric charac	ter generator for
insulating tiles	n mounting rigid	comb panels	072 10259 09	oscilloscope	
JSC-14182	B73-10465 06	LANGLEY-10957	B73-10358 08	GSFC-11582	873-10370 02
KURTZ, R. L.		LEAVITT, L. D.  Eye-controlled "teletype"	writer"	LOH, G. M.	•
Coherence-length exten	nder	LANGLEY-11564	B73-10514 02	Microminiaturized, b	
M-FS-22434	B73-10399 03	LEHMAN, M. T.		tioning system (MBCS)	
A real time moving-si	cene holographic	Semi-organic structur	al adhesive for	JSC-14180	B73-10236 02
camera		aluminum		LOIACONO, G. M.	ina madium
M-FS-21087	B73-10421 03	M-FS-21328	B73-10071 04	A new optical record M-FS-22348	B73-10095 03
Mintion compensator	for holographic	LEHWALT, M. F.		LONGTHORNE, J. E.	073-10033-03
motion picture camera		'Dry-column' chromatog	graphy of plant	Meter circuit for tu	ning RF amplifiers
M-FS-22517	B73-10434 03	pigments		NPO-11865	B73-10389 02
Photography of randor	n motion with a	ARC-10780	B73-10271 04	LOVALL, D. D.	
holographic camera		LEISER, D.		Measuring the electr	ric field of a cloud
M-FS-22537	B73-10435 03		urface-insulation	KSC-10731	B73-10074-02
KWAN, S. C.		material ARC-10721	B73-10504 04	LOWERY, J. R.	
Semi-organic structur	al adhesive for	LESCO, D. J.	B)3-1030+ 0+	Sefective coating f	for collecting solar
aluminum	070 40071 04	Low-cost clearance in	dicator for high	energy on aluminum	
M-FS-21328	B73-10071 04	speed turbomachinery	diddio: (o/ mg.	M-FS-22562	B73-10527 04
M-FS-21328	B73-10071 04		B73-10411 02	LUCE, R. S.	-
	B/3-100/1 04	speed turbomachinery LEWIS-12128 LEVIN, H.	B73-10411 02	LUCE, R. S. A new dry biomedica	al electrode
M-FS-21328	873-10071 04	speed turbomachinery LEWIS-12128 LEVIN, H. Refractory porcelain e	B73-10411 02	A new dry biomedica JSC-14321	el electrode B73-10146 02
	8/3-100/1 04	speed turbomachinery LEWIS-12128 LEVIN, H. Refractory porcelain e thermal-control coating	B73-10411 02	LUCE, R. S. A new dry biomedica JSC-14321 Microminiaturized.	al electrode B73-10146 02 propotential condi-
L LAMB, B. L		speed turbomachinery LEWIS-12128 LEVIN, H. Refractory porcelain e thermal-control coating temperature superalloys	B73-10411 02 enamel passive- g for high-	A new dry biomedica JSC-14321	al electrode B73-10146 02 propotential condi-
. <b>L</b>		speed turbomachinery LEWIS-12128 LEVIN, H. Refractory porcelain e thermal-control coating temperature superalloys M-FS-22324	B73-10411 02	LUCE, R. S. A new dry biomedica JSC-14321 Microminiaturized, b tioning system (MBCS)	al electrode B73-10146 02 piopotential condi-
LAMB, B. L. Image formation in mi	crowave hologra-	speed turbomachinery LEWIS-12128 LEVIN, H. Refractory porcelain e thermal-control coating temperature superalloys M-FS-22324 LEVY, G. S.	B73-10411 02 enamel passive- p for high- B73-10215 04	LUCE, R. S. A new dry biomedica JSC-14321 Microminiaturized, b tioning system (MBCS JSC-14180 LUDWIG, A. C. High-gain antenna	al electrode B73-10146 02 propotential condi- B73-10236 02
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LAMB, B. L. Image formation in mi phy ARC-10773 Microwave holography	icrowave hologra- B73-10378 03	speed turbomachinery LEWIS-12128 LEVIN, H. Refractory porcelain e thermal-control coating temperature superalloys M-FS-22324 LEVY, G. S. Low-noise microwave p NPO-11512	B73-10411 02 enamel passive- g for high- B73-10215 04 colarimeter	LUCE, R. S.  A new dry biomedica JSC-14321  Microminiaturized, b tioning system (MBCS JSC-14180  LUDWIG, A. C. High-gain antenna of reflector NPO-11361	al electrode B73-10146 02 propotential condi- B73-10236 02
