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CUMULATIVE INDEX
to NASA Tech Briefs
January–December 1968

February 1969

National Aeronautics and Space Administration
Introduction

This Index to NASA Tech Briefs lists the technological innovations derived from the U.S. space program and published during the period January through December 1968. A new five year cycle of cumulative indexes begins with this index. The Cumulative Indexes for the previous five years (1963–1967) are contained in NASA SP-5021(06) which was published in April 1968. The main section is arranged in six categories: Electrical (Electronic); Physical Sciences (Energy Sources); Materials (Chemistry); Life Sciences; Mechanical; and Computer Programs. A typical entry has these elements:

- TECH BRIEF NUMBER
- TITLE
- ABSTRACT
- INNOVATOR
- ORIGINATING SOURCE NUMBER

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

- SUBJECT HEADING
- TITLE
- ORIGINATING SOURCE NUMBER
- TECH BRIEF NUMBER
- CATEGORY

Note that in this index several routes are opened for obtaining further information. If the title seems promising, the Tech Brief number and category may be used to locate the abstract, which will be found in the main section arranged sequentially by Tech Brief number within each category. Further, the Tech Brief number can of course be used for obtaining a copy of the original Tech Brief.
The second index relates all items by the originating source and number to the Tech Brief number and category.

The third index relates all items by the Tech Brief number and category to the originating source and number.
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Other information on the Availability of Tech Briefs may be obtained from:
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This Index supplements the Cumulative Index to NASA Tech Briefs (NASA SP-502(06)) which was published in April 1968. The index was prepared by the Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by the Technical Information Services Company.
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01 ELECTRICAL (ELECTRONIC)

B68-10001
DC PIN-TO-PIN TESTING OF INTEGRATED CIRCUITS
THOMAS, E. F. DATE—JAN. 1968
GSFC-10684
External pin-to-pin nondestructive testing procedure measures the electrical characteristics of each element in an integrated circuit. The procedure involves choosing specific pairs of pins and applying appropriate test voltages to them.

B68-10002
GAGE MONITORS QUALITY OF CROSS-WIRE RESISTANCE WELDS
ETZEL, J. PILITCH, A. DATE—JAN. 1968
GSFC-90549
Gage nondestructively monitors the quality of cross-wire resistance welds during the welding operation. The gage gives a dial indication of the relative embedment of the cross wires during the actual welding operation. A direct relationship exists between the depth of embedment and both weld strength and consistency.

B68-10003
LINEAR ANALOG DC VOLTAGE-TO-PULSE-WIDTH CONVERTER
CROCKETT, W. R. DATE—JAN. 1968
GSFC-656
Circuit converts a dc analog input signal to pulse widths that are proportional to the input signal voltages. The circuit would be particularly useful as an analog-to-digital converter where low power, ruggedness, reliability, and good linearity are prime requirements.

B68-10007
BIMETAL SENSOR AVERAGES TEMPERATURE OF NONUNIFORM PROFILE
DITTRICH, R. T. DATE—JAN. 1968
LEWIS-10362
Instrument that measures an average temperature across a nonuniform temperature profile under steady-state conditions has been developed. The principle of operation is an application of the expansion of a solid material caused by a change in temperature.

B68-10008
IMPROVED PHASE LOCKED LOOP RECEIVER
DALEY, T. J. /GEN. DYN./ELECTRON. DATE—JAN. 1968
GSFC-90561
Improved phase locked loop receiver tracks and demodulates a signal whose signal-to-noise ratio may be low and whose information sidebands are close in frequency. This receiver recovers the carrier from input signals and applies it to a demodulator which recovers the sidebands.

B68-10012
ONE-SHOT PULSE SHAPER CIRCUIT
RADYS, R. G. /HUGHES AIRCRAFT CO./ DATE—JAN. 1968
XG-11379
Pulse shaper circuit exhibits low power dissipation, self setting, and easy triggering. It is basically a magnetic one-shot multivibrator consisting of two blocking oscillators and an inhibit circuit.

B68-10015
INPUT GATE CIRCUIT CONVERTED FOR USE AS LINEAR AMPLIFIER
HARPER, T. P. /IBM/ DATE—JAN. 1968
M-FS-14220
Commercially available integrated circuit that is marketed as a digital computer input gate circuit was converted to a linear amplifier in a microphone circuit that has high input impedance, low output impedance, low cost, and is small enough to fit on a standard printed circuit card.
M-PS-12396
Thin film convective heat transfer gage functions effectively for prolonged periods at temperatures up to 1000 degrees F. An initial resistance shift does not inhibit the performance or accuracy of the gages, as the original resistance-temperature relationship remains unchanged.

B66-10054
AMPLITUDE AND FREQUENCY READOUT OVERLAY
Pitch, A. E. DATE— MAR. 1968
GSFC-10183
Amplitude and frequency readout overlay simplifies the interpretation of oscillograph traces for full scale deflections of one inch. The overlay increases accuracy in data interpretation and saves time in analyzing oscillograph records.

B66-10056
LUMINESCENT SCREEN COMPOSITION FOR CATHODE RAY TUBES
Hilborn, E. H. DATE— MAR. 1968
ERC-19
Screen composition for cathode ray tubes exhibits differential color of emission as a function of beam current variation at a constant accelerating voltage. The screen consists of a mixture of phosphors which emit different hues, have different current saturation values and exhibit a nonlinear current-brightness characteristic.

B66-10058
SIMPLIFIED, HIGH-SPEED BINARY DATA DECODER
Anderson, T. O. DATE— FEB. 1968
NPD-10118
Simplified, high-speed decoder of encoded binary data received over a noisy channel is provided in a versatile apparatus that can accommodate more than one particular set of codes. The apparatus is applicable to satellite, lunar, and planetary data transmission.

B66-10059
THERMAL SHORT IMPROVES SENSITIVITY OF CRYOGENICALLY COOLED MASER
Clauss, R. C. DATE— MAR. 1968
NPD-09975
In-line, quarter-wave thermal short cools the center conductor of the signal-input coaxial transmission line to a cryogenically cooled traveling wave maser. It reduces both the thermal noise contribution of the coaxial line and the heat leak through the center conductor to the maser at 4.4 degrees K.

B66-10061
ELECTRONIC CIRCUIT PROVIDES AUTOMATIC LEVEL CONTROL FOR LIQUID NITROGEN TRAPS
Tusby, B. R. DATE— MAR. 1968
KSC-10127
Electronic circuit, based on the principle of increased thermistor resistance corresponding to decreases in temperature provides an automatic level control for liquid nitrogen cold traps. The electronically controlled apparatus is practically service-free, requiring only occasional reliability checks.

B66-10063
PLASTIC PREFORMS FACILITATE FABRICATION OF WELDED CORDDWOOD ELECTRONIC MODULES
Sturman, J. C. DATE— MAR. 1968
Lewis-99559
Molded plastic preforms facilitate the fabrication of small lots of welded cordwood circuits. The preforms retain the components during welding and electrical checkout and facilitate encapsulation of the welded module when used with a conventional potting shell.

B66-10065
MULTICHANNEL IMPLANTABLE TELEMETRY SYSTEM
Fryer, T. B. DATE— MAR. 1968 SEE ALSO B64-10171, B66-10057, AND B66-10624
ARC-10083
Multichannel telemetry system is used for chronic implantation in animals to monitor a variety of physiological parameters. A hermetically sealed unit, the system uses a line-sharing multiplex scheme to commutate between various sensor inputs and enables the number of channels to be increased or decreased.

B68-10067
SELF-CORRECTING, SYNCHRONIZING RING COUNTER USING INTEGRATED CIRCUIT DEVICES
Maaeberg, W. A. /IBM/ DATE— MAY 1968
M-PS-13991
Three half gate circuits are used to add error detection and reset logic circuitry for initiating and retaining the correct binary state in the flip-flop circuits of a ring counter. As the input signals are counted, the position of the specified state moves in ordered sequence around circuit loop.

B68-10068
DIVERSITY RF RECEIVING SYSTEM WITH IMPROVED PHASE-LOCK CHARACTERISTICS
Di Losa, V. J., Laughlin, C. R., Jr. DATE— MAR. 1968
XGS-01222
Improved diversity receiving system automatically utilizes the combined output from its two independent receiving channels with cross-polarized receiving antennas to increase the reliability of maintaining the requisite phase lock for optimum signal reception. It is adapted for use with AM, PM, or narrow band FM signals.

B68-10069
PRINCIPLES OF OPTICAL-DATA PROCESSING TECHNIQUES
Shulman, A. R. DATE— MAR. 1968
GSFC-10271
Document presents optical-data processing information on a level which will convey the basic principles involved to those having a general technical background. Mathematical discussions are included but are not required for a basic understanding.

B68-10070
DEVELOPMENT OF BIAXIAL TEST FIXTURE INCLUDES CRYOGENIC APPLICATION
M-PS-14185 M-PS-14189
Test fixture has the capability of producing biaxial stress fields in test specimens to the point of failure. It determines biaxial stress by dividing the applied load by the net cross section. With modification it can evaluate materials, design concepts, and production hardware at cryogenic temperatures.

B68-10073
NEW MICROELECTRONIC POWER AMPLIFIER
New, T. C. /WESTINGHOUSE ELEC. CORP./ DATE— MAR. 1968
M-PS-13621
Integrated push-pull power amplifier fabricated on a chip of silicon has interdigitated power transistors and is hermetically encapsulated in a beryllia flat package. It provides current output greater than the nominal 10 amperes from an input current drive of 1 amper.

B68-10074
IMPROVED DC VOLTAGE MULTIPLIER
Savelle, C. R., Jr. /BPAOC/ DATE— MAR. 1968
M-PS-14042
Circuit multiplies a dc input voltage in the millivolt range to yield a larger dc output voltage bearing a fixed ratio to the input voltage. The supply voltage need not be precisely regulated, the potentiometer need not be linear, and the gain of servo amplifier is not critical.

B68-10079
MAGNETIC TAPE TRANSPORT CONTROLLED BY ROTATING TRANSDUCER HEADS
HEATS OF FORMATION OF ALLOYS AT HIGH TEMPERATURES

DARBY, B. E., BEBOO, CORP.

MSC-12060

GYRATOR-TYPE CIRCUITS REPLACE UNGROUNDED ELECTRONIC METHOD OF DISJOINING ADHESIVELY BONDED INDUCTORS

ARG-90260
/NORTHWESTERN UNIV./

J. CHUPITY, J. SALCEDO, G. SPERRY, J. D. /AMPEX
/CORP./

DATE- MAR. 1968

DATE- APR. 1968

GFS-14574

GFS-10083

The twin differential calorimeter measures the small heat effects generated over extended periods of time, has maximum operating temperature of 1073 degrees K and an automatic data recording system.

DABRO, B. J., JR. KLEB, R. KLEPPA, G. J.
/CHICAGO UNIV./

ARG-10114

The twin differential calorimeter determines the heats of formation of transition metal alloys at high temperatures. The twin differential calorimeter measures the small heat effects generated over extended periods of time, has maximum operating temperature of 1073 degrees K and an automatic data recording system.

XAC-10608

B66-10003

Magnetiq Calvert-type, twin liquid metal solution calorimeter includes a common drive for both the tape drive capstans and the rotating record/reproduce heads. Speed of the drive may be varied within a preselected range, but, once selected, remains constant so head and capstan are driven in synchronization and at constant speed.

B66-10004

Magnetiq Calvert-type, twin liquid metal solution calorimeter determines the heats of formation of transition metal alloys at high temperatures. The twin differential calorimeter measures the small heat effects generated over extended periods of time, has maximum operating temperature of 1073 degrees K and an automatic data recording system.

ARG-10114

GFS-10083

GFS-10084

TWIN SOLUTION CALORIMETER DETERMINES HEATS OF FORMATION OF ALLOYS AT HIGH TEMPERATURES

CABLE, G. J.
DATE- MAR. 1968

ARG-10114

The gyror circuits using only transistors, capacitors, and resistors which can replace both grounded and ungrounded inductors have been developed to permit complete microminiaturization of circuitry by integration of the components.

B66-10086

METHOD OF DISJOINING ADHESIVELY BONDED ELECTRONIC CORDWOOD MODULES

SACRAMUNE, P. J. /RCA/
/DATE- MAY 1968

MCS-12050

Embedent of resistive heating elements in a cordwood module used for packaging electronic components, facilitates separation of the adhesive bond between the module, and metal heat sink and the potting material without damaging the components. Electrical power applied to the elements causes breakdown of bonding material.

B66-10087

SUPERCONDUCTING SWITCH PERMITS MEASUREMENT OF SMALL VOLTAGES AT CRYOGENIC TEMPERATURES

GOVENDIK, R. E. HUBBNER, R. P.
/DATE- APR. 1968

ARG-90260

Double-coil, superconducting, on-off switch measures small, thermoelectrically generated voltages produced by thermocouples in a liquid helium bath. Placed in a shunt configuration between the thermocouple and the measuring device, the measuring device sees the sum of the voltage to be measured and the spurious thermoelectric voltages produced by thermocouples in a liquid helium bath. After the read command is given, the output register collects and stores the data that are on the set output terminals of the up-down counters.

B66-10100

ALTERNATING CURRENT ELECTROMAGNETIC SERVO INDUCTION METER

BOSUE, R. X.
DATE- MAY 1968

XFR-03035

Electromagnetic device accurately indicates the response of various sensors in high performance flight research aircraft to conditions encountered in flight. The device responds to sensor inputs to move a slideable armature along an indicator scale by the force of currents induced in the armature winding.

B66-10106

PORTABLE PULSE CODE MODULATION /PCM/ SUBSYSTEM

BRADANINI, P. A.
DATE- APR. 1968

MCS-11369

Small, programmable, high speed PCM subsystem, supports the variety of signals inherent in sophisticated equipment. A signal generated by a transducer is first conditioned to the proper signal range, then sampled by an external multiplexer or by the subsystem directly and then converted and transmitted to a receiving station.

B66-10112

PROJECTION TRANSPARENCIES FROM PRINTED MATERIAL

GRUNEWALD, L. S. NICKERSON, T. B. /BOEING CO./
/DATE- APR. 1968

MFS-14508

Projection transparencies are created by using a photostat process to copy the original from a large overhead projector. The method can be accomplished by either of two techniques, with a slight difference in materials.

B66-10114

PIGGY-BACK MOUNTING WOULD INCREASE MICROCIRCUIT PACKAGING DENSITY

GUAOIANO, S.
/DATE- APR. 1968

MCS-12059

Piggy-back method of packaging integrated circuits will increase packaging density and design flexibility. It will also eliminate interconnection leads between the die and associated inductances, and thus increase the attainable frequency response of the circuit.

B66-10116

HIGH EFFICIENCY, HIGH FREQUENCY MAGNETIC DEFLECTION DRIVER

SCHAPP, F. L. /WESTINGHOUSE ELECTRIC CORP./
/DATE- APR. 1968

MFS-10097

Electromagnetic deflection yoke stores energy during the scan and releases it in the flyback or retrace. The operation of the device involves a method of switching to a voltage high enough to dissipate the flyback pulse during the retrace time and then operating during the scan time at a much lower voltage.

B66-10099

AUTOMATIC CONTOUR WELDER INCORPORATES SPEED CONTROL SYSTEM

WALL, W. A., JR.
/DATE- MAR. 1968

MFS-14574

The speed control system maintains the welding torch of an automatic welder at a substantially constant speed. The system is particularly useful when welding contoured or unusually shaped surfaces, which cause the distance from the work surface to the weld carriage to vary in a random manner.

B66-10093

ACCUMULATOR FOR SHAFT ENCODER

CARROLL, C. C., CHILD, J. A.
/DATE- MAR. 1968

MFS-13699

Digital accumulator relies almost entirely on an integrated circuitry to process the data derived from the outputs of gyro shaft encoder. After the read command is given, the output register collects and stores the data that are on the set output terminals of the up-down counters.
B68-10118  
**BILATERAL, ZERO-IMPEDANCE STATIC SEMICONDUCTOR SWITCH**  
DOUGRAMAN, C. L. /WESTINGHOUSE ELEC. CORP./  
DATE- APR. 1968  
LEWIS-10129  
Static semiconductor switching circuit eliminates the undesirable features of electromechanical relays and conventional semiconductor switching circuits. There is a net zero voltage drop at the terminals and thus a zero impedance for bilateral currents there.  

B68-10121  
**CIRCUIT ENHANCES VERTICAL RESOLUTION IN RASTER SCANNING SYSTEMS**  
ALSOVSKY, W. H. GREENWOOD, J. R. HOLLEY, G. M. /PHILCO-FORD CORP./  
DATE- APR. 1968  
MSC-12123  
Circuit enhances vertical resolution in electron beam, raster scanning systems exhibiting aperture distortion in the vertical direction. A sensitized area /image/ produces a video output when the scan beam nears it, which causes vertical elongation in the reconstructed images of all sensitized areas on the surface.  

B68-10124  
**RELIABLE, SELF-CALIBRATING VIBRATION TRANSUCER**  
MC KINNEY, R. L.  
LANGLEY-99  
Transducer system measures the uniaxial vibration amplitudes and frequency of a body subjected to mechanical vibration. The basic system is self-calibrating and provides an output which unambiguously indicates the direction as well as the amplitude of the uniaxial deformations.  

B68-10129  
**COMPENSATION CIRCUIT IMPROVES OPERATION OF INDUCTIVE COUPLING TRANSFORMERS**  
INNOVATOR NOT GIVEN /SPERRY GYROSCOPE CO./  
DATE- APR. 1968  
M-PS-13081  
Circuitry eliminates undesirable modulation effects in rotary transformers which transfer electrical energy to and from angular rate transducers on a gyroscope. It cancels the error by feeding back compensation signals through a tertiary winding on the stator of the output rotary transformer.  

B68-10130  
**PHASE-LOCK LOOP FREQUENCY CONTROL AND THE DROPOUT PROBLEM**  
ATTWOOD, S. KLINE, A. J. /MOTOROLA/  
DATE- APR. 1968  
M-PS-13948 M-PS-13950  
Technique automatically sets the frequency of narrow-band phase-lock loops within automatic lock-in-range. It presests a phase-lock loop to a desired frequency with a closed loop electronic frequency discriminator and hold the phase-lock loop to that center frequency until lock is achieved.  

B68-10131  
**AUTOMATED PATIENT MONITORING SYSTEM**  
BEDARD, R. E. BURTON, R. L. DAWSON, W. S. /SEEBING CO./  
DATE- MAY 1968 SEE ALSO  
M-PS-14065  
Radio-linked patient monitoring system collects several channels of physiological data from as many as 64 hospital patients and transmits the data in digital form to a central control station. The system consists of a central control station and battery-operated patient units comprising small strap-on electronics packages.  

B68-10133  
**IMPROVED COMPENSATION CIRCUIT FOR DIRECT-COUPLED AMPLIFIERS**  
BREUER, D. N. /TWN SPACE TECHNOL. LABS./  
DATE- APR. 1968  
MSC-11148 MSC-11235  
Drift- and offset-control circuit compensates the inherent temperature drift and offset of a closed-loop feedback amplifier. It overcomes the disadvantages of conventional chopping circuits used to minimize drift in low-level, direct-coupled amplifiers.  