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L  LAMB, B. L Image formation in mi phy ARC-10773 Microwave holography testing ARC-10774  LAMB, T. Logistics hardware and system KSC-10819  LAMBERT, M., III Dynamic power load s	B73-10378 03 for nondestructive B73-10379 03 d services control B73-10418 09 imulator	speed turbomachinery LEWIS-12128  LEVIN, H.  Refractory porcelain of thermal-control coating temperature superalloys M-FS-22324  LEVY, G. S.  Low-noise microwave p NPO-11512  LEVY, R.  Node-recording metho matrix wavefront reduction analysis NPO-11620  Improved procedures for reductions in eigenvalue s NPO-11619  LEWETT, R. P.  Hydrogen-environment	enamel passive- g for high- B73-10215 04 colarimeter B73-10134 02 cd for stiffness ion in structural B73-10296 09 or mass matrix- colutions B73-10384 09	LUCE, R. S.  A new dry biomedica JSC-14321  Microminiaturized, be tioning system (MBCS JSC-14180)  LUDWIG, A. C.  High-gain antenna or reflector  NPO-11361  LUNDY, C. C.  Means for mapping for measuring different antenna elements  NPO-13053  Probes for measuring an electronic cable NPO-13123  LUSBY, T. K., JR.  System for measuring	al electrode B73-10146 02 piopotential condi- B73-10236 02 with singly-curved B73-10291 02 radiated fields and intial movement of B73-10452 02 ng noise current in B73-10454 02 ng passenger reaction
L  LAMB, B. L Image formation in mi phy ARC-10773 Microwave holography testing ARC-10774  LAMB, T. Logistics hardware and system KSC-10819  LAMBERT, M., III Dynamic power load s JSC-14285	B73-10378 03 for nondestructive B73-10379 03 d services control B73-10418 09 imulator B73-10305 02	speed turbomachinery LEWIS-12128 LEVIN, H. Refractory porcelain a thermal-control coating temperature superalloys M-FS-22324 LEVY, G. S. Low-noise microwave p NPO-11512 LEVY, R. Node-recording metho matrix wavefront reducti analysis NPO-11620 Improved procedures for reductions in eigenvalue s NPO-11619 LEWETT, R. P. Hydrogen-environment metals: A study	enamel passive- property for high- B73-10215 04 polarimeter B73-10134 02 polarimeter B73-10134 02 polarimeter B73-10296 09 por mass matrix- colutions B73-10384 09 embrittlement of	LUCE, R. S.  A new dry biomedica JSC-14321  Microminiaturized, b tioning system (MBCS JSC-14180  LUDWIG, A. C.  High-gain antenna of reflector NPO-11361  LUNDY, C. C.  Means for mapping for measuring differe antenna elements NPO-13053  Probes for measuring an electronic cable NPO-13123  LUSBY, T. K., JR.  System for measuring to transportation-vehicle	al electrode B73-10146 02 piopotential condi- B73-10236 02 with singly-curved B73-10291 02 radiated fields and intial movement of B73-10452 02 ng noise current in B73-10454 02 g passenger reaction e vibration
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MOBERT, M. L.  Dynamic : technique for measuring	LEWIS-11859 B73-10246 09	NURICK, W. H.  Experimental verification of computer
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True airspeed measured by airborne laser		
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ARC-10763 B73-10506 02	nitrogen JSC-14465 B73-10394 04	_
MOEN, G. C.	JSC-14405 B/3-10394 04	AMERICA
Synchro phase selector aid LANGLEY-11282 B73-10160 01	•	O'NEAL, R. L. Particulate and aerosol detector
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MOORE, J. M. Traveling digital counters for microme-	braking system	JSC-14143 B73-10429 06
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