B68-10138  
**ELECTRONIC CALORIMETRIC COMPUTER**  
HECKELMAN, J. D.  
DATE- APR. 1968  
LEWIS-90254  
Electronic calorimetric computer calculates nuclear reactor thermal power output to a nominal accuracy of 1 percent. Heat balance is determined by an electronic approach. The thermal power is calculated using the inlet and outlet temperatures and the volume of cooling water and is displayed by a digital readout system.  

B68-10140  
**INSTRUMENTATION FOR BONE DENSITY MEASUREMENT**  
MEHARG, L. S. /KAMAN INSTR./  
DATE- APR. 1968  
MSC-11306  
Measurement system evaluates the integrated bone density over a specific cross section of bone. A digital computer converts stored bone scan data to equivalent aluminum calibration wedge thickness, and bone density is then integrated along the scan by using the trapezoidal approximation integration formula.  

B68-10144  
**STEREO PHOTOMACROGRAPHY SYSTEM**  
LINDSEY, W. F.  
DATE- APR. 1968  
LANGLEY-10176  
Stereophotomicrography system provides sharply focused and correctly exposed stereo pairs of photographs through a stereomicroscope. The system uses components of the old system but incorporates a sharp focusing system and includes an improved photometer.  

B68-10145  
**HIGH-PRESSURE GAS FACILITATES CALIBRATION OF TURBINE FLOWMETERS FOR LIQUID HYDROGEN**  
KRAUSE, L. M. SZANISZLO, A. J.  
DATE- MAY 1968  
SEE ALSO B67-10566 AND NASA-TN-D-3773  
LEWIS-10406  
Nitrogen gas at a pressure of 60 atmospheres and ambient temperature facilitates the calibration of turbine flowmeters used for monitoring the flow of liquid hydrogen in cryogenic systems. Full-scale calibration factors can be obtained to an accuracy of 0.4 percent.  

B68-10147  
**DEFLECTION CIRCUIT MONITORS FORCE ON OBJECT UNDER WATER**  
ROLLER, R. YAROSHUK, N. /WESTINGHOUSE ASTRONUC./  
DATE- MAY 1968  
NUC-10147  
Capsule containing samples for radiation testing is guided under through a seal to an exact position within a nuclear reactor. A Linear Variable Differential Transformer /LVDT/ excited deflection circuit monitors the force on the capsule as it is positioned within the reactor.  

B68-10148  
**SILICON SOLAR CELL MONITORS HIGH TEMPERATURE FURNACE OPERATION**  
ZELLNER, G. J. /WESTINGHOUSE ASTRONUC./  
DATE- MAY 1968  
NUC-10163  
Silicon solar cell, attached to each viewpoint,
monitors that incandescent emission from the hot interior of a furnace without interfering with the test assembly or optical pyrometry during the test. This technique can provide continuous indication of hot spots or provide warning of excessive temperatures in cooler regions.

**B68-10149**

**SYSTEM REMOTELY INSPECTS, MEASURES, AND RECORDS INTERNAL IRREGULARITIES IN PIPING**

**BURRY, H. F. /CUNNINGHAM, J. Y. /HEISMAN, R. M.**

**ICELAND, W. F. /NORWOOD, L. B. /N. AM. AVIATION/ DATE- MAY 1968**

M-FS-14545

Video electromechanical probe visually inspects and measures internal offset and peaking of welds in relatively large piping. Irregularity dimensions are recorded on peripheral equipment consisting of video tape and X-Y plotter. The probe is used for inspection of vacuum-jacketed liquid lines that cannot be inspected externally.

**B68-10151**

**IMPROVED 2/N METER**

**WINDETT, C. B. /MOTOROLA/ DATE- MAY 1968**

MSC-11565

Signal-to-noise ratios /S/N meter containing a variable-frequency notch filter measures noise plus interference in the presence of carrier or modulation signals. A noise source and calibration signal source are included in the instrument for calibration purposes.

**B68-10152**

**MM-WAVE POWER METER MOUNT**

**MULLEN, D. L. /OLTZMANS, D. A. /STELZRIED, C. T.**

**DATE- MAY 1968**

NPO-10348

E-band thermastrat mount and a technique for adjusting a temperature compensating thermistor to provide an electrically balanced bridge are used for measuring RF power in the mm-wavelength. The mount is relatively insensitive to temperature effects that cause measurement errors in single ended circuits.

**B68-10155**

**HYDRA 1 DATA DISPLAY SYSTEM**

**HODGINS, R. L. /DEGOOD, B. R.**

**DATE- MAY 1968**

MSC-11594

System named Hydra, generates charts, graphs, and printed matter on slides or conventional negatives and positives, and combines these media with a capability of storage on magnetic tape for future updating to accommodate engineering changes or contract modifications to be readily added to basic data.

**B68-10156**

**PRECISION BOLOMETER BRIDGE**

**WHITE, D. R. /N. AM. AVIATION/ DATE- MAY 1968**

MSC-11473

Prototype precision bolometer calibration bridge is manually balanced device for indicating dc bias and balance with either dc or ac power. An external galvanometer is used with the bridge for null indication, and the circuit monitors voltage and current simultaneously without adapters in testing 100 and 200 oha thin film bolometers.

**B68-10157**

**THERMAL RESISTANCES OF SOLDER-BOSS/POTTING COMPOUND COMBINATIONS**

**VEILLEUX, E. D. /RC/ DATE- MAY 1968**

MSC-12074

Formulas, which can be used as a design tool, are derived to calculate the thermal resistance of solder-boss/potting compound combinations, for different depths of a solder boss, in electronic cordwood modules. Since the solder boss is the heat source, its shape and position will affect the thermal resistance of the surrounding potting compound.

**B68-10163**

**IMPROVED PROCESS FOR MAKING THIN-FILM SODIUM NITRATE CAPACITORS**

**MICKA, E. Z. /TW SPACE TECHNOL. LABS./ DATE- MAY 1968**

MSC-11231

Sodium niobate, formed by high vacuum, flash, and reactive evaporations, has a high dielectric constant and is used as a thin film dielectric in microelectronic capacitors. High purity films are formed from relatively inexpensive, pure starting materials. Crystalline sodium niobate films can be formed on amorphous or crystalline materials.

**B68-10166**

**SILICON SURFACE BARRIER DETECTORS USED FOR LIQUID HYDROGEN DENSITY MEASUREMENT**

**JAMES, D. T. /MILAM, J. K. /WINDETT, H. B. /ORTEC CO./ DATE- JUN. 1968**

M-FS-14115

Multichannel system employing a radioisotope radiation source, strontium-90, and a radiation detector, silicon surface barrier detector, measures the local density of liquid hydrogen, at various levels in a storage tank. The instrument contains electronic equipment for collecting the density information, and a data handling system for processing this information.

**B68-10171**

**SILICON OXIDE FILMS GROWN IN MICROWAVE DISCHARGE**

**KRAITCHMAN, J. /WESTINGHOUSE RES. LABS./ DATE- JUN. 1968**

M-FS-14654

Silicon oxide films thicker than 1000 angstrom are produced in the dense plasma of a microwave discharge. The oxide growth is characterized by a rate limiting diffusion process modified by sputtering effects produced by the discharge. Silicon is rapidly oxidized at temperatures estimated to be 500 degrees C or lower.

**B68-10173**

**TUNNEL DIODE CIRCUIT USED AS MANSECONDS-RANGE TIME MARKER**

**LARSEN, R. N. /SHKAR, E. B.**

**DATE- JUN. 1968**

ARG-90164

Simple tunnel diode time marker circuit determines the time at which an event occurs in a scintillation crystal. It is capable of triggering at voltages as low as the noise level of a 10-stage PM tube.

**B68-10175**

**CAPACITANCE-COUPLED WIPER INCREASES POTENTIOMETER LIFE**

**DIMEFF, J.**

**DATE- JUN. 1968**

SEE ALSO ANL-7170

NASA-TM-X-1235

Capacitively-coupled wiper reduces the friction between the sliding contact and the potentiometer element in conventional potentiometers. A small preamplifier employed close to the wiper reduces errors caused by output cable capacitance. The device is friction free with resultant low wear and has high speed and high resolution.

**B68-10182**

**STEADY-STATE DIFFERENTIAL CALORIMETER MEASURES GAMMA HEATING IN REACTOR**

**HERBST, D. /TALBOY, J. H.**

**DATE- JUN. 1968**

SEE ALSO ANL-7170

ARC-10120

Steady-state differential calorimeter, which displays good accuracy and reproducibility of results, is used to measure gamma heating in a reactor environment. The calorimeter has a long life expectancy since it is virtually unharmed by the reactor environment.

**B68-10183**

**DETECTION AND LOCATION OF METALLIC OBJECTS IMBEDDED IN NONMETALLIC STRUCTURES**

**BROWN, R. L. /NDESCALF, R. W.**

**DATE- JUN. 1968**

M-FS-14790

Small battery operated eddy current proximity measuring device detects and locates metal objects the size of a dime at distances up to one foot within nonmetallic structures. This device weighs approximately two pounds, occupies approximately 60 cubic inches, and is battery
powered.

B68-10185
CONCEPT FOR SLEEV E INDUCTION MOTOR WITH
1-MSEC MECHANICAL TIME CONSTANT
WIEGAND, D. E. DATE- JUN. 1968
ARG-10124
Conductive sleeve induction motor having a 1-msec
mechanical time constant is used with solid-state
devices to control all-electric servo power
systems. The servomotor rotor inertia is small
compared to the maximum force rating of the servo
motion, permitting high no-load acceleration.

B68-10188
HIGH- AND LOW-PRESSURE PNEUMOTACHOMETERS
MEASURE RESPIRATION RATES ACCURATELY IN
ADVERSE ENVIRONMENTS
FAGET, R. J., MCDONALD, R. T./ NORTHERN
NORTRONICS/ ROMAN, J. A. DATE- JUN. 1968
SEE ALSO NASA-TN-D-4217
FRC-10012 FRC-10022
Respiration-rate transducers in the form of
pneumotachometers measure respiration rates of
pilots operating high performance research
aircraft. In each low pressure or high pressure
oxygen system a sensor is placed in series with the
pilots oxygen supply line to detect gas flow
accompanying respiration.

B68-10202
FAST-RESPONSE CUP ANEMOMETER FEATURES
CSININE RESPONSE
FRENZEN, P. DATE- JUN. 1968 SEE ALSO
ANL-7360
ARG-9193
Six-cup, low-inertia anemometer combines high
resolution and fast response with a unique ability
to sense only the horizontal component of the
winds fluctuating rapidly in three dimensions.
Cup assemblies are fabricated of expanded
polystyrene plastic.

B68-10203
ELECTRONIC LOAD FOR TESTING POWER
GENERATING DEVICES
FRIEDMAN, E. B., STEPFER, G. DATE- JUN. 1968
NPO-10300
Instrument tests various electric power generating
devices by connecting the devices to the input of
the load and comparing their outputs with a
reference voltage. The load automatically
adjusts until voltage output of the power
generating device matches the reference.

B68-10205
MULTILAYER PLATED WIRE SHOWS PROMISE AS
MEMORY DEVICE
KADISH, D. DATE- JUN. 1968
MSC-11587
Multilayer plated wire memory system surpasses
planar thin film memories because of its high
speed, simplicity, and high output. The device
consists of a film Be-Cu wire plated with Ni-Fe
alloy about 1 micron thick crossed orthogonally by
word lines.

B68-10207
FACSIMILE VIDEO ENHANCEMENT DEVICE
VERMILLON, C. H. DATE- JUN. 1968
GSFC-10185
Video remodulation unit enhances facsimile
transmission using an amplitude-modulated 2400 Hz
carrier. The unit demodulates the signal and
then remodulates it, using the same carrier. By
using the unit controls, modulation can be set to
levels that compensate for picture in-transit
degradation.

B68-10210
ACTIVE RC NETWORKS OF LOW SENSITIVITY FOR
INTEGRATED CIRCUIT TRANSFER FUNCTION SYNTHESIS
HUELSMAN, L. P., KERWIN, W. J., NEWCOMER, R. W.
DATE- JUN. 1968
ARG-10146
Active RC network is capable of extremely high Q
performance with exceptional stability and has
independently adjustable zeros and poles. The
circuit consists of two integrators and two
numbers that are interconnected to produce a
complete second-order numerator and a second-order
denominator.

B68-10213
TECHNIQUE INCREASES STORAGE CAPACITY IN
CAMERA TUBE TARGET
BOLL, K. F. DE WRIES, H. R./ WESTINGHOUSE ELEC.
CORP./ DATE- JUN. 1968
MSC-11599
Technique increases the signal current, where
direct beam readout is used, in Secondary
Electron Conduction/SEC/ camera tubes.
Increasing the storage capacity and therefore the
dynamic range of the SEC target permits
satisfactory operation at reduced frame rates.

B68-10218
ZINC-OXYGEN PRIMARY CELL YIELDS HIGH
ENERGY DENSITY
GRAFF, C. B. DATE- JUN. 1968
M-PE-14661
Zinc-oxygen primary cell yields high energy
density for battery used as an auxiliary power
source in space vehicle systems. Maximum
reliability and minimum battery weight is achieved
by using a stacking configuration of 25
series-connected modules with 6 parallel-connected
cells per module.

B68-10220
NEW ELECTRICAL PLETHYSMOGRAPH MONITORS
CARDIAC OUTPUT
KURIEK, W. B., PATTERNSON, R. P., WITSOE, D. A.
/MINNESOTA UNIV./ DATE- JUN. 1968
MSC-11447
Four-electrode impedance plethysmograph measures
ventricular stroke volume of cardiac output of
humans. The instrument is automatic, operates
with only one recording channel, and minimizes
patient discomfort.

B68-10223
LIGHTWEIGHT HEATER GENERATES HIGH
TEMPERATURES FROM LOW CURRENT
HANSEN, E. L. DATE- JUL. 1968
SAN-10044
Double spiral polybdenum heater element uses low
current, needs no insulation, and requires support
only at the ends, which are also the power input
points. Because there is no insulation or
internal support necessary, the heater is
lightweight. Its temperature will vary with its
size and environment.

B68-10224
SEMI CONDUCTOR AC STATIC POWER SWITCH
VRANCIC, R. DATE- JUN. 1968
LEWIS-10344
Semiconductor ac static power switch has long life
and high reliability, contains no moving parts,
and operates satisfactorily in severe
environments, including high vibration and shock
conditions. Due to their resistance to shock and
vibration, static switches are used where
accidental switching caused by mechanical
vibration or shock cannot be tolerated.

B68-10230
IMPROVED ATOMIC RESONANCE GAS CELL FOR USE
IN FREQUENCY STANDARDS
HAGGERTY, G. R./ VARIAN ASSOCIATES/ DATE- JUL.
1968
MSC-11666
Atomic resonance gas cell maintains a stable
operating frequency in the presence of pressure
fluctuations in the ambient atmosphere. The new
cell includes an envelope which is transparent to
radiation in the optical region and to microwave
energy at the atomic resonance frequency of the
alkali-metal vapor within the envelope.

B68-10233
ELECTROCARDIOGRAPH TRANSMITTED BY RF AND
PHONE LINKS IN EMERGENCY SITUATIONS
CAMPBELL, L. R., LEWIS, C. E., JR., MCDONALD, R.
DATE- JUL. 1968
FRC-10021
Electrocardiograph of an injured human subject is
transmitted by RF and telephone links from the ambulance at the emergency scene, to the hospital emergency facilities. This system eliminates delay in the diagnosis of required therapy, thereby enhancing emergency and rescue operations.

B68-10236 QUIESCENT VAPOR PRESSURE MEASUREMENTS ON REACTIVE SYSTEMS IN INERT ATMOSPHERE BOX ARG-90142

Apparatus makes vapor pressure measurements on air-sensitive systems in an inert atmosphere glove box. Once the apparatus is loaded with the sample and all connections made, all measuring operations may be performed outside the box. The apparatus is a single-tube adaptation of the double-tube quasi-static technique.

B68-10238 ASTRONAUT SPACE SUIT COMMUNICATION ANTENNA LINDSEY, J. F., III /NAVY/ DATE- JUL. 1968

Astronaut space suit communication antenna consists of a spring steel monopole in a blade-type configuration. This antenna is mounted in a copper cup filled with a potting compound that is recessed in the center to facilitate bending the blade flat for stowing when not in use.

B68-10240 PARALLEL-TO-SERIAL BIPHASE-DATA CONVERTER TRUENOY, R. B. /N. AM. AVIATION/ DATE- JUL. 1968

Conversion produces a serial biphase output signal from parallel input data. Alternate bits are loaded into a shift register in complement form so that the bits appear at the end of the shift register in a true-complement form sequence.

B68-10242 WELDER ANALYZER MILLER, L. L. /GEN. MOTORS CORP./ DATE- JUL. 1968

Welder analyzer circuit evaluates and certifies resistance welding machines. The analyzer measures peak current, peak voltage, peak power, total energy, and first-pulse energy. It is used as an energy monitor while welding is being performed, or a precision shunt load for a pure electrical evaluation of the weld machine.

B68-10244 IMPROVED TRAVELING WAVE MASER AMPLIFIER CLAUS, R. C. /N. AM. AVIATION/ DATE- JUL. 1968

Traveling Wave Maser /TWM/ that operates at S-band frequencies is characterized by a greatly improved gain-bandwidth product with relatively low equivalent-noise temperature. Tests indicate that its performance exceeds that of any other type of S-band amplifier.


Miniature pressure transducer responds to static or dynamic pressures acting against a structural surface without introducing errors caused by stresses in the structural surface. This is accomplished by a thin stainless steel pressure sensing diaphragm with an attached foil strain gage.

B68-10254 HARMONIC DISTORTION ANALYZER SPEEDS SETUP OF MAGNETIC TAPE RECORDERS TINARI, D. F. /NAVY/ DATE- JUL. 1968

Harmonic distortion analyzer effects rapid and accurate setup and calibration of magnetic tape instrumentation recorders. The analyzer is portable, requires no warmup period and need not be calibrated for normal usage. Average setup time with this analyzer is approximately 30 seconds per track.

B68-10256 ACQUISITION OF PSEUDONOISE SIGNALS BY SEQUENTIAL ESTIMATION WARD, E. B. /LOCKHEED MISSILES AND SPACE CO./ DATE- JUL. 1968

Rapid Acquisition by Sequential Estimation /RASE/ system is used in the receivers of tracking and communications systems to bring identical locally generated pseudonoise digital modulation signal into time synchronization with the incoming pseudonoise signal. This acquisition system is particularly suited for medium input signal-to-noise ratios.

B68-10262 SILICON STRAIN SENSORS ENABLE PRESSURE MEASUREMENT AT CRYOGENIC TEMPERATURES BOWMAN, R. BURNs, J. MC LELAN, W. /ELECTRO-OPTICAL SYSTEMS/ DATE- JUL. 1968

Miniature pressure transducers with diffused, heavily doped silicon strain-gage sensor elements, operates over a wide temperature range. Small thermal mass combined with close coupling between a metallic diaphragm and sensor elements minimizes sensitivity to temperature transients.

B68-10264 IMPROVED FUEL-CELL-TYPE HYDROGEN SENSOR RUDEN, F. P. RUTKOWSKI, R. B. /GE/ DATE- JUL. 1968

Modified hydrogen sensor replaces oxygen cathode with a cathode consisting of a sealed paste of gold hydroxide and a pure gold current collector. The net reaction which occurs during cell operation is the reduction of the gold hydroxide to gold and water, with a half-cell potential of 1.4 volts.

B68-10267 CONCEPTUAL DEAD WEIGHT DEVICE TO PROVIDE PRESSURE CALIBRATION KARCHER, G. /CHRYSLER CORP./ DATE- JUL. 1968

Dead weight testing device uses a common force plane piston manometer to set accurate gage pressure in pounds per square inch. An additional piston gage easily adapts the device for absolute pressure calibration.

B68-10269 MOEBIUS RESISTOR IS NONINDUCTIVE AND NONREACTIVE DAVIS, R. L. /OKLAHOMA STATE CO./ DATE- JUL. 1968

Moebius strip made of insulated resistive materials with electrical leads attached directly opposite one another provides a noninductive, nonreactive resistor which is simple, inexpensive, and flexible in usage, and can be made to almost any desired size and shape.

B68-10268 VIBRATION TESTING AND DYNAMIC STUDIES OF RELAYS INNOVATOR NOT GIVEN /OKLAHOMA STATE UNIV./ DATE- JUL. 1968

Study has been undertaken to determine the separation criteria for a preloaded, idealized set of contacts when they are subjected to a steady-state sinusoidal excitation and when the elasticity of one contact is nonlinear. The study consists of two phases, theoretical and experimental.

B68-10269 LOW ENERGY ODOMETER CAN BE USED TO TEST SENSITIVE CIRCUITS, OTHER MEASUREMENTS PLATT, L. W. /NAVY/ DATE- JUL. 1968

Hazardous circuit ohmmeter is of sufficiently low resistance to not adversely affect the test, yet is of sufficiently low equivalent-noise temperature. Tests indicate that its performance exceeds that of any other type of S-band amplifier.
energy output that it may be used to test extremely sensitive circuits safely, reliably, and accurately. A polyethylene-foam-lined aluminum case provided protection for the unit assembly.

**B68-10272**

**NOISE FIGURE MEASUREMENT CONCEPT FOR ACOUSTIC AMPLIFIERS**


GSFC-10066

Optimum length buffer crystals are used with an amplification section for measuring the noise figure for acoustic amplifiers. Measuring the time required to saturate with noise as a signal, which is reflected back and forth in the circuit, gives a direct measurement of the amplifiers noise figure.

**B68-10273**

**RECHARGE UNIT PROVIDES FOR OPTIMUM RECHARGING OF BATTERY CELLS**

BAER, D. FORD, F. E. /DATE- AUG. 1968

GSFC-10688

Percent recharge unit permits each cell of a rechargeable battery to be charged to a preset capacity of the cell. The unit automatically monitors and controls a rechargeable battery to charge-discharge cycling tests.

**B68-10280**

**IGNITION OF BINARY ALLOYS OF URANIUM**

BAKER, L., JR. BINGLE, J. D. SCHNIZLEIN, J. G. /DATE- AUG. 1968

ARG-10057

Experiments determine the effect of alloying additives on the ignition of uranium. Data on oxidation rates, ignition temperatures, and burning curves are provided in the report.

**B68-10283**

**HIGH-VOLTAGE PULSE GENERATOR DEVELOPED FOR WIDE-GAP SPARK CHAMBERS**

KELLER, L. P. WALSCHON, E. G. /DATE- AUG. 1968

ARG-10136

Low-inductance, high-capacitance Marx pulse generator provides for minimization of internal inductance and suppression of external electromagnetic radiation. The spark gaps of the generator are enclosed in a pressurized inert atmosphere which allows the charging voltage to be varied by changing the nitrogen pressure.

**B68-10289**

**DEEP SPACE FM SYSTEM, A CONCEPT**

BOLDON, G. D. /LOCHHEID ELECTRON. CO./ DATE-AUG. 1968

MSC-11825

Deep-space frequency modulation system permits transmission of data where the signal deviation is greater than 1/2 the predetection bandwidth. It provides satisfactory performance at great distances or with low signal levels.

**B68-10290**

**DYNAMIC LINEARITY MEASUREMENT TECHNIQUE**

MERZ, K. MORRELL, L. /BOEING CO./ DATE-AUG. 1968

KSC-10186

Measurement technique involves frequency modulated discriminator which produces an error signal as two signals, one of known and one of unknown frequency. The signals are electronically switched to a discriminator input, allowing independent measuring of dynamic linearity in a frequency modulated subcarrier oscillator.

**B68-10291**

**CRYOGENIC LIQUID LEVEL MEASURING PROBE**

BINKEL, J. A. WEGNER, C. R. /DATE- AUG. 1968

ARG-10139

Universal probe, which contains a unique frequency discriminator, measures the static and dynamic levels of cryogenic liquids in a hydrogen bubble chamber. The probe allows boiling conditions or other turbulence to be observed throughout all the transition stages.
unmanned astronomical stations. More efficient systems are required for the microwave power transmission.

B68-10310
STANDARDS FOR COMPATIBILITY OF PRINTED CIRCUIT AND COMPONENT LEAD MATERIALS
INNOVATOR NOT GIVEN /MARTIN CO./ DATE- AUG. 1968
M-PS-14531
Study of packaging of microminiature electronic components reveals methods of improving compatibility of lead materials, joining techniques, transfer molding concepts, printed circuit board materials, and process and material specifications.

B68-10311
IMPROVED ELECTRO-OPTICAL TRACKING SYSTEM
JOHNSON, R. E. WEISS, P. F. /SYLVANIA ELECTRON.
SYSTEMS/ DATE- AUG. 1968
M-PS-14701
Electro-optical tracking system employs a laser beam illuminating source, an electronic beam deflector, and an image dissector photomultiplier. An electronic scanning transmitter and receiver follows rapid movements or accelerations of the target.

B68-10312
SYSTEM MEASURES ARC ENERGY DISSIPATED IN RELAY CONTACT CYCLING
INNOVATOR NOT GIVEN /OKLAHOMA ST. UNIV./ DATE- AUG. 1968
M-PS-14541
System, containing cycle timer, measures the energy dissipated at the contacts of a relay operating in an electric circuit. The system measures as well and records the energy for a large number of repetitive operations.

B68-10313
ANALYSIS AND DESIGN OF A CLASS-D AMPLIFIER
INNOVATOR NOT GIVEN /AUBURN UNIV./ DATE- AUG. 1968
M-PS-14603
Analysis of a basic class-D amplifier circuit configuration shows its adaptability to a variety of applications. The feedback, input and output configuration and the frequency spectrum of the pulse-width-modulated signal are analyzed.

B68-10314
COLOR-TELEVISED MEDICAL MICROSCOPY
HEATH, M. A. PECK, J. C. DATE- AUG. 1968
MSC-13086
Color-television microscopy used at laboratory-range magnifications, reproduces a slide image with sufficient fidelity for medical laboratory and instructional use. The system is used for instant pathological reporting between operating room and remotely located pathologist viewing a biopsy through this medium.

B68-10315
GIMBAL ANGLE SENSOR
ZAREMSA, J. G. /THW SYSTEMS GROUP/ DATE- AUG. 1968
GSFC-10305
Detector flake located parallel to a slotted mask mechanical differentiator, senses the rotation of a gimbaled reaction wheel mounting. As the global moves light passes through the mask and strikes a section of the detector, the electrical output of which has been calibrated in terms of degrees of rotation.

B68-10316
OPTIMETRIC SYSTEM FACILITATES COLORIMETRIC AND FLUOROMETRIC MEASUREMENTS
HALEY, F. C. DATE- AUG. 1968
NPO-10233
Compact, unitary optimetric systems uses a single device for colorimetric, fluorometric and spectral absorption measurements. The basic element of the unitary systems is a test cell containing filter elements with uniquely fabricated lenses.

B68-10317
METHOD OF REDUCING TIME BASE ERROR IN DIGITAL MAGNETIC RECORDERS
MOORE, J. M. /ELECTRO-MECHAN. RES./ DATE- AUG. 1968
GSFC-10108
Apparatus reduces time base error /TBE/ in the playback of digital data from magnetic recording equipment. The apparatus uses a magnet which employs a servo position control of the tape by which the playback data clock is phase locked with a fixed frequency reference signal.

B68-10319
ULTRASONIC TEMPERATURE MEASURING DEVICE
LEWIS-10446
Pulse echo ultrasonic system automatically determines the temperature in the core of a nuclear rocket engine by measuring the transit time of an acoustic pulse in a wire sensor. The measurement is based on the fact that the speed of sound in the sensor material is a function of temperature.

B68-10321
CONCEPT TO CONVERT ELECTRICAL POWER
RATTI, N. /LEAR SIEGLER/ DATE- AUG. 1968
GSFC-10222
Moving fluid conductor transforms electrical power from one voltage to another. The electrically conductive fluid acts as a coupling medium between or among electromagnetic fields producing the conversion.

B68-10322
HYDROGEN SAFETY MANUAL
LEWIS-10487
Hydrogen safety manual covers the characteristics and nature of hydrogen, design principles for hydrogen systems, protection of personnel and equipment, and operating and emergency procedures. It sets standards and practices for minimum safety requirements at hydrogen installations.

B68-10325
ELECTROCHEMICAL CELL HAS INTERNAL RESISTIVE HEATER ELEMENT
COLSTON, E. F. FORD, F. E. HENNIGAN, T. J. DATE- AUG. 1968
GSFC-10358
External source supplies power to electrochemical cells containing internal resistive heater element. Each cell plate is individually contained in its own Pellon bag, enabling the heater element to be arranged in a continuous, parallel circuit.

B68-10327
POWER CONSUMPTION IN ACOUSTIC AMPLIFIERS
UNDER CONDITIONS OF MAXIMUM STABLE GAIN
JOHNSON, V. R. /MICROWAVE ELECTRON./ DATE- AUG. 1968
GSFC-10067
Comparison is made of the power consumed and the acoustic amplification realized when a dc bias field is placed across a piezoelectric semiconductor and adjusted to amplify a microwave acoustic signal to the point where the forward gain is just equal to the reverse attenuation. This represents the maximum possible gain condition.

B68-10328
TRANSISTORIZED MARX BANK PULSE CIRCUIT
PROVIDES VOLTAGE MULTIPLICATION WITH NANOSECOND RISE-TIME
JUNG, E. A. LEWIS, R. N. DATE- AUG. 1968
ARG-10118
Base-triggered avalanche transistor circuit used in a Marx bank pulser configuration provides voltage multiplication with nanosecond rise-time. The avalanche-mode transistors replace conventional spark gaps in the Marx bank. The delay time from input signal to output signal to the output is typically 6 nanoseconds.
B68-10330
SIMULTANEOUS MESSAGE FRAMING AND ERROR DETECTION
FRENCH, A. H., JR. /IBM/ DATE- SEP. 1968
MSC-12001
Circuitry simultaneously inserts message framing information and detects noise errors in binary code data transmissions. Separate message groups are framed without requiring both framing bits and error-checking bits, and predetermined message sequence are separated from other message sequences without being hampered by intervening noise.

B68-10336
AUTOMATIC, NONDESTRUCTIVE TEST MONITORS
IN-PROCESS WELD QUALITY
DEAL, F. C. /MARTIN CO./ DATE- SEP. 1968
K-FS-10998
Instrument automatically and nondestructively monitors the quality of welds produced in microresistance welding. It measures the infrared energy generated in the weld as the weld is made and compares this energy with maximum and minimum limits of infrared energy values previously correlated with acceptable weld-strength tolerances.

B68-10337
TEMPERATURE OR PRESSURE CONTROLLER
GILLET, J. D. /N. AM. ROCKWELL CORP./ DATE- SEP. 1968
LEWIS-10297
Silicon chip thermal sensor coupled into a solid state power source controls temperature or pressure in combustion research. The silicon chip sensing element is embedded in a ceramic support for insulation, and connected to a high resistance bridge which operates the solid state power amplifiers.

B68-10341
SUPERCONDUCTIVE THIN FILM MAKES CONVENIENT LIQUID HELIUM LEVEL SENSOR
BECKER, H. H. DATE- SEP. 1968
LANGLEY-10209
Sensor consisting of superconductive film mounted on a dipstick measures the level of liquid helium in a Dewar flask. The sensor is made by depositing a thin film of niobium metal to a thickness of 2000 angstroms on a quartz substrate, which is then mounted on a graduated dipstick.

B68-10342
INDIUM ADHESION PROVIDES QUANTITATIVE MEASURE OF SURFACE CLEANLINESS
KRIEGER, G. L. WILSON, G. J. DATE- SEP. 1968
SAN-10024
Indium tipped probe measures hydrophobic and hydrophilic contaminants on rough and smooth surfaces. The force needed to pull the indium tip, which adheres to a clean surface, away from the surfaces provides a quantitative measure of cleanliness.

B68-10350
FLUIDIC-THERMOCROMIC DISPLAY DEVICE
GRUNSTEIN, D. HILSON, E. N. DATE- SEP. 1968
ERC-10031
Fluidic decoder and display device has low-power requirements for temperature control of thermochromic materials. An electro-to-fluid converter translates incoming electrical signals into pneumatic signal of sufficient power to operate the fluidic logic elements.

B68-10357
CLOSED CIRCUIT TV SYSTEM AUTOMATICALLY GUIDES WELDING ARC
M-FS-20684
Closed circuit television /CCTV/ system automatically guides a welding torch to position the welding arc accurately along weld seams. Digital counting and logic techniques incorporated in the control circuitry, ensure performance reliability.

B68-10362
RATING OF ELECTRICAL WIRES IN VACUUM ENVIRONMENTS
SCHAEFER, J. L. SVENSON, F. C. /N. A. ROCKWELL CORP./ DATE- OCT. 1968
MSC-10108
Electric conductors used in vacuum environments have smaller cross sections. This report provides data on the correct size wire for a required current load in free-air, low-pressure oxygen, and vacuum environments.

B68-10364
NONDESTRUCTIVE TEST DETERMINES OVERLOAD DESTRUCTION CHARACTERISTICS OF CURRENT LIMITER FUSES
SWARTZ, G. A. /ELECTRA-MIDLAND CORP./ DATE- OCT. 1968
XGS-8566
Nondestructive test predicts the time required for current limiters to blow/open the circuit/ when subjected to a given overload. The test method is based on an empirical relationship between the voltage rise across a current limiter for a fixed time interval and the time to blow.

B68-10365
AUTOMATIC PATIENT RESPIRATION FAILURE DETECTION SYSTEM WITH WIRELESS TRANSMISSION
DINEFF, J. POPE, J. M. DATE- OCT. 1968
ARC-10174
Automatic respiration failure detection system detects respiration failure in patients with a surgically implanted tracheostomy tube, and actuates an audible and/or visual alarm. The system incorporates a miniature radio transmitter so that the patient is unencumbered by wires yet can be monitored from a remote location.

B68-10367
DETECTION OF EFFECT OF DEPOSITS ON OPTICAL WINDOWS OF PYROMETER MEASUREMENTS
CIPOLONE, P. DATE- OCT. 1968
LEWIS-10366
Temperature measurements in an enclosed test chamber are more accurate when the reflectivity of the inner coated surface is compared to the outer clean surface of an optical window. Temperature readings are corrected by correlating the reflectivity of the deposits with their effect on the temperature measurement.

B68-10370
COOLED MINIATURE PRESSURE TRANSDUCERS EFFECTIVE AT HIGH TEMPERATURES
ARMENTROUT, E. C. DATE- OCT. 1968
LEWIS-10401
Miniature pressure transducers in compact water-cooled mounts are placed in hotter and more confined environments than previously possible. It quantitatively measures high frequency total pressure fluctuations resulting from rotating stall in an axial flow engine compressor.

B68-10379
AUTOMATIC SYSTEM NONDESTRUCTIVELY MONITORS AND RECORDS FATIGUE CRACK GROWTH
HOPPE, F. INMAN, N. S. /FAIRCILD HILLER CORP./ DATE- OCT. 1968
LANGLEY-10091
Ultrasonic reflection system automatically and nondestructively detects and records the propagation of fatigue cracks in test specimens undergoing fatigue cycling. A reflector plate
obtains a reference signal and monitors the location of the tip of a propagating fatigue crack.

B68-10382  
SYSTEM MEASURES RESPONSE TIME OF PHOTOMULTIPLIER TUBES  
LAUVER, M. R. DATE- OCT. '68

LEWIS-10437  
Calibration system enables precise determination of rise time of photosensitive detectors. To perform a calibration, the time-voltage curve of the excitation voltage for a light source is compared with the time-voltage curve of the voltage output from a photosensitive detector which is responding to the light.

B68-10384  
IMPROVED LIMITER FOR TURN-ON CURRENT TRANSIENT  
HALLBERG, F. C. DATE- OCT. 1968

GSFC-10413  
Circuit limits the turn-on current transient to a specified amplitude and provides a low-impedance path between supply voltage and load after a prescribed time interval. The circuit offers a wide range of flexibility in adjusting peak current and automatic control of the initial peak current.

B68-10386  
LOW-COST, FAST-RESPONSE DRIVE CIRCUIT FOR ELECTROMAGNETIC TORQUE MOTORS  
ZELLER, J. R. DATE- OCT. 1968

LEWIS-10443  
Fast-response coil drive circuit for electromagnetic torque motors, reduces the inductive coil time constant with a minimum of circuit sophistication. The low-cost modulator preamplifier stage which provides the servo-loop function of summing, adjustable gain and compensation.

B68-10388  
METHOD FOR REDUCING SNAP IN MAGNETIC AMPLIFIERS  
FISCHER, R. L. E. WORD, J. L. DATE- OCT. 1968

LEWIS-10543  
Method of reducing snap in magnetic amplifiers uses a degenerative feedback circuit consisting of a resistor and a separate winding on a magnetic core. The feedback circuit extends amplifier range by allowing it to be used at lower values of output current.

B68-10389  
METHOD FOR MAKING SMALL POINTED THERMOCOUPLES  
STOVER, C. M. DATE- OCT. 1968

SAN-10014  
Constantan wire worked to a needle point and covered with a copper coating produces a small, concentric, fast-reaction thermocouple that has the fast response time necessary to measure rapid temperature changes accurately and only slightly alters the environment being measured.

B68-10397  
CHARTS DESIGNATE PROBABLE FUTURE OCEANOGRAPHIC RESEARCH TIES  
INNOVATOR NOT GIVEN /MCDONNELL DOUGLAS CO./ DATE- OCT. 1968

M-55-59292  
Charts outline the questions and problems of oceanographic research in the future. NASA uses the charts to estimate the probable requirements for instrumentation carried by satellites engaged in cooperative programs with other agencies concerned with identification, analysis, and solution of many of these problems.

B68-10399  
AUTOMATIC SOLAR LAMP INTENSITY CONTROL SYSTEM  
LEVERONE, H. MANDELL, N. DATE- NOV. 1968

XGS-10017  
System that substitutes solar cells directly in the path of the radiation incident on the test volume and uses a dc bridge-null system was developed. The solar cell is affixed to a heat sink mounted on each of three arms for each solar lamp. Control of the radiation from the solar lamps is automatic.

B68-10400  
LITHIUM-TELLURIUM BIMETALLIC CELL HAS INCREASED VOLTAGE  
CAIROS, E. J. ROGERS, G. L. SHIMOTAKE, H. DATE- NOV. 1968

ARG-10141  
Lithium-tellurium secondary cell with a fused lithium halide electrolyte, tested in the temperature range 467 degrees to 500 degrees C, showed improvement over the sodium bismuth cell. The voltage of this bimetallic cell was increased by using the more electropositive anode material, lithium, and the more electronegative cathode material, tellurium.

B68-10402  
SYSTEM FOR MEASURING SPATIAL DISTRIBUTION OF EJECTED DROPLETS, A CONCEPT  
AYVAZIAN, R. A. DATE- NOV. 1968

NPO-10185  
System measures the spatial distribution of high-velocity droplets ejected from a nozzle or spray gun. The system employs an electrically resistive grid as the sensing screen, electrical leads, and a signal scanner such as a cathode ray tube.

B68-10404  
DESIGN CONCEPT FOR NONARCING ELECTRICAL CONNECTOR  
HULMEM, R. E. /DOUGLAS AIRCRAFT CO./ DATE- NOV. 1968

M-55-14937  
Connector plug automatically minimizes arcing during mating and mating. This plug uses a high-resistivity outer sheath as an extension to the regular pin contact. It is used in atmospheres containing explosive gases, and reduces erosion at the contact surfaces where mating and demating are performed frequently.

B68-10411  
INVERTED GROUNDING TECHNIQUE FOR ELECTRON BEAM HEATING  
JINBERG, R. J. DATE- DEC. 1968

LEW-10543  
In the production of high temperatures by electron bombardment the cathode is held at ground potential while the hot anode is raised to a high negative potential. An annealing chamber using the inverted grounding is constructed around a commercially available stainless steel cross.**

B68-10422  
AUTOMATIC CALIBRATION SYSTEM FOR PRESSURE TRANSDUCERS  
INNOVATOR NOT GIVEN /G. T. SCHJELDAHL CO./ DATE- DEC. 1968

M-55-20127  
Fifty-channel automatic pressure transducer calibration system increases quantity and accuracy for test evaluation calibration. The pressure transducers are installed in an environmental test chamber and manifolded to connect them to a pressure balance which is uniform.

B68-10413  
UV DETECTOR MONITORS ORGANIC CONTAMINATION OF OPTICAL SURFACES  
GLENN, C. G. KENNEDY, B. W. DATE- DEC. 1968

M-55-30246  
Silicon carbide, insensitive to visible light, is used in photodetectors. System contamination can be monitored during the normal operation without interference to the operator, and without shielding from ambient light.

B68-10415  
NEW BIMETALLIC EMF CELL SHOWS PROMISE IN DIRECT ENERGY CONVERSION  
HESSON, J. C. SHIMOTAKE, H. DATE- NOV. 1968

ARG-10183
Concentration cell, based upon a thermally regenerative cell principle, produces electrical energy from any large heat source. This experimental bismuth merit cell uses a sodium-bismuth alloy cathode and a pure liquid sodium anode. The cell exhibits reliability, corrosion resistance, and high current density performance.

B68-10420
HIGH RESOLUTION GE /LI/ SPECTROMETER REDUCES RATE-DEPENDENT DISTORTIONS AT HIGH COUNTING RATES
NRG-10144
Modified spectrometer system with a low-noise preamplifier reduces rate-dependent distortions at high counting rates, 25,000 counts per second. Pole-zero cancellation minimizes pulse undershoots due to multiple time constants, baseline restoration improves resolution and prevents spectral shifts.

B68-10428
DESIGN CONCEPT FOR A RAPID AUTOMATIC SYNC ACQUISITION SYSTEM
ANDERSON, T. O., GAILL, A. J. DATE- NOV. 1968
NRG-10214
System intends to provide rapid command sync acquisition between widely separated transmitter-receivers, such as a spacecraft telemetry transmitter and a ground-based receiver. The system facilitates rapid sync acquisition between stations and regains data lock after interruption or equipment failure.

B68-10429
CONDITIONING FLAT CONDUCTORS FOR FLAT CONDUCTOR CABLE PRODUCTION
INNOVATOR NOT GIVEN /VITRO CORP. OF AMER./ DATE- DEC. 1968
M-FS-14914
Apparatus can straighten, anneal, clean, and apply a tension to stretch a cable one percent to assure uniform cross-sectional area. A conductor passes through temperature controlled distilled water and through a toroid coil. As the conductor enters the water, steam performs the cleaning action. Quenching and annealing also take place.

B68-10430
SYSTEM CONVERTS OPTICAL PHASE CHANGES TO RF PHASE CHANGES
LOGUE, S. S. /GEN. DYN./CONVAIR/ DATE- NOV. 1968
M-FS-20091
System converts phase changes at optical frequencies to equal phase changes at RF. This system operates in conjunction with either a Nicholson interferometer or conventional interferometers.

B68-10431
CHARGE CONTROL OF NICKEL-Cadmium BATTERIES BY COULOMETER AND THIRD ELECTRODE METHOD
FORD, P. PAULKOVITCH, J. DATE- SEP. 1968
GSFC-10487
Combined coulometer/third electrode control circuit for a nickel-cadmium battery included at least one cell of the third electrode type is illustrated. The coulometer/third electrode sensing circuit controls the series regulator as necessary to maintain the sensing voltage at the preset sensing level.

B68-10432
HIGH-EFFICIENCY STEP-UP REGULATOR
LISTER, L. R. /SPERRY RAND CORP./ DATE- DEC. 1968
M-FS-20049
Single-ended step-up regulator-chopper power supply employing conventional chopper circuitry combines the advantages of the chopper and switching regulator circuits. Schematic of the power supply incorporating the step-up regulator is shown.

B68-10434
SELECTIVE VIDE BLANKING TECHNIQUE
SABOE, M. M., TRENDE, R. C. /WESTINGHOUSE ELEC. CORP./ DATE- DEC. 1968
M-FS-20013
Adverse viewing effects caused by faulty photosensitive elements are eliminated. A linear max./min. or nonmax./ sequence generator gives a pseudorandom pulse train to selectively blank the display monitor during specified mosaic interrogation times. The outputs minimize the length of the required shift register generator.

B68-10435
COMPACT ROTATING CUP ANEMOMETER
WILLMAN, J. B. DATE- DEC. 1968
NPD-10563
Compact, collapsible rotating cup anemometer is used in remote locations where portability and durability are factors in the choice of equipment. This lightweight instrument has a low wind-velocity threshold, is capable of withstanding large mechanical shocks while in its stowed configuration, and has fast response to wind fluctuations.

B68-10437
TWO-WAY DIGITAL DRIVER/RECEIVER USES ONE SET OF LINES
BURNETT, G. J., PFEIFER, A. F. /N. AM. ROCKWELL CORP./ DATE- OCT. 1968
ERC-10055
Two-way/bilateral/digital driver/receiver system using MOS circuits was designed for a multiprocess computer having several subsystems at relatively close locations. The system requires only a single set of communication lines between subsystems, thus achieving lower cost with increased reliability.

B68-10438
NOSEPICE STRATION MONITOR
ERC-10136
Comfortable, inexpensive nosepiece respiration monitor produces rapid response signals to most conventional high impedance medical signal conditioners. The monitor measures respiration in a manner that produces a large signal with minimum delay.

B68-10443
SHORT CIRCUIT PROTECTION FOR A POWER DISTRIBUTION SYSTEM
STURMAN, J. DATE- DEC. 1968
LEWIS-10712
Stable input stage was designed for the use with a integrated circuit operational amplifier to provide improved performance as an instrumentation-type amplifier. The circuit provides high input impedance, stable gain, good common mode rejection, very low drift, and low output impedance.

B68-10456
AMPLIFIER IMPROVEMENT CIRCUIT
STURMAN, J. DATE- DEC. 1968
LEWIS-10712
Stable input stage was designed for the use with a integrated circuit operational amplifier to provide improved performance as an instrumentation-type amplifier. The circuit provides high input impedance, stable gain, good common mode rejection, very low drift, and low output impedance.

B68-10501
READOUT SYSTEM FOR RADIATION DETECTOR
BAKER, B. R., CASHION, K. D. DATE- NOV. 1968
MSC-90180
Improved electrical circuit determines the amount of light detected by a photomultiplier tube when its output signal is in the dark-current range of the tube. The low-intensity light to which the tube responds arises from a thermo-luminescent ionized dosimeter.

B68-10502
RAPID-RESPONSE, LIGHT-EXPOSURE CONTROL SYSTEM
HIGH-TEMPERATURE THERMIonic EMISSION

NPG-10238
Rapid-response electro-optical, light exposure control system, will maintain the light reaching a camera film or other light-sensitive detector at essentially constant level, despite wide variations in the brightness of the light source. The system permits detailed photographic or photoelectric recording of the phenomenon over a range of brightnesses.

B68-10565
LONG-TERM DATA STORAGE AND RETRIEVAL

FOX, T. I. /BOEING CO./ DATE- NOV. 1968
M-FS-14799
Combination magnetic tape/microfilm system may give reliable long-term storage and immediate retrieval. The recording, storage, and retrieval of data would be accomplished by computers, without manual intervention. The proposed system retrieves data in less than one hour after being stored for periods of up to 50 years.

B68-10511
ROCKET ENGINE ANALOG SIMULATION

PHILYAW, B. K. RANDAZZU, G. J. /BOEING CO./ DATE- NOV. 1968
M-FS-14011
Mathematical equations simulate the operation of a rocket engine, simulate destructive and nondestructive tests to verify engine design feasibility, and investigate nonlinear variations in engine performance.

B68-10513
METHOD FOR MEASURING ALTERNATOR VOLTAGE TRANSISTORS

PERZ, D. A. DATE- NOV. 1968
LEWIS-10373
Transient voltage detection circuit measures voltage excursions and recovery times resulting from step-load changes applied to a combination alternator-voltage regulator.

B68-10514
AUTOMATIC CALIBRATION APPARATUS FOR TELEMETRY SYSTEMS

ALLEN, W. W. DATE- NOV. 1968
NPO-10160
Apparatus automatically calibrates and tests spacecraft telemetry systems. The apparatus can generally be used to calibrate analog-to-digital converters.

B68-10516
HIGH-TEMPERATURE THERMIonic EMISSION MICROSCOPE

CAMPBELL, R. E., J. R. HAMBRINGER, R. W. /ELECTRO-OPT. SYSTEMS/ DATE- NOV. 1968
NPG-10584
Thermionic emission microscope was designed to operate with metal specimen cathode temperatures of 2000 degrees C.

B68-10518
INTEGRATED METAL TRANSISTOR LEADS

GSFC-50536
Technique that makes the metal leads integral to the transistor wafer and reduces capacitance in the device, thereby increasing its efficiency is outlined.

B68-10525
DIGITAL LASER-BEAM DEFLECTION SENSOR

FOWLER, V. J. /GEN. TELEPHONE AND ELECTRON. LABS./ DATE- NOV. 1968
M-FS-14785
Sensor automatically and accurately measures the two-dimensional deflection angles of a laser beam to provide closed-loop servomechanism control of laser beam directivity.

B68-10529
IMPROVED COMMUNICATION SYSTEM FOR LARGE OPERATIONS CENTER

DRAPER, M. S. /BOEING CO./ DATE- NOV. 1968
M-FS-15016
When several microphones are fed into a common system, sound originating at any given source results in poor articulation. Introduction of an automatic microphone priority control suppresses echo and reverberation.

B68-10539
ACTIVE RC FILTER PERMITS EASY TRADE-OFF OF AMPLIFIER GAIN AND SENSITIVITY TO GAIN

KERNIN, W. J. SHAFFER, C. V. DATE- NOV. 1968
ARC-10442
Passive RC network was designed with zeros of transmission in the right half of the complex frequency plane in the feedback loop of a simple negative-gain amplifier. The proper positioning provides any desired trade-off between amplifier gain and sensitivity to amplifier gain.

B68-10541
FAILURE RATES FOR ACCELERATED ACCEPTANCE TESTING OF SILICON TRANSISTORS

TOYE, R. DATE- NOV. 1968
ERC-10198
Extrapolation tables for the control of silicon transistor product reliability have been compiled. The tables are based on a version of the Arrhenius statistical relation and are intended to be used for low- and medium-power silicon transistors.

B68-10542
HIGH DIELECTRIC THICK FILMS FOR SCREENED EXTENSOMETER

RANGS, G. L. SEPLOW, S. /AEROJET GEN./ DATE- DEC. 1968
LANGLEY-10294
Techniques and materials have recently been developed to obtain high dielectric films /K of 300 to 800/. High dielectric barium titanate particles are mixed in a barium titanate glass.

B68-10543
TEMPERATURE CONTROLLED STRAIN GAGED EXTENSOMETER

RAMS, G. L. SEPLOW, S. /AEROJET GEN./ DATE- DEC. 1968
M-FS-13737
Temperature controlled strain-gaged extensometer measures longitudinal and girth deflections of pressure vessels in excess of one percent strain during pressurization and depressurization with cryogenic fluids at cryogenic temperatures. The device is of beryllium-copper strips.

B68-10544
COOLING OF 2-KW H SUBSCRIPT-2 SUBSCRIPT-0 SUBSCRIPT 2 FUEL CELL

ALLAN, K. N. BJORKMAN, H. K. ELBERT, T. E. M-FS-13749
HURLEY, J. R. /ALLIS-CHALMERS/ DATE- DEC. 1968
M-FS-13747
M-FS-13740
An extensive research and development program has been carried out to devise an improved method of removing waste heat of reaction from a developmental 2 KW hydrogen-oxygen fuel cell.

B68-10545
A 35 GHZ SOLID STATE TRANSMITTER/DRIVER

DE ANGELIS, X. A. DATE- DEC. 1968
M-FS-20152
Solid state transmitter/driver/multiplier/signal source has been designed and fabricated to produce a stable crystal-controlled CW power output of 100 mw at 35 Ghz.

B68-10547
OPERATIONAL INTEGRATOR

LUTZ, E. B. DATE- NOV. 1968
NPG-10530
System operates in the nonreturn-to-zero mode, maintaining the increased bit density capability of this mode but with much higher noise immunity than conventional schemes offer. This integrator performs a mathematical integrating function on inputs from 100 Hz through 100 MHz.

B68-10555
ELECTROLYTIC SILVER ION CELL STERILIZES WATER SUPPLY

13
MSC-11827
Electrolytic water sterilizer controls microbial contamination in manned spacecraft. Individual sterilizer cells are self-contained and require no external power or control. The sterilizer generates silver ions which do not impart an unpleasant taste to water.

B68-10558
COMBINATION PROBE FOR AIRFLOW MEASUREMENTS
DUDZINSKI, T. J. GLAVE, G. E. KRAUSE, L. N. DATE- DEC. 1968 LEVIS-10281
Probe combines a high-recovery shielded therocouple for sensing total temperature, a total pressure sensing tube, and a flow direction sensing wedge having a 60 degree included angle.

B68-10559
ACCELERATION INSENSITIVE FLUID EXPANSION LEWIS-10281
HUGHES, L. F. P/MIT/ DATE- OCT. 1968 ERC-10152
Device compensates for temperature and acceleration effects on a fluid-floated mass in a sealed container of a high performance angular or acceleration sensing instrument. It is used in precision instruments for regulation of gases or liquids in a moving body.

B68-10562
RELIABLE METHOD FOR TESTING GROSS LEAKS IN SEMICONDUCTOR COMPONENT PACKAGES
ALTSHULER, T. L. DATE- DEC. 1968 ERC-10150
Simple, reliable, inexpensive method for gross-leak testing has been devised, based upon the conventional fine-leak technique. The sensitivity ranges from the detection of very low leaks down to leaks of 10 to the minus seven cc helium per sec.

B68-10563
PRESSURE-SENSITIVE BONDED JUNCTION TRANSUCERS
IANNINI, A. RINDNER, W. DATE- OCT. 1968 ERC-10087
Miniature transducers involve the use of appropriate commercial epoxy resins. Design protects the sensitive semiconductor surface from ambients and excludes an air space in the device capsule.

B68-10565
LOCATING **SNEAK PATHS** IN ELECTRICAL CIRCUITRY
DANBACK, T. M. /BOEING CO./ DATE- DEC. 1968
M-FS-16014
Use of a matrix system wherein circuit pin connections are assigned arbitrary designators and these used in formation of the matrix is illustrated. The matrix is a format that shows the current paths.

B68-10566
WELDING SKATE WITH COMPUTERIZED CONTROLS
WALL, W. A. JR. DATE- NOV. 1968 M-FS-20224
New welding skate concept for automatic TIG welding of contoured or double-contoured parts combines lightweight welding apparatus with electrical circuitry which computes the desired torch angle and positions a torch and cold-wire guide angle manipulator.

B68-10572
DESIGN OF DISSIPATIVE LINEAR PHASE FILTERS
PHARES, R. L. SPACEC/ INC. DATE- DEC. 1968 M-14088
Set of design curves eliminates work involved in designing linear phase filters by being normalized in such a way as to apply to low, band, and high-pass filters of any bandwidth. Similar curves for any number of poles are plotted by solving a system of simultaneous equations.

B68-10010
FLOW TUBE USED TO COOL SOLAR-PUMPED LASER
INNOVATOR NOT GIVEN /RCA/ DATE- JAN. 1968
MSC-11026
A flow tube has been designed and constructed to provide two major functions in the application of a laser beam for transmission of both sound and video. It maintains the YAG laser at the proper operating temperature of 300 degrees K under solar pumping conditions, and it serves as a pump cavity for the laser crystal.

B68-10013
METHOD OF MEASURING THERMAL CONDUCTIVITY OF HIGH PERFORMANCE INSULATION
Method accurately measures the thermal conductivity of high-performance sheet insulation as a discrete function of temperature. It permits measurements to be made at temperature drops of approximately 10 degrees F across the insulation and ensures measurement accuracy by minimizing longitudinal heat losses in the system.

B68-10021
OPTICAL SYSTEM FACILITATES INSPECTION OF PRINTED CIRCUIT BOARDS
CRIDLIN, M. OCONNOR, J. DATE- JAN. 1968 SIFC-07971
Optical comparator method determines the quality and registration of surface features of double-sided printed circuit boards. Color-coded superimposed images of both sides of a printed circuit board are presented to view, clearly showing details and registration of the circuitry.

B68-10060
NEW TECHNIQUE FOR OPTIMAL SMOOTHING OF DATA
FRASER, B. C. P/MIT/ DATE- MAY 1968 MSC-11354
Recursive method for the optimal smoothing of data has numerical superiority and is more easily understood in terms of physical reasoning than earlier methods. Using a Kalman filter, the smoothing technique, applied to a nonlinear parameter identification problem, is useful in those situations where linearization about a reference solution is valid.

B68-10071
IMPROVED OPTICAL DIFFRACTOMETER
BILDERBACK, R. R. DATE- MAR. 1968 MSC-12055
Diffrectometer is designed for diffraction measurements in the visible and near-infrared spectral regions. It provides higher resolution of diffraction patterns, an alternate illumination section for coherent light /from a laser source/, a unique alignment and adjustment arrangement for the optical system, and a very stable mounting.

B68-10077
ELECTRONIC GATING CIRCUIT AND ULTRAVIOLET LASER EXCITATION PERMIT IMPROVED DOSIMETER SENSITIVITY
EUGENBERGER, D. KING, D. LONNECKER, A. SCHUTT, D. NOTRE DAME UNI./ DATE- APR. 1968 ARO-10199
Standard dosimeter reader, modified by adding an electronic gating circuit to trigger the intensity level photomultiplier, increases readout sensitivity of photoluminescent dosimeter systems. The gating circuit is controlled by a second photomultiplier which senses a short ultraviolet pulse from a laser used to excite the dosimeter.

B68-10081
INFRARED SPECTROMETER FOR ROCKET EXHAUST ANALYSIS
HERGET, W. F. /N. AM. ROCKWELL CORP./ DATE- MAY 1968
B68-10099
ANTIGLARE IMPROVEMENT FOR OPTICAL IMAGING SYSTEMS
DAVIS, E. S. DATE- MAR. 1968
NPO-10337

Baffle configuration provides a more efficient shade against interfering sources of illumination outside the desired field of view of optical imaging systems. It consists of a semi-ellipsoid of revolution about the minor axis with black specular reflecting surface and an aperture defined by the locus of the foci of the generating ellipse.

B68-10098
RECTANGULAR CONFIGURATION IMPROVES SUPERCONDUCTING CABLE
FOSS, M. LAVERICK, C. LOBELL, G. DATE- APR. 1968
ARG-90088

Superconducting cable for a cryogenic electromagnet with improved mechanical and thermal properties consists of a rectangular cross-sectioned combination of superconductor and normal conductor. The conductor cable has superconductors embedded in a metallic coating with high electrical and mechanical conductivity at liquid helium temperatures.

B68-10108
STUDY OF CRYOGENIC CONTAINER THERMODYNAMICS DURING PROPELLANT TRANSFER
BRUGAN, J. J. VERNON, R. M. /LOCKHEED MISSILES AND SPACE CO./ DATE- MAY 1968
M-FS-14310

Study of thermodynamic phenomena occurring during transfer of cryogenic liquids from dewar to receiver tank reveals that the basic cause of tank implosion is evaporation rate of droplets entering the tank in the early transfer phase. Analyses of the thermodynamics involved and implosion prevention techniques are included.

B68-10113
ROCKET ENGINE NOZZLE PHOTOGRAPHIC SYSTEM
BAILEY, R. L. TIBBITS, W. C. DATE- APR. 1968
NPO-10174

Protective enclosure for a camera, located on the exhaust stream of a rocket engine, permits continuous recording of erosion processes of materials used in nozzle throat structures. The system uses a standard camera in a water-cooled, pressurized enclosure having a unique, inert gas-sealed viewing duct.

B68-10119
MULTICHIP PACKAGING WITH THERMAL INSULATION
M-FS-14076

Thermal insulation technique permits low and high power electronic chips to operate in the same package without thermal cross-coupling. An aluminous glass shield thermally isolates the low power chip from the high power chip while Kovar substrate acts as a heat sink to remove heat from the high power chip.

B68-10126
OPTICAL INTEGRATING SPHERE OPERATES AT VISIBLE AND INFRARED WAVELENGTHS
ALLENBERG, G. /SPACE SCI./ DATE- APR. 1968
M-FS-14244

An optical integrating sphere with a faceted reflective lining on the inside surface will provide light randomization/mixing of diffusely and specularly reflected light with relatively few reflections. The improved sphere has a sufficiently high reflectivity for both visible and infrared radiation.

B68-10128
PHOTOGRAPHIC AND DRAFTING TECHNIQUES SIMPLIFY METHOD OF PRODUCING ENGINEERING DRAWINGS
PROVISIOR, H. /N. AM. AVIATION/ DATE- APR. 1968
MSC-716

Combination of photographic and drafting techniques has been developed to simplify the preparation of three dimensional and denticine engineering drawings. Conventional photographs can be converted to line drawings by making copy negatives on high contrast film.

B68-10135
ANTECHAMBER FACILITATES LOADING AND UNLOADING OF VACUUM FURNACE
LEWIS-10265

Antechamber facilitates the use of a furnace in which materials are heat treated in a high vacuum or a gas atmosphere. It has a high vacuum pumping system, a means for backfilling with a selected gas, an access door, glove ports, and a motor driven platform.

B68-10136
THE X SQUARE STATISTIC AND GOODNESS OF FIT TEST
GSFC-10547

The X square statistic is a useful measure of the discrepancy between the actual distribution of a set of data points and the theoretical distribution of a random variable of which the data points supposedly are values. Thus the X square statistic is frequently used in goodness of fit tests.

B68-10143
DEEP GAMMA RAY PENETRATION IN THICK SHIELDS
ARMSTRONG, T. W. STEVEN, P. N. /TENN. UNIV./ DATE- APR. 1968
M-FS-14308

Appropriate importance function and sampling scheme facilitates the application of the Monte Carlo method to problems involving the deep penetration of radiation.

B68-10154
TOOL RECONSTRUCTS DATA INPUT POINTS CORRESPONDING TO FIRST ORDER OUTPUT GRAPH
BISGS, R. E. /N. AM. ROCKWELL CORP./ DATE- MAY 1968
M-FS-14003

Tool aids in graphic determination of input values for any first order lag system of known gain and time constant where the corresponding output function is displayed graphically and can be described by a first order differential equation. This tool permits a rapid reconstruction of input points.

B68-10160
ABSOLUTE LOW-PRESSURE CALIBRATION SYSTEM
ROHRIG, J. R. /NATL. RES. CORP./ DATE- MAY 1968
M-FS-13985

McLeod gage is used as the primary reference standard in a system used for absolute calibration of vacuum gages in the very low pressure range. The system involves steady-state flow of a gas through a cascade of differentially pumped chambers or stages connected by precisely defined orifices.

B68-10170
LARGE-AMPLITUDE INVISCID FLUID MOTION IN AN ACCELERATING CONTAINER
PERK, L. M. /LOCKHEED MISSILES AND SPACE CO./ DATE- JUN. 1968
MSC-11560

Study of dynamic behavior of the liquid-vapor interface of an inviscid fluid in an accelerating cylindrical container includes an
analytical-numerical method for determining large amplitude motion. The method is based on the expansion of the velocity potential in a series of harmonic functions with time dependent coefficients.

**B68-10174**

LOW SCATTER LIGHTWEIGHT FISSION SPECTROMETER
CONSTRUCTED FOR BIOLOGICAL RESEARCH

FRIGERIO, N. A. DATE- JUN. 1968

ARG-10094

Low scatter, lightweight fission spectrometer provides a simple, reliable method for determining absolute neutron fluxes in a fixed neutron. It minimizes neutron scatter and energy degradation effects, and has a counting volume large enough to intercept the most energetic fission fragments, yet small enough to be discriminating.

**B68-10179**

CONCEPT TO COMFORT-CONDITION SUBJECTS WEARING RESTRICTIVE CLOTHING

TUCKER, E. N. DATE- JUN. 1968

MSC-10964

Heat exchanger maintains a desirable thermal balance in a subject wearing restrictive clothing. A grid of high thermal conductance fibers, in contact with the skin, transfers heat to or from the skin surface by means of a system of ducts, carrying the transfer fluid which is maintained at a controlled temperature.

**B68-10180**

APPLICATION OF A TRUNCATED NORMAL FAILURE DISTRIBUTION IN RELIABILITY TESTING

GRUDES, C. JR. /N. AM. ROCKWELL CORP./ DATE- JUN. 1968

M-FS-14320

Statistical truncated normal distribution function is applied as a time-to-failure distribution function in equipment reliability estimations. Age-dependent characteristics of the truncated normal function provide a basis for formulating a system of high-reliability testing that effectively merges statistical, engineering, and cost considerations.

**B68-10181**

STUDY OF CONVECTIVE MAGNETOHYDRODYNAMIC CHANNEL FLOW

SINGER, R. M. DATE- JUN. 1968 SEE ALSO ANL-6937

ARG-10102

Study involves the effects of the interactions of electromagnetic, velocity, and temperature fields to aid in the design of a magnetohydrodynamic device. It concerns a theoretical analysis of the convective flow of an electrically conducting gas in a channel composed of conducting walls.

**B68-10186**

MAGNETIC FORMING STUDIES


M-FS-14217

Investigation of the tensile strength dependability on the characteristic time over which a pressure pulse is applied to a metal workpiece shows that the mechanical properties of these materials are functions of the rate at which the material is undergoing strain. These results and techniques are used in magnetometal forming.

**B68-10190**

PROCEDURE DEVELOPED FOR REPORTING FAST-NEUTRON EXPOSURE

ROSSIN, A. D. DATE- JUN. 1968 SEE ALSO

ANL-6826

ARG-10035

Procedure for reporting fast-neutron exposure involves determination of the spectrum shape and absolute magnitude, selection of an energy weighting for the neutrons, and definition of a unit for reporting exposure. Using this method, comparisons of irradiation data from different reactors will be free from errors resulting from differences between the spectra.

**B68-10228**

THEORY OF A REFINED EARTH MODEL

GRAUD, H. G. L. DATE- JUN. 1968

M-FS-14679

Refined equations are derived relating the variations of the earth's gravity and radius as functions of longitude and latitude. They particularly relate the oblateness coefficients of the odd harmonics and the difference of the polar radii, respectively, ellipticities and polar gravity accelerations in the northern and southern hemispheres.

**B68-10234**

DESIGN TECHNIQUES - STOCHASTIC CONTROLLERS

WIDNALL, W. S. /MIT/ DATE- JUL. 1968

MSC-11554

Analytic techniques aid in the design of nearly optimal linear time-varying sampled-data stochastic controllers. The techniques also aid in the simplification and automation of program designing for control computers.

**B68-10240**

PROPERTIES OF OPTICS AT HIGH TEMPERATURE AND THEIR MEASUREMENT, A STUDY

GATES, D. W. DATE- JUL. 1968

M-FS-14966

Bibliography lists the sources containing emissivity and absorptivity data on materials at extremely high temperatures. The experimental techniques, equipment and efforts of the experimenters to characterize the materials used and methods to evaluate the errors are given in the sources in this bibliography.

**B68-10243**

PORTABLE, HIGH INTENSITY ISOTOPIC NEUTRON SOURCE PROVIDES INCREASED EXPERIMENTAL ACCURACY

MOHL, W. C. STEWART, D. C. WAHLGREN, R. A. DATE- JUL. 1968 SEE ALSO ANL-6917 AND ANL-6933

ARG-99250

Small portable, high intensity isotopic neutron source combines twelve curium—americium—beryllium sources. This high intensity of neutrons, with a flux which slowly decreases at a known rate, provides for increased experimental accuracy.

**B68-10245**

IMPROVED RELAY OPTICAL ELEMENT FOR SPECTRORADIOMETER USING CRYOGENICALLY COOLED DETECTOR

KRAMER, A. R. /LOCKHEED MISSILES AND SPACE CO./ DATE- JUL. 1968

MSC-11688

By coating half of one element in the relay optical system of a spectroradiometer with a very high emissivity paint, the effect of the reflected radiation from the back of the filter wheel is eliminated optically. This causes the detector to view a constant level of radiation, regardless of how the reflectivity of the back of the filter wheel changes.

**B68-10252**

NEW METHOD FOR CRITICAL FAILURE PREDICTION OF COMPLEX SYSTEMS


M-FS-14133

Rigorous analytical technique, called criticality determination methodology, or CD technique, determines the probability that a given complex system will successfully achieve stated objectives. The CD technique identifies critical elements of the system by a failure mode and effects analysis.

**B68-10255**

ELECTRO-OPTIC MODULATOR FOR INFRARED LASER USING GALLIUM ARSENIDE CRYSTAL

WALSH, T. E. /RCA/ DATE- JUL. 1968

GSFC-10686

Gallium arsenide electro-optic modulator used for infrared lasers has a mica quarter-wave plate and two calcite polarizers to amplitude- or phase
modulate an infrared laser light source in the wavelength range from 1 to 3 microns. The large single crystal has uniformly high resistivities, is strain free, and comparable in quality to good optical glass.

868-10259
Fluorescent Particles Enable Visualization of Gas Flow
Wilson, A. J. /AM. ROCKWELL CORP./ DATE- JUL. 1968
M-FS-14583
Fluorescent particles enable visualization of the flow patterns of gases at slow velocities. Through a transparent section in the gas line, a camera views the visible light emitted by the particles carried by the gas stream. Fine definition of the particle tracks are obtained at slow camera shutter speeds.

868-10260
Technique Developed for Measuring Transmittance of Optical Birefringent Networks
Ammann, E. G. /YARBOROUGH, J. M. /SYLVANIA PROD./ DATE- AUG. 1968
M-FS-14267
The transmission characteristics of synthesized optical single-pass and double-pass birefringent networks is obtained by measuring network transmission as a function of network temperature. This technique is most useful for testing those birefringent networks whose bandwidths and periods are very small.

868-10265
Acoustic Wave Analysis
Jackson, E. D. /AM. ROCKWELL CORP./ DATE- JUL. 1968
M-FS-18076
The primary mechanism for generation of acoustic waves in a centrifugal pump, due to the rotor/stator interaction, is an unsteady source at the entrance of the blade row as represented by the unsteady velocity field. The amplitude of wave generated by pressure loading on the blades and by velocity boundary condition are compared.

868-10275
Synthesis of Electro-Optic Modulators for Amplitude Modulation of Light
Ammann, E. O. /YARBOROUGH, J. M. /SYLVANIA ELEC./ DATE- AUG. 1968
M-FS-14268
Electro-optical modulator realizes voltage transfer function in synthesizing birefringent networks. Choice of the voltage transfer function is important, the most satisfactory one being the square root of the modulator function.

868-10276
Solution of Differential Equations by Application of Transformation Groups
M-FS-14802
Report applies transformation groups to the solution of systems of ordinary differential equations and partial differential equations. Lie's theorem finds an integrating factor for a system of ordinary differential equations when the appropriate invariance group or groups can be found and can be extended to partial differential equations.

868-10282
High-Speed Camera Synchronization
Rojec, E. A. /AM. ROCKWELL CORP./ DATE- AUG. 1968
M-FS-18062
Photoelectric sensor enables synchronization of the rotating mirror in a high-speed framing camera with the passage of a very-high-velocity droplet to obtain direct photographic data on droplet breakup. It detects droplet movement across the high intensity light beam and generates a signal triggering the camera.
DYNAMICS OF MOVING Bubbles IN SINGLE AND BINARY COMPONENT SYSTEMS

CLARK, J. A. NAMER, S. JR. TOKUDA, N. YANG, W. J. /MICHIGAN UNIV./ DATE- SEP. 1968
M-FS-14845

Density of a single bubble moving in a quiescent liquid is analyzed for single and binary component systems. The transport of energy and/or mass at thermodynamic-phase equilibrium governs the dynamics of the bubble at its interface.

INDEPENDENT DOUBLY TRUNCATED GAMMA VARIABLES

LAVENDER, D. E. /GEORGIA UNIV./ DATE- SEP. 1968
M-FS-20143

Density and distribution functions of the sum of independent variables, each having a truncated gamma density function, were derived for use in the measurement of complex physical phenomena.

CONTROLLABILITY OF DISTRIBUTED-PARAMETER SYSTEMS

HERGET, C. J. /CALIF. UNIV./ DATE- SEP. 1968
M-FS-14929

Controllability of distributed-parameter control systems is mathematically studied. A general theory for control systems includes those that cannot be described by ordinary differential equations.

IMPROVEMENT IN RECORDING AND READING HOLOGRAMS

HALLOCK, J. N. /TENNESSEE UNIV./ DATE- SEP. 1968
ERC-10151

Three-beam technique superimposes a number of patterns in the same plane of a hologram and then uniquely identifies each pattern by a suitable readout process. The developed readout process does not require any movement of parts.

STUDY OF OPTIMUM DISCRETE ESTIMATORS IN MEASUREMENT ANALYSIS

HUNG, J. C. /TENNESSEE UNIV./ DATE- SEP. 1968
M-FS-14915

Study of statistical techniques for obtaining estimates of true data parameters uses discrete measured quantities containing random error. These techniques develop estimation procedures as an iterative algorithm for digital computation in real time.

LASER DOPPLER GAS-VELOCITY INSTRUMENT

SEE ALSO 866-10693
M-FS-20039

Three-D instrument using a laser light source measures both turbulence and mean velocity of subsonic and supersonic gas flows. This instrument is based on the measurement of the Doppler frequency shift of light waves scattered by moving particles in the gas stream.

IMPROVED RADIOGRAPHIC IMAGE AMPLIFIER PANEL

BROWN, R. L. /JR. DATE- OCT. 1968
M-FS-14522

Layered image amplifier for radiographic X-ray and gamma-ray applications, combines very high radiation sensitivity with fast image buildup and ease of handling by adding a layer of material that is both photoconductive and light-emitting to a basic image amplifier and cascading this assembly with a modified thoreau panel.

EVALUATION OF SUPERCONDUCTING MAGNETS, A STUDY

M-FS-14808

Study analytically develops and experimentally verifies the steady state behavior characteristics of composite superconductors. Zero-dimensional, one-dimensional, and three-dimensional analyses were performed.
Empirical equations were derived to establish the appropriate heat transfer coefficients as functions of the temperature drops and heat transfer rates for a wide range of convective and boiling conditions at different locations in a liquid hydrogen turbopump.

High conductance vapor thermal switch was produced to maintain heat dissipating component temperatures within acceptable limits. The switch is a self-acting, automatic device that regulates the rate of heat flow to control.

Telescope dome control system is automatically tracks sun to simulate actual electronic installation. The method controls thermal output to simulate actual electronic component thermal output.

High conductance vapor thermal switch was produced to maintain heat dissipating component temperatures within acceptable limits. The switch is a self-acting, automatic device that regulates the rate of heat flow to control.

A mass flux probe for measurement in a supersonic stream is designed and developed. A 35 mm slide is projected directly onto a Xerox plate, eliminating the necessity to produce a film positive of the slide.

Carbon dioxide laser as a simple portable unit generates coherent light pulses at selected infrared wavelengths. The improved laser was designed for the detection of air pollutants but can be applied to optical communications.

A mass flux probe for measurement in a supersonic stream is designed and developed. A 35 mm slide is projected directly onto a Xerox plate, eliminating the necessity to produce a film positive of the slide.

Telescope dome control system automatically tracks sun to simulate actual electronic installation. The method controls thermal output to simulate actual electronic component thermal output.

High conductance vapor thermal switch was produced to maintain heat dissipating component temperatures within acceptable limits. The switch is a self-acting, automatic device that regulates the rate of heat flow to control.

A mass flux probe for measurement in a supersonic stream is designed and developed. A 35 mm slide is projected directly onto a Xerox plate, eliminating the necessity to produce a film positive of the slide.

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METALLURGICAL CHARACTERISTICS
GLASIER, L. F., JR. /AERODUT-GEN. CORP./ DATE- FEB. 1968
NRC-16002
- Literature survey and testing program were initiated to obtain pertinent information for Hastelloy X, a nickel-base alloy, through the temperature range of minus 453 degrees to 1900 degrees F. A report has been prepared which includes the tensile properties, mechanical properties, and the manufacturing and fabrication processes.

B68-10029
HEAT TREATMENT PROCEDURE TO INCREASE DUCTILITY OF DEGRADED NICKEL ALLOY
BURKLEY, P. /A. M. AVIATION/ DATE- FEB. 1968
M-FS-12410
- Tests demonstrate the room temperature ductility of degraded Rene 41 can be increased to acceptable values by solution heat treatment at a temperature of 2605 degrees to 2150 degrees F /h to 2 hours/ and cooling through a controlled temperature range followed by normal aging in air /16 hours at 1400 degrees F/.

B68-10032
SURVEY MADE OF REFRACTORY METALS
ALLEN, M. /AM. AVIATION/ DATE- FEB. 1968
LEWIS-10380
- Survey reviews the structural applications of refractory metals and the special problems they present in manufacture, evaluation, and application. The unique facilities required for their processing and evaluation, a summary of the accomplishments in achieving commercial products, and the present status of the most advanced refractory materials are presented.

B68-10034
CONTINUOUS DETONATION REACTION ENGINE
LARGE, O. H. STIN, R. J. TUBBS, H. E. DATE- FEB. 1968
M-FS-14019
- Reaction engine operates on the principles of a controlled condensed detonation rather than on the principles of gas expansion. The detonation results in reaction products that are expelled at a much higher velocity.

B68-10043
CURE OF EPOXY RESINS DETERMINED BY SIMPLE TESTS
LADAKI, N. NIGH, W. G. /A. M. AVIATION/ DATE- FEB. 1968
M-FS-13133
- Rapid visual and simple quantitative tests indicate the degree of cure of particular epoxy resin binders in prepreg stock. It is possible that these tests may be extended to a number of different epoxy formulations.

B68-10046
SURVEY OF FRACTURE TOUGHNESS TEST METHODS
LEWIS-10379
- Comprehensive survey presents current methods of fracture toughness testing that are based on linear elastic fracture mechanics. General principles of the basic two dimensional crack stress field model are discussed in relation to real three dimensional specimens. Methods of test instrumentation and procedure are described.

B68-10048
SIMPLE TEST FOR PHYSICAL STABILITY OF CRYOGENIC TANK INSULATION
ROUSSEL, D. /DOUGLAS AIRCRAFT CO./ DATE- MAR. 1968
M-FS-12537
- Qualitative test determines the ability of insulation liners used on liquid hydrogen tanks to withstand stresses produced by the thermal shocks imparted to the insulation during tank filling and drainage. Test specimens are bonded to metal plates with a low thermal expansion coefficient and are immersed in liquid hydrogen.

B68-10049
METHOD OF MAINTAINING ACTIVITY OF HYDROGEN-SENSING PLATINUM ELECTRODE
HARMAN, J. M. /BECKMAN INSTR./ DATE- MAR. 1968
M-FS-1422
- Three-electrode hydrogen sensor containing a platinum electrode maintained in a highly catalytic state, operates with a minimal response time and maximal sensitivity to the hydrogen gas being sensed. Electronic control and readout circuitry reactivates the working electrode of the sensor to a state of maximal catalytic activity.

B68-10052
PYROTECHNIC DEVICE PROVIDES ONE-SHOT HEAT SOURCE
HALLER, H. C. LALL, V. R. /TRW EQUIPMENT LABS/ DATE- MAR. 1968
LEWIS-10131
- Pyrotechnic heater provides a one-shot heat source capable of creating a predetermined temperature around sealed packages. It is composed of a blend of an active chemical element and another compound which reacts exothermically when ignited and produces fixed quantities of heat.

B68-10066
STATIC STRUCTURAL ANALYSIS OF SHELL-TYPE STRUCTURES
M-11505
- Shell analysis manual provides methods for determining static deflections and internal load and stress distributions in shells under various loading conditions, and methods for analyzing static instability of shell structures. Also included are methods for determining the lightest shell wall for various constructions.

B68-10085
REINFORCED THERMAL-SHOCK RESISTANT CERAMICS
CRUMP, D. N. /THOMPSON RUM WOODRIDGE/ DATE- MAY 1968
LEWIS-10376
- Composite material, made by dispersing short tungsten-rhenium fibers randomly throughout zirconium oxide, is highly resistant to oxidizing environments at temperatures above 2000 degrees F. This reinforced ceramic is also thermal stress resistant.

B68-10092
MOLDING A HIGH-DENSITY LAMINATE
HARAWAY, W. M. HEIER, W. C. KING, C. B. DATE- MAR. 1968
LANGLEY-10051
- Molding press is used to form phenolic resin impregnated glass fiber cloth into a high-density, cylindrical-ring laminate. The press applies clamping pressure and heat to a mold containing the glass fiber cloth laminate, which has hydrostatic pressure applied to it by means of a specially designed pressure plug.

B68-10094
HIGH STRENGTH NICKEL-BASE ALLOY WITH IMPROVED OXIDATION RESISTANCE UP TO 2200 DEGREES F
FRECHE, J. C. WATERS, W. J. DATE- APR. 1968
LEWIS-10115
Modifying the chemistry of the NASA TAZ-8 alloy and utilizing vacuum melting techniques provides a high strength, workable nickel base **superalloy** with improved oxidation resistance for use up to 2200 degrees F.

**B68-10095**

**COBALT-TUNGSTEN, FERROMAGNETIC HIGH-TEMPERATURE ALLOY**


**SEE ALSO** NASA-TN-9-4336

**LEWIS-10378**

Cobalt-base alloy which combines high temperature strength and magnetic properties has a composition in weight percent of 7-1/2 tungsten, 2-1/2 iron, 1 titanium, 1/2 zirconium, 1/2 carbon, and the balance cobalt. It may be used as construction material for electric motors and generators operating at high temperatures.

**B68-10101**

**REACTION RATES OF GRAPHITE WITH OZONE MEASURED BY ETCH DECORATION**

HENNIG, G. R. MONTET, G. L. DATE- APR. 1968

**ARG-10068**

Etch-decoration technique of detecting vacancies in graphite has been used to determine the reaction rates of graphite with ozone in the directions parallel and perpendicular to the layer planes. It consists essentially of peeling single atom layers off graphite crystals without affecting the remainder of the crystal.

**B68-10102**

**ANALYTICAL TECHNIQUES FOR DETERMINING BORON IN GRAPHITE**

HENNIG, G. R. MONTET, G. L. DATE- APR. 1968

**ARG-10069**

Two analytical techniques, a gold nucleation and an etch-decoration technique have been developed for determining the presence and mobility of boron in graphite.

**B68-10103**

**GLASSY MATERIALS INVESTIGATED FOR NUCLEAR REACTOR APPLICATIONS**

LYNCH, E. D. DATE- APR. 1968 SEE ALSO ANL-7062

**ARG-10070**

Studies determine the feasibility of preparing fuel-bearing glasses and glasses bearing neutron-absorbing materials for use as crystalline fuel and control rods for reactors. Properties investigated were devitrification resistance, urania solubility, and density.

**B68-10104**

**DECOMPOSITION VESSEL**

BENNIS, B. /NATL. ACADEM. OF SCI. DATE- MAR. 1968

**GSFS-10343**

Stainless steel crucible-shaped vessel permits rapid decomposition of silicates and other refractory compounds by acids at relatively low temperatures. The vessel is lined with tetrafluoroethylene fluorocarbon resin and sealed by a sheet of the same material retained in a stainless steel screw cap.

**B68-10105**

**BLAST DEFLECTOR TRAPS SMOKE AND DEBRIS FROM EXPLOSIVE TRAINS**

WILKOWSKI, J. C. /N. AM. AVIATION DATE- MAR. 1968

**MSSC-11241**

Blast deflector protects interior areas and personnel from the smoke and debris of explosive trains. It contains open-cell foam to absorb the pressure loads generated by explosive charges and control the smoke and debris.

**B68-10109**

**TUNGSTEN-RHENIUM ALLOY THERMOCOUPLES EFFECTIVE FOR HIGH-TEMPERATURE MEASUREMENT**

BROOKS, E. J. KRAMER, W. C. DATE- APR. 1968

**SEE ALSO** ANL-6981

**ARG-10059**

Tungsten-rhenium alloy thermocouples, specifically, insulated, sheathed W/W plus 26Re and W plus 5Re/W plus 26Re thermocouples, are effective for temperature measurement in excess of 2200 degrees C. These thermocouples have a high thermoelectric output and excellent relationship to temperatures up to 2760 degrees C.

**B68-10142**

**DEVICE PROVIDES CONTROLLED GAS LEAKS**

KAPL, S. A. KING, H. J. /HUGHES AIRCRAFT CO./ DATE- APR. 1968

**NPO-10295**

Modified palladium leak device provides a controlled release /leak/ of very small quantities of gas at low or medium pressures. It has no moving parts, requires less than 5 watts to operate, and is capable of releasing the gas either continuously or in pulses at adjustable flow rates.

**B68-10146**

**LAMINATED SHEET COMPOSITES REINFORCED WITH MODULAR FILAMENT SHEET**

REECE, G. Y. DATE- MAY 1968

**M-FS-14285**

Aluminum and magnesium composite sheet laminates reinforced with low density, high strength modular filament sheets are produced by diffusion bonding and explosive bonding. Both processes are accomplished in normal atmosphere and require no special tooling or cleaning other than wire brushing the metal surfaces just prior to laminating.

**B68-10153**

**STUDY OF CRACK INITIATION PHENOMENA ASSOCIATED WITH STRESS CORROSION OF ALUMINUM ALLOYS**

HUNTER, M. S. /ALUMINUM CO. OF AM./ DATE- MAY 1968

**M-FS-14283**

Study of stress corrosion cracks in aluminum alloys reveals that crack initiation is greatly influenced by boundary orientation and directionality of the structure. In all crack susceptible materials, intergranular corrosion and stress corrosion cracking started and progressed in boundaries oriented perpendicularly to the stressing direction.

**B68-10157**

**EVALUATION OF IGNITION MECHANISMS IN SELECTED NONMETALLIC MATERIALS**

GERSTEIN, M. MC LAIN, H. ROSS, W. /Bryn. SCI. CORP./ DATE- MAY 1968

**MSSC-11645 MSSC-11646 MSSC-11647**

Test program evaluates thermal and electric ignition mechanisms in selected nonmetallic materials found in spacecraft with concentrated oxygen atmospheres. The phenomena evaluated were spontaneous ignition, ignition of flammable vapor by a spark, and ignition by an arc where the arc produces the combustible vapor and the ignition source.

**B68-10175**

**STUDY REVEALS EFFECT OF ALUMINUM ON SATURATION MOMENT OF Fe-Ni ALLOYS**


**ARG-90259**

Study of saturation magnetization, important in the investigation of the electronic structure of alloys, reveals the effect of aluminum on the saturation moments of iron-nickel alloys. The saturation magnetizations were extrapolated to the absolute zero of temperature for calculating average atomic moments.

**B68-10177**

**SARAN FILM IS FIRE-RETARDANT IN OXYGEN ATMOSPHERE**


**MSSC-11604**

Saran was tested for flammability as a wrapping on TFE-insulated electrical wire bundles in oxygen gas at pressures of 7.5 psia and 14.7 psia. It was found to be fire retardant or self-extinguishing in most instances.
03 MATERIALS (CHEMISTRY)

B68-10184
STRESS-CORROSION CHARACTERISTICS OF ALUMINUM CASTING ALLOY M-45
LOVY, C. V. DATE- JUN. 1968 SEE ALSO ANL-6924 AND BST-10159
M-5S-14817
Evaluation of the stress-corrosion characteristics of aluminum alloy M-45 shows that the most favorable artificial aging cycle for this alloy, with regard to optimum strength and stress-corrosion resistance, appears to be 400 degrees F for 12 hours.

B68-10189
REACTION STUDIED OF STEAM WITH NIOBIUM AND TANTALUM
KILPATRICK, M. LOTT, S. K. DATE- JUN. 1968
Study reveals the kinetics of niobium and tantalum with steam at elevated temperatures to determine the suitability of high melting metals for fabrication of equipment for temperature steam environments. Niobium obeyed linear kinetics from 1050 degrees to 1500 degrees C but tantalum followed a paralinear law.

B68-10191
EVALUATION OF METHODS FOR NONDESTRUCTIVE TESTING OF BRAZED JOINTS
KANNO, A. DATE- JUN. 1968 SEE ALSO ANL-7078
ARG-10051
Evaluation of nondestructive methods of testing brazed joints reveals that ultrasonic testing is effective in the detection of nonbonds in diffusion bonded samples. Radiography provides excellent resolutions of void or inclusion defects, and the neutron radiographic technique shows particular advantage for brazing materials containing cadmium.

B68-10192
WELDING OF COMMERCIAL BASE PLATES IS INVESTIGATED
M-5S-13549
Investigation of aluminum alloy welds reveals that the combinations of metallic elements with hydrogen are not capable of producing weld porosity themselves, rather they tend to increase the amount of porosity only in the presence of arc contamination by water vapor.

B68-10194
SUSCEPTIBILITY OF IRRADIATED STEELS TO HYDROGEN EMBRITTLEMENT
ROSSIN, A. D. DATE- JUN. 1968 SEE ALSO ANL-7266
ARG-10115
Investigation determined whether irradiated pressure-vessel steels 4340 and 212-8 are susceptible to hydrogen embrittlement and to catastrophic failure. Hydrogen-charging conditions which completely embrittled 4340 steel had negligible effect on 212-8 steel in tensile and delayed-failure tests.

B68-10195
ELEMENTARY REVIEW OF ELECTRON MICROPROBE TECHNIQUES AND CORRECTION REQUIREMENTS
HART, R. K. DATE- JUN. 1968 SEE ALSO ANL-7078
ARG-10062
Report contains requirements for correction of instrumented data on the chemical composition of a specimen, obtained by electron microprobe analysis. A condensed review of electron microprobe techniques is presented, including background material for obtaining X ray intensity data corrections and absorption, atomic number, and fluorescence corrections.

B68-10196
FUNDAMENTAL ELECTRODE KINETICS
ELDER, J. P. DATE- JUN. 1968 SEE ALSO ANL-7072
ARG-10067
Report presents the fundamentals of electrode kinetics and the methods used in evaluating the characteristic parameters of rapid-charge transfer processes at electrode-electrolyte interfaces. The concept of electrode kinetics is outlined, followed by the principles underlying the experimental techniques for the investigation of electrode kinetics.

B68-10197
STUDY OF MECHANICAL PROPERTIES OF URANIUM COMPOUNDS
BEALS, R. J. DRAGEL, C. M. HANDWERK, J. H. TUTTLE, C. R. DATE- JUN. 1968 SEE ALSO ANL-7070
ARG-10074
Study determines the mechanical properties, including brittleness and ductility of several uranium compounds. These include uranium dioxide, uranium sulfide, and uranium phosphate.

B68-10198
CRYSTAL STRUCTURE ANALYSIS OF INTERMETALLIC COMPOUNDS
ARG-10099
Study concerns crystal structures and lattice parameters for a number of new intermetallic compounds. Crystal structure data have been collected on equiatomic compounds, formed between an element of the Sc, Ti, V, or Cr group and an element of the Co or Ni group. The data, obtained by conventional methods, are presented in an easily usable tabular form.

B68-10199
STUDIES IN ZIRCONIUM OXIDATION
DRALEY, J. E. DRUNEN, C. J. LEVITAN, J. DATE- JUN. 1968 SEE ALSO ANL-7252
ARG-10099
Study provides insight into the oxidation mechanism of zirconium by combining electrical measurements with oxidation data. The measurement of electrical potential across growing scale on zirconium and the determination of conventional weight-change oxidation data were carried out at 550, 700, and 800 degrees C.

B68-10200
RESISTIVITY MEASUREMENTS OF NEUTRON-IRRADIATED PURE METALS AND AL-ZN ALLOYS
HORAN, J. A. DATE- JUN. 1968 SEE ALSO ANL-7185
ARG-10108
Report presents resistivity measurements and their interpretation for neutron-irradiated pure metals and Al-Zn alloys. The influence of temperature, the role of point defects, and the aging behavior on resistivity are considered. The experimental procedures and results are discussed in detail.

B68-10201
TECHNOLOGICAL SURVEY OF TELLURIUM AND ITS COMPOUNDS
STEINDLER, M. J. VISSERS, D. R. DATE- JUN. 1968 SEE ALSO ANL-7142
ARG-10119
Review includes data on the chemical and physical properties of tellurium, its oxides, and fluorides, pertinent to the process problem of handling fission product tellurium in fluoride form. The technology of tellurium handling in nonaqueous processing of nuclear fuels is also reviewed.

B68-10204
MANGANESE-ALUMINA-CERAMIC GLASS ELIMINATES RIGID CONTROLS NECESSARY IN BONDING METALS TO CERAMICS
HOLLAR, E. L. DATE- JUN. 1968
SAN-10012
Matrix of manganese-alumino-silicate glass simplifies the processes of metallicizing alumina ceramics. Because the manganese in the glass is preoxidized to the 2 plus state by firing in nitrogen, the ceramic can be metallized in dry hydrogen. Lengthening the firing time permits a
lower metallizing temperature.

B68-10212
ION PLATING TECHNIQUE IMPROVES THIN FILM DEPOSITION
MATTOX, D. M. DATE- JUN. 1968
SAN-10006
Ion plating technique keeps the substrate surface clean until the film is deposited, allows extensive diffusion and chemical reaction, and joins insoluble or incompatible materials. The technique involves the deposition of ions on the substrate surface while it is being bombarded with inert gas ions.

B68-10214
REDUCING BUBBLES IN GLASS COATINGS IMPROVES ELECTRICAL BREAKDOWN STRENGTH
BANKS, B. DATE- JUN. 1968
M-FS-14151
Helium reduces bubbles in glass coatings of accelerator grids for ion thrusters. Fusing the coating in a helium atmosphere creates helium bubbles in the glass. In an argon atmosphere, entrapped helium diffuses out of the glass and the bubbles collapse. The resultant coating has a substantially enhanced electrical breakdown strength.

B68-10215
GLASS COATED SINGLE GRID FOR CHARGED PARTICLE ACCELERATION
BANKS, B. A. NAKANISHI, S. DATE- JUN. 1968 LEWIS-10106
Glass coating is used on a single grid accelerator system for ion thrusters. The uniformly thin, smooth, dense, impervious glass coating has a high dielectric strength and is firmly bonded to the accelerator grid.

B68-10221
LIQUID CRYSTAL CALIBRATOR
COHEN, S. E. /LOCKHEED-GEORGIA CO./ DATE- JUN. 1968 M-F-14151
Calibration apparatus determines the operating temperature range /sensitivity/ of liquid crystals. The calibrator maintains a precisely controlled test surface temperature. It permits a measurement accuracy of plus or minus 0.5 degrees F and a sensitivity of plus or minus 0.15 degrees F.

B68-10251
WELD MICROFISSURING IN INCONEL 718 MINIMIZED BY MINOR ELEMENTS
Manganese, silicon, and magnesium markedly reduce the tendency of Inconel 718 to weld microfissuring. By combining a manganese, 0.20 percent by content, with silicon, greater than 0.20 percent content, or by adding 20 ppm of magnesium, the weld microfissuring decreased in the standard alloy.

B68-10253
HIGH TEMPERATURE ALLOY
FRANK, R. G. SEMKEL, J. W., JR. /GE/ DATE- JUL. 1968 LEWIS-10377
Molybdenum is substituted for tungsten on an atomic basis in a cobalt-based alloy, 8-1, thus enabling the alloy to be formed into various mill products, such as tubing and steels. The alloy is weldable, has good high temperature strength and is not subject to embrittlement produced by high temperature aging.

B68-10256
GRAPHITE CLOTH FACILITATES VACUUM EVAPORATION OF SILICON MONOXIDE
CARITHERS, M. D. /GEORGIA INST. OF TECH./ DATE- JUL. 1968 M-FS-14764
Woven graphite cloth facilitates the vacuum deposition of thin films of silicon monoxide on substrate surfaces. The cloth serves both as a container and electric heating element for the silicon monoxide. It minimizes and prevents the silicon monoxide particle ejection, provides uniform heat distribution, and cools rapidly by radiation.

B68-10271
PREPARATION OF SILVER-ACTIVATED ZINC SULFIDE THIN FILMS
FELDMAN, C. SWINDELLS, F. E. /MELPAR/ DATE- AUG. 1968 GSFC-10687
Silver improves luminescence and reduces contamination of zinc sulfide phosphors. The silver is added after the zinc sulfide phosphors are deposited in thin films by vapor evaporation, but before calcining, by immersion in a solution of silver salt.

B68-10274
VISCOSITY AND DENSITY OF METHANOL/WATER MIXTURES AT LOW TEMPERATURES
AUSTIN, J. G. KURATA, F. SWIFT, G. W. /KANSAS UNIV./ DATE- AUG. 1968 M-F-14991
Viscosity and density are measured at low temperatures for three methanol/water mixtures. Viscosity is determined by a modified falling cylinder method or a calibrated viscometer. Density is determined by the volume of each mixture contained in a calibrated glass cell placed in a constant-temperature bath.

ARG-10049
Study of fluidized-packed bed includes investigation of heat transfer, solids-gas mixing, and elutriation characteristics. A fluidized-packed bed is a system involving the fluidization of small particles in the voids of a packed bed of larger nonfluidized particles.

B68-10279
100 ANGSTROM NIOBIUM WIRE
CLINE, H. E. ROSE, R. M. WULFF, J. /MIT/ LEWIS-10128
Composite of fine niobium wires in copper is used to study the size and proximity effects of a superconductor in a normal matrix. The niobium rod was drawn to a 100 angstrom diameter wire on a copper tubing.

B68-10281
STUDY OF BEHAVIOR OF STEROLS AT INTERFACES
KLEIN, P. D. KNIGHT, J. C. SZCZEPAKIN, P. A. DATE- AUG. 1968 ARG-10085
Behavior of sterols and sterol acetates on various types of interfaces indicates that the function of a sterol depends upon a surface orientation and surface energy of the interface. Column-chromatographic techniques determine the retention volume of various sterols under standard conditions.

B68-10385
PRE-WELD HEAT TREATMENT IMPROVES WELDS IN RENE 41
PRAGER, H. /N. AM. ROCKWELL CORP./ DATE- AUG. 1968 M-FS-18174
Cooling of Rene 41 prior to welding reduces the incidence of cracking during post-weld heat treatment. The microstructure formed during the slow cooling rate favors elevated temperature ductility. Some vestiges of this microstructure are apparently retained during welding and thus enhance strain-age crack resistance in air.

B68-10302
EFFECTS OF SURFACE PREPARATION ON QUALITY OF ALUMINUM ALLOY WELDMENTS

23
Study of surface preparations and surface contamination effects on the welding of 2014 aluminum involves several methods of surface analysis to identify surface properties conducive to weld defects. These methods are radioactive evaporation, spectral reflectance mass spectroscopy, gas chromatography and spark emission spectroscopy.

M66-10354
MICROPROBE INVESTIGATION OF BRITTLE SEGREGATES IN ALUMINUM MIG AND TIG WELDS
LARSEN, P. A. MILLER, E. L. MCDONNELL DOUGLAS CORP./ DATE- SEP. 1968
M-FS-14720
Quantitative microprobe analysis of segregated particles in aluminum MIG /Metal Inert Gas/ and TIG /Tungsten Inert Gas/ welds indicated that there were about ten different kinds of particles, corresponding to ten different intermetallic compounds. Differences between MIG and TIG welds related to the individual cooling rates of these welds.

M66-10368
CONSOLIDATION AND FABRICATION TECHNIQUES FOR VANADIUM-20 W/O TITANIUM /TV-20/
SEE ALSO ANL-69263
ARC-10148
Tests of the mechanical properties, fuel compatibility, sodium corrosion and irradiation behavior were made for vanadium and vanadium alloy. Improved methods for consolidation and fabrication of bar, rod, sheet, and high-quality, small diameter, thin-wall tubing of vanadium-20 without titanium are reported.

M66-10358
TUNGSTEN FIBER-REINFORCED NICKEL SUPERALLOY
Lewis-10424
Tungsten fiber-reinforced nickel superalloy combines the strength of refractory metals with the oxidation resistance of superalloys. Knowledge of the relationship between fabrication technique, matrix compositions and fiber sizes minimized the reaction of matrix. Potential application includes high temperature turbine components.

M66-10373
PRODUCT IDENTIFICATION TECHNIQUES USED AS TRAINING AIDS FOR ANALYTICAL CHEMISTS
GRILLO, J. P. DATE- OCT. 1968
SNC-10025
Laboratory staff assistants are trained to use data and observations of routine product analyses performed by experienced analytical chemists when analyzing compounds for potential toxic hazards. Commercial products are used as examples in teaching the analytical approach to unknowns.

M66-10378
NONDESTRUCTIVE METHOD FOR MEASURING RESIDUAL STRESSES IN METALS, A CONCEPT
SCHONEL, C. D. /ROEING CORP./ DATE- OCT. 1968
KSC-10237
Nondestructive direct measurement of residual stress in metals can be made because metal under stress has a different electrochemical potential than in the unstressed condition. The method uses two matched electrolytic cells to cancel extraneous effects on the actual solution potential of the metal specimen.

M66-10380
NICKEL-BASE SUPERALLOYS EXCELLENT PROPERTIES PROMOTE ITS SERVICE TO 2200 DEGREES F
FRECHT, J. C. WATERS, W. J. DATE- OCT. 1968
SEE ALSO NASA-TN-D-4390, M66-10222, AND M66-10094
LEWIS-10355
Nickel base alloy with high strength, ductility, good impact and oxidation resistance, microstructural stability, workability potential, and the ability to show improved strength and ductility when directly solidified has recently been developed for high temperature applications.

M66-10381
HIGH-EMITTANCE COATINGS ON METAL SUBSTRATES
EMANUELSON, R. C. LUGA, W. L. WALEK, W. J. /PRATT AND WHITNEY AIRCRAFT CORP./ DATE- OCT. 1968
LEWIS-10324
High-emittance coatings of iron, calcium, and...
zirconium titanates thermally sprayed on stainless steel, columbium-1 percent zirconium, and beryllium substrates promote control radiative heat transfer from the metal substrates. Adherence, compatibility and emittance stability at elevated temperature and high vacuum were evaluated.

**B68-10386**

**ELECTROMOVING SERIES ESTABLISHED FOR METALS USED IN AEROSPACE TECHNOLOGY**

KUSTER, C. A. / / AM. ROCKWELL CORP./ DATE- OCT. 1968

M-FS-18327

Electromoving series has been established for approximately 190 commonly used aerospace metals. For most metals an initial potential and a service related potential was obtained.

**B68-10390**

**IMPROVED PROCESS FOR EPITAXIAL DEPOSITION OF SILICON ON PREDIFFUSED SUBSTRATES**

CLARKE, M. G. HALSOR, J. L. WOOD, J. C. / / WESTINGHOUSE ELECTRIC CORP./ DATE- OCT. 1968

M-FS-14910

Process for fabricating integrated circuits uniformly deposits silicon epitaxially on prediffused substrates without affecting the sublayer diffusion pattern. Two silicon deposits from different sources, and deposited at different temperatures, protect the sublayer pattern from the silicon tetrachloride reaction.

**B68-10391**

**TRAINING MANUALS FOR NONDESTRUCTIVE TESTING USING MAGNETIC PARTICLES**

INNOVATOR NOT GIVEN / / GEN. DYN./ CONVAIR/ DATE- OCT. 1968

M-FS-20187

Training manuals containing the fundamentals of nondestructive testing using magnetic particle as detection media are used by metal parts inspectors and quality assurance specialists. Magnetic particle testing involves magnetization of the test specimen, application of the magnetic particle and interpretation of the patterns formed.

**B68-10392**

**CONTAMINATION CONTROL HANDBOOK**

INNOVATOR NOT GIVEN / / SANDIA CORP./ DATE- OCT. 1968

M-FS-20185

Contamination Control Handbook provides technical information on avoiding contamination of physical, chemical or biological systems or products. The book includes control methods for product design, gases and liquids, airborne and surface contamination, radiation, packaging, handling, storage and personnel.

**B68-10394**

**NONDESTRUCTIVE TESTING OF BRAZED ROCKET ENGINE COMPONENTS**

ADAMS, C. J. HAGEMAIER, D. J. MEYER, J. A. / / AM. ROCKWELL CORP./ DATE- OCT. 1968

M-FS-10191

Report details study made of nondestructive radiographic, ultrasonic, thermographic, and leak test methods used to inspect and evaluate the quality of the various brazed joints in liquid-propellant rocket engine components and assemblies. Descriptions of some of the unique equipment and methods developed are included.

**B68-10408**

**THE THERMODYNAMIC PROPERTIES OF THE WUSTITE PHASE ARE STUDIED**

ACKERMAN, R. J. SANDFORD, R. W., JR. / / DATE- DEC. 1968

See also ANL-7250

ARG-10200

Study of the precise location of the wustite phase boundaries and the dependence of the partial pressure of oxygen on the temperature and composition of the solid phase was made. From the pressure of oxygen, the temperature and the composition thermodynamic quantities can be determined.

**B68-10409**

**THE PREPARATION, IDENTIFICATION AND PROPERTIES OF CHLOROPHYLL DERIVATIVES**


ARG-10265

In the investigation of 10-hydroxy chlorophylls a and b novel techniques included modification of chromatography and the use of fully-deuterated compounds isolated from fully-deuterated autotropic algae to determine the molecular structure of the chlorophylls.

**B68-10414**

**TITANIUM-NITROGEN REACTION INVESTIGATED FOR APPLICATION TO GETTING SYSTEMS**

ARNITZEN, J. D. COLEMAN, L. F. KYLE, M. L. PIERCE, R. B. / / DATE- NOV. 1968

See also ANL-7167

ARG-10208

Titanium is one of several getting materials available for removing nitrogen from inert gases. The reaction rate of titanium-metal sponge and nitrogen in argon-nitrogen mixtures was studied at 900 degrees C. The rate was found to depend upon the partial pressure of nitrogen in the gas phase. Mathematical relationships simulate titanium systems.

**B68-10419**

**CHEMISTRY LABORATORY SAFETY MANUAL AVAILABLE**

ELDBROCK, R. G. / / DATE- NOV. 1968

SAM-10030

Chemistry laboratory safety manual outlines safe practices for handling hazardous chemicals and chemistry laboratory equipment. Included are discussions of chemical hazards relating to fire, health, explosion, safety equipment and procedures for certain laboratory techniques and manipulations involving glassware, vacuum equipment, acids, bases, and volatile solvents.

**B68-10425**

**NITRIC ACID-ORGANIC MIXTURES SURVEYED FOR USE IN SEPARATION BY ANION EXCHANGE METHODS**

BLOOMQUIST, C. A. A. FARIS, J. P. STEWART, D. C. / / DATE- NOV. 1968

See also ANL-6999

ARG-10065

Column elution-spectrographic analysis technique copes certain solvents directly to the methanol system, using inert rare earths instead of actinides. Distribution ratios for americium between 90 percent solvent, 10 percent 5 M nitric acid and Dowex 1 nitrate form resin for a large group of organics miscible in water was determined.

**B68-10433**

**AN ECONOMICAL METHOD FOR THE CONTINUOUS PRODUCTION OF IODINE-123**


LEWIS-10518

Simple and inexpensive method produces iodine-123, in a conventional cyclotron. Tellurium-122, a stable isotope available for enrichments exceeding 95 percent, is held on a porous metal plate by a flowing stream of helium and bombarded with either alpha particles or helium-3.

**B68-10454**

**HYDROGEN PEROXIDE ETCHING PROVES USEFUL FOR GERMANIUM**


ARG-10170

Influence of process variations in the etching of germanium with hydrogen peroxide has been studied, along with damage effects due to radiation. The work advances the knowledge of the etching process for germanium.

**B68-10465**

**GRAIN-BOUNDARY MIGRATION IN ECL BICRYSTALS**

GIBSON, C. F. / / DATE- DEC. 1968

See also ANL-7232

ARG-10181

Boundary migration in melt-grown bicrystals of...
KCl containing pure twist boundaries was investigated. The experiments involve the use of bicrystal specimens in the shape of right-triangular prisms with the boundary parallel to one side.

B68-10520 AMBIENT TEMPERATURE CATALYST FOR HYDROGEN IGNITION
ROBERTS, R. W. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968
LEWIS-10551 Low cost, ambient temperature catalyst for reacting hydrogen gas with air in a catalytic cell near the point of evolution at a controlled rate is announced.

B68-10522 METHOD FOR REMOVING SURFACE-DAMAGED LAYERS FROM NICKEL ALLOYS
FAVLEY, R. W. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968
M-FS-10151 Electrical discharge machining /EDM/ damaged layer can be effectively removed from Rene 41, Inconel 625, Inconel 718, and Monel K-500 by abrasive-grit blasting or electropolishing /at room temperature/ at a current density of 5A/inches squared in a water solution of phosphoric and sulfuric acids.

B68-10523 EVALUATION OF A FLUOROCARBON PLASTIC USED IN CRYOGENIC VALVE SEALS
M-FS-10189 Effects of strain rate, temperature, crystallinity, and surface finish /smoothness/ on the tensile strength of a commercial chlorotrifluorothylene plastic /CTFE/ used for lipseals in very fast-acting liquid oxygen valves.

B68-10524 DISPENSING GRADUATE FOR BUTADIENE
HINSMFIELD, B. H. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968
NPO-10070 Graduate was designed for dispensing small volumes of liquid 1,3-butadiene or other volatile liquids which are in the gaseous state at room temperature.

B68-10526 PRECISE DOPING OF METALS BY SMALL GAS FLOWS
BABBRETT, C. A. DATE- NOV. 1968
LEWIS-10444 Simple method was developed for doping refractory metals with oxygen. The metal specimens are heated in a dynamic high-vacuum system. The system can be used for other oxygen absorption processes /such as low-pressure oxidation measurements/ and for gases other than oxygen.

B68-10527 GRAIN GROWTH INHIBITOR FOR POROUS TUNGSTEN MATERIALS
TODD, H. H. /ELECTRO-OPT. SYSTEMS/ DATE- NOV. 1968
LEWIS-10535 Boron, either uncombined or combined with nitrogen or carbon added to tungsten powder prior to processing, effectively inhibits grain growth. The tungsten material is stable up to 1800 degrees C.

B68-10528 METHOD FOR CONTROLLING DENSITY AND PERMEABILITY OF SINTERED POWDERED METALS
TODD, H. H. /ELECTRO-OPT. SYSTEMS/ DATE- NOV. 1968
LEWIS-10393 Improved, relatively low-cost method has been developed to produce porous metals with predetermined pore size, pore spacing, and density, utilizing powder-metal processes. The method utilizes angular not spherical tungsten powder.

B68-10532 MASS LOADING EFFECTS ON VIBRATED RING AND SHELL STRUCTURES
LEE, S. Y. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968
M-FS-14579 Efficient methods for predicting the effects of attached masses on the vibration characteristics of ring and shell structures have been developed and substantiated with experimental data.

B68-10536 A RAPID STRESS-CORROSION TEST FOR ALUMINUM ALLOYS
HELFRICH, W. J. /KAISER ALUMINUM AND CHEM. CORP./ DATE- DEC. 1968
NPO-10783 Equipment fabricates and uses simulated hailstones to test the weatherability of exposed structures. The equipment projects the hailstones at velocities experienced in hailstorms.

B68-10532 STRUCTURAL THERMAL-CONTROL COATINGS
STOLLER, F. W. DATE- DEC. 1968
NPO-10785 Specifications have been formulated for application of thermal-control paints on large radar antenna structures exposed to solar radiation. The paint minimizes thermally induced mechanical deflections and glare of incident solar radiation.

B68-10557 SEPARATOR FOR ALKALINE BATTERIES
HOYT, H. W. /PFLUGER, H. L. /BORDEN CO./ DATE- DEC. 1968
USFC-10173 Separator compositions have been tested as components of three-plate silver-zinc oxide cells in a standard cycling test. Six materials meet imposed requirements, giving cycling performance superior to cellophane.

B68-10561 WELD JOINT STRENGTH AND MECHANICAL PROPERTIES IN 2219-T81 ALUMINUM ALLOY
LEWIS-10479 Plate and sheet were welded using automatic TIG /tungsten-inert gas/ weld techniques and manual repair weld techniques. Yield strength of 2219-T81 sheet and plate decreases significantly when welded.

B68-10568 STRESS-CORROSION-INDUCED PROPERTY CHANGES IN ALUMINUM ALLOYS
BANKSTON, B. F. /CLOFTELTER, W. N. DATE- DEC. 1968
M-FS-20209 Measurements of electrical conductivity, ultrasonic surface wave attenuation, and internal friction loss were made on aluminum alloys 7079-T6, 2219-T81, and 2219-T6 as a function of the onset of stress corrosion.

04 LIFE SCIENCES

B68-10476 METABOLIC AND TOXICOLOGICAL EFFECTS OF WATER-SOLUBLE XENON COMPOUNDS ARE STUDIED
FINKEL, A. J. KATZ, J. J. MILLER, C. E. DATE- APR. 1968
Biological properties of water-soluble xenon compounds are the moderate toxicity of these substances, their rapid decomposition in the body, the speed with which the xenate appeared to be reduced to xenon gas, and the very rapid elimination of this gas from the body.

Infrared viewing permits human iris response studies. Infrared image converter tube and a filtered light source monitor and measure the eye of a subject during experimental task-work operations to obtain a more natural measurement of unimpeded iris response. The device permits observation in the near infrared region, with little stimulation to the eye except by normal ambient lighting.

Vacuum probe sampler removes micron-sized particles from surfaces. Vacuum probe sampler removes micron-sized particles from sensitive surfaces, without damage to the surface. The probe has a critical orifice to disturb the boundary layer of air and raises bacteria from the surface into the probe with the moving air stream.

Experimental study and evaluation of radioprotective drugs. Experimental study evaluates radioprotective drugs administered before exposure either orally or intravenously. Specifically studied are the sources of radiation, choice of radiation dose, choice of animals, administration of drugs, the toxicity of protective agents and types of protective drug.

Food products for space applications. Specially-prepared foodstuffs supply an astronaut with a diet containing his basic nutritional requirements in a form that is useful in his environment. Several edible coatings preserve foods and give "loose** foods form and firmness. These coatings aid in packaging and give the food **slip** for easy removal from the package.

Stratification of centrifuged amoeba nuclei investigated by electron microscopy. Study establishes a relationship between radioreistance and the nuclear stratification characteristics of various amoeba species. Two species of fresh water amoeba are studied with the electron microscope. The report discusses the nature of nuclear layers and their possible relationship to the differences in radiosensitivity of the two amoeba species.

Rate constants measured for hydrated electron reactions with peptides and proteins. Effects of ionizing radiation on the amino acids of proteins and the reactivity of the protonated amino group depend upon the Pd subscript a of the group. Estimates of the rate constants for reactions involving the amino acid side chains are presented. These rate constants gave an approximate rate constant for three different protein molecules.

Compound growth equation developed for postnatal growth of birds and mammals. Compound growth equation was developed in which the rate of this linear growth process is regarded as proportional to the mass already attained at any instant by an underlying somers process. This compound growth model was fitted to the growth data of a variety of birds and mammals of both sexes.

Biological Isolation Garment. Biological Isolation Garment /BIG/ is a one piece loose fitting garment fabricated from a tightly woven, permeable, 100 percent-cotton fabric. Its headpiece, incorporates an integral oronasal respirator with 0.3-micron-particle filters, and a full width visor. All fabrication seams are sealed on the inside of the garment.

A Microlagagnon technique for the culture of mammalian cells. Technique obtains micropartitioning in a simple and reproducible manner by forming a field of tiny ponds or lagoons on the surface of a suitable culturing vessel. The technique allows free access of the common culture to all parts of the field.

Mechanized ultrasonic scanning system. Mechanized ultrasonic scanning system inspects the flaw content in the welds of space vehicle booster stages and propellant tanks. It is capable of scanning welds at speeds greater than 1 inch per second.

Pneumatic raft automatically reforms after rupture of buoyant member. Unique, inflated, expandable socks are attached within the inflated chamber of a raft or a float in such a way that collapse of the chamber wall through damage, causes the adjacent sock to expand and restore the original configuration.

Vent and relief valve maintains low leakage rate over broad temperature range. Low leakage rate, large diameter vent and relief valve operates satisfactorily over a large temperature range by a design that accommodates waviness and distortions due to thermal gradients. It is based on a fixed sealing member having an inclined lapped surface to which a flexible flow gate conforms.
B68-10022
MECHANICAL SHIELDING REDUCES WELD SURFACE
CRACKING IN 6061 T6 ALUMINUM
HILL, J. E. /N. AM. AVIATION/ DATE- FEB. 1968
MSC-11494
Mechanical shield of high melting point material protects 6061-T6 aluminum welded with high frequency ac tungsten arc equipment. It is held in place around the weld bead area and eliminates heat check cracks.

B68-10024
LOCATING AND SEALING AIR LEAKS IN
MULTIROOMED BUILDINGS
BRITTON, J. M. /AEROJET-GEN. CORP./ DATE- FEB. 1968
NUC-10304
Industrial, nontoxic smoke bombs are used in multiroomed buildings to locate and fill discovered leak areas with polyurethane foam. All obvious air escape routes are sealed and the room is then pressurized to a minimum of 0.1 inch water above the pressure of adjoining rooms.

B68-10026
PREDICTING FATIGUE LIFE OF METAL BELLows
DANIELS, C. M. /N. AM. AVIATION/ DATE- FEB. 1968
M-9S-14096
Classical method of presenting fatigue data in plots of alternating stress vs number of deflection cycles is applied to bellows formed of various metals, including corrosion-resistant steel, nickel alloys, and aluminum alloys. The expected life of a new bellows design can then be determined before fabrication and testing.

B68-10030
COMPUTER MAGNETIC TAPE REHABILITATION STUDY
BYRGE, V. H. DATE- FEB. 1968
GSFC-10283
Study determines the most efficient method for magnetic tapes rehabilitation and storage for reuse. Investigated were the physical changes taking place in the tape during the rehabilitation process, measure of quality of the processed tapes, and the level of quality required to achieve sufficient yield.

B68-10036
TUBE DIMPILING TOOL ASSURES ACCURATE
DIP-BRAZED JOINTS
MSC-533
Portable, hand-held dimpling tool assures accurate brazed joints between tubes of different diameters. Prior to brazing, the tool performs precise dimpling and nipple forming and also provides control and accurate measuring of the height of nipples and depth of dimples so formed.

B68-10037
SWING ARM CARRIER PROTECTS FLEXIBLE LINES
DURING TEST ITEM ROTATION
WARD, D. P. /N. AM. AVIATION/ DATE- FEB. 1968
MSC-11464
Swing arm carrier provides protection for flexible lines /fluid, electrical, RF/ connected to a test item that must be rotated through 360 degrees during test. It uses five gates riding on pivots to permit rotation of flexible lines through arcs of plus 180 degrees and minus 180 degrees.

B68-10039
CONCEPT TO STANDARDIZE SPACE VEHICLE
PIGGYBACK EXPERIMENT MODULES
M-9S-1697
Study investigates the use of spent launch vehicle stages and modules to support earth orbital operations and functions after successful completion of the primary mission. Emphasis is placed primarily on determination of those uses that afford the greatest utility with minimum possibility of degradation to the primary mission.

B68-10039
FUEL TRANSFER SYSTEM PERMITS RAPID
COUPLING
WEST, A. M. /LOCKHEED MISSILES AND SPACE CO./ DATE- FEB. 1968
M-9S-91526
Docking and fuel transfer system provides an efficient method for transferring fuel from a tanker to another vehicle. With this system, no triggering operation is required prior to docking; the support system can be rigidized by simply locking the rams of shock absorbers, and no separate fuel line coupling action is required.

B68-10044
HEAT-SHRINK PLASTIC TUBING SEALS JOINTS IN
GLASS TUBING
DEL DUCA, B. DOWNEY, A. /N. AM. AVIATION/ DATE- FEB. 1968
LEWIS-10329
Small units of standard glass apparatus held together by short lengths of transparent heat-shrinkable polyolefin tubing. The tubing is shrunk over glass O-ring type connectors having O-rings but no lubricant.

B68-10047
FAST METHOD FOR OBTAINING SCALE DIMENSIONS
ON TAPE-CONTROLLED MILLING MACHINE
THOMPSON, L. J. /N. AM. AVIATION/ DATE- MAY 1968
MSC-11609
Calculator obtains the Rail and Z Scale dimensions on the tape-controlled Sundstrand milling machine. It provides computer with depth information required to process numerical control programs which, in turn, provide the tapes for operation of N/C milling machines.

B68-10052
MULTICHANNEL WIREWAY ADAPTER BOX
BLAKE, W. /N. AM. AVIATION/ DATE- MAR. 1968
MSC-9645
Adapter box provides continuous separation of different electrical leads at points where their runs must intersect. Thus, multichannel conduits of standard commercial design may be used in a manner that prevents crossing of wire leads carrying different currents where the runs intersect and change direction.

B68-10053
REMOTELY INSTALLED PIPE PLUG PROVIDES
EFFECTIVE SEAL IN HAZARDOUS ENVIRONMENT
CLIFTON, R. P. /AEROJET-GEN. CORP./ DATE- MAR. 1968
NUC-10303
Pipe plug for remote installation in an open-ended pipe used in a hazardous environment provides a gastight seal by expanding a rubber seal against the inside surface of the pipe opening, with mechanical clamps contacting the pipe flange for positive retention of the plug.

B68-10057
SYNCHRONIZED CIRCUIT IMPROVES ACCURACY OF
FLUID TRANSFER MEASUREMENTS
VENDL, C. J. /M. AM. AVIATION/ DATE- MAR. 1968
MSC-11167
Shut-off valve at the destination of a transferred fluid, improves the accuracy of measurements determining the quantity of liquid transferred from a storage source, to a remote location. By synchronizing this valve with the measuring device /totalizer/, the inaccuracies resulting from unfilled transfer lines can be reduced.

B68-10064
FLEXIBLE RING BAFFLES FOR DAMPING LIQUID
SLOSH
BROOKS, G. W. STEPHENS, D. G. DATE- FEB. 1968
SEE ALSO NASM-TN-9-3878
LANGLEY-90194
Slosh damping, obtained through the use of small, less massive, flexible baffles, provides a relatively lightweight system for damping the motions of liquid propellants in launch vehicles, missiles, and other tankage systems.

B68-10072
CLAMP FOR DETONATING FUZE
HOLDERMAN, E. J. /DOUGLAS AIRCRAFT CO./ DATE- MAR. 1968
M-FS-13399
Quick acting clamp provides physical support for a closely confined detonating fuse in an application requiring removal and replacement at frequent intervals during test. It can be designed with a base of any required strength and configuration to permit the insertion of an object.

B68-10075
MAINTAINABILITY METHODOLOGY AND MAINTENANCE ANALYSES
BACH, R. L. ELLIS, G. F. GRALOW, F. H.
HOLDERMAN, J. J. KOZLOWSKI, F. J. /BOEING CO./ DATE- MAR. 1968
M-FS-14134 M-FS-14221
Initial approach in performing maintainability studies involves detailed description of methodology used. Maintenance analyses are formulated for system, subsystem, and component levels. These are performed to ensure that complete, integrated, logistics system support elements are identified.

B68-10078
DEVICE DAMPS FLUID PRESSURE OSCILLATIONS IN VENT VALVE
NEIN, H. J. DATE- MAY 1968
M-FS-13290
Device, containing a tuned series arrangement of two plenum chambers and two orifices, damps high frequency fluid oscillations in a vent valve. Used in conjunction with vent valves, it relieves gas pressure that develops in liquid hydrogen and liquid oxygen tanks used on a space vehicle.

B68-10080
NUMERICAL CONTROL MACHINE DATA MANUAL
MACKEY, R. T. SR. /M. AM. ROCKWELL CORP./ DATE- MAY 1968
M-FS-14342
Numerical Control Machine Data Manual provides programmers with specific information for various types and sizes of numerical control machine tools and auxiliary equipment.

B68-10092
DEPLOYABLE LATTICE COLUMN
MAUCH, R. N. /ASTRO RES. CORP./ DATE- MAY 1968
NPO-10228
Lattice column, made up of many individually collapsible sections connected in tandem, rapidly raises measuring instruments to a level appreciably above that where data is to be recorded and evaluated. The column may be collapsed by collapsing each section in sequence and is deployed by extending each section in sequence.

B68-10099
SYSTEM FOR MEASURING ROUNDNESS AND CONCENTRICITY OF LARGE TANKS
MELTON, R. E. /SPACE/ DATE- MAY 1968
SEE ALSO B67-10214
M-FS-13362
Equipment measures the roundness and concentricity of large, massive tanks. The equipment includes a 34-foot rotary table, a variable reluctance displacement transducer, an electronics console, a digital computer, and a 5-foot plunger used for final data display.

B68-10107
ELECTROFORMED SCREENS WITH UNIFORM HOLE SIZE
SCHAEF, G. R. /BATTELLE N. INST./ DATE- APR. 1968
MSC-12072
Efficient method electroforms fine-mesh nickel screens, or plaques, with uniform hole size and accurate spacing between holes. An electroformed nickel mandrel has nonconducting silicon rubber projections that duplicate the desired hole size and shape in the finished nickel screen.

B68-10110
VISCOUS DAMPER
DEAN, W. C. /UNITED AIRCRAFT CORP./ DATE- APR. 1968
MSC-12071
Damping device exhibiting no hysteresis effect and capable of preload is used in place of a preload spring in an aneroid bellows to provide viscous damping. It operates about the action of a pressure sensing outer bellows attached to an active header above and a static header below.

B68-10111
SLEEVED DAMPER LIMITS SPRING SURGING
DEAN, W. C. /UNITED AIRCRAFT CORP./ DATE- APR. 1968
MSC-12071
Damping device limits spring surging in delicate instrumentation subjected to shock loading to tolerable limits. The device consists of a spiral formed plastic member interleaved between the spring coils in the same helix configuration.

B68-10115
METHOD FOR REINFORCING TUBING JOINTS
KINZLER, J. LEE, W. S. DATE- APR. 1968
MSC-11108
Joint repair technique uses a longitudinally slit aluminum shield over the joint ferrule and immediately adjacent tubing to reseal or reinforce leaking or weak joints in small tubing. Epoxy resin coating on inside surfaces of the two shield halves provides a tightly sealed bond between shield and tubing.

B68-10117
TOGGLE OPERATED DOUBLE LATCH
MSC-11377
Double hook latch provides preloading and support capability up to 60,000 pounds and opens self-energizingly when restraint linkage is released. It incorporates a double hook latch held closed by a toggle linkage attached to a flexible cable rigged in tension.

B68-10120
PRESSURE VARIABLE ORIFICE FOR HYDRAULIC CONTROL VALVE
ARMERMAN, R. L. /M. AM. AVIATION/ DATE- APR. 1968
MSC-11323
Hydraulic valve absorbs impact energy generated in docking or joining of two large bodies by controlling energy release to avoid jarring shock. The area of exit porting presented to the hydraulic control fluid is directly proportional to the pressure acting on the fluid.

B68-10122
MEASURING THERMAL EXPANSION OF MULTIPLE SPECIMENS AT HIGH TEMPERATURE
GAAL, P. S. /WESTINGHOUSE ASTRONUC. LAB./ DATE- MAY 1968
NUC-10153
Furnace capable of heating 10 specimens to a
Active vibration isolator simultaneously isolates a flexible structure or payload from disturbances, attenuates the response of a flexible structure to transient disturbances, and maintains the equilibrium position of the payload within predetermined limits over a wide range of steady loads and accelerators.

Rolling-type spacers in the form of steel balls retained in appropriate sleeves affixed at intervals to the exterior of the transfer line facilitate the installation of a vacuum-jacketed line. They act as standoffs to position the transfer line concentrically within the vacuum jacket line.

Single molding process ensures that plastic parts of a given mechanical design produced from a conventional thermosetting molding compound will have a maximum tensile strength. The process can also be used for other thermosetting compounds to produce parts with improved physical properties.

Bearing designs, which shape the surface to create artificial fluid-film wedges in the absence of any applied radial load, generate radial restoring forces to keep journals from whirling. Helical- or herringbone-grooved journals or rotors show most promise of stable operation, with no sacrifice in load capacity.

Roll diffusion bonding of titanium alloy panels exhibits excellent strength characteristics under tensile and compressive loads. This program is applied to structures in which weight/strength ratio and integral construction are important considerations.

Hot-gas seal prevents warpage tendencies in large flange joints exposed to high temperatures, such as those present in large space vehicle engine exhausts. Two Inconel wire mesh cores are held in place by an asbestos cloth cover that acts as a spacer to form the seal.

Rolling element bearings in spacecraft mechanical systems use solid lubricant composites of polytetrafluoroethylene in the bearing cage which functions as the lubricant reservoir. The cage spaces the rolling elements equally and provides the lubricant at the bearing load-carrying surface.

Ballast for underwater structure consists of a reinforced concrete structure partitioned into watertight compartments. The barge structure includes a 3-way venting valve, a compressed air manifold, a master valve for connecting the manifold to an air line, and an open port in each compartment for admitting and expelling sea water.

Squeeze-film bearing is studied to develop a low-friction suspension for the output-axia gimbal of a single-degree-of-freedom gyroscope. Included are a review of pertinent literature, the theory of squeeze-film lubrication, and design elements.

M-1 steel are suitable as high temperature cage materials for precision bearings. The area of the wear scar in the cage pocket that developed during the test was used as the measure of wear.

The assembly consists of flooded flotation tanks cabled together, equipped with relief valves to equalize pressure as the array ascends and hydrostatic pressure diminishes, and carrying remotely activated welding units.

Gas generation system, used for recovery of submerged objects, generates hydrogen gas by the reaction of sodium with sea water. The assembly consists of flooded flotation tanks cabled together, equipped with relief valves to equalize pressure as the array ascends and hydrostatic pressure diminishes, and carrying remotely activated welding units.

Information compiled on the shock and vibration environment encountered by items and equipment during shipment shows the distribution of drop heights for particular packages, distribution systems, and handling operations. Applications of the data to typical package design problems are discussed.
B68-10222
ASSEMBLY, CHECKOUT, AND OPERATION
OPTIMIZATION ANALYSIS TECHNIQUE FOR
COMPLEX SYSTEMS
/INNOVATOR NOT GIVEN/ DATE- JUN. 1968
M-FS-14105 M-FS-14102 M-FS-14137
Computerized simulation model of a launch vehicle/ground support equipment system optimizes assembly, checkout, and operation of the system. The model is used to determine performance parameters in three phases or modes - /1/ system optimization techniques, /2/ operation analysis methodology, and /3/ systems effectiveness analysis technique.

B68-10225
LASER SYSTEM USED FOR DYNAMIC BALANCING OF GYRO
M-FS-12218
System using a pulsed ruby laser balances or trims gyro rotors spinning at speeds of up to 24,000 rpm. It is designed to detect high spots on the spinning rotor and to focus a precisely timed laser beam on these detected spots.

B68-10229
EFFECT OF SURFACE IRREGULARITIES ON BELLOWS FATIGUE LIFE
SCHMIDT, E. H. SHEAFFER, E. F. TURNER, J. D.
ZEIMER, R. L. /N. AM. ROCKWELL CORP./ DATE- JUL. 1968
M-FS-14490
Report presents test data on the bending fatigue life of notched sheet specimens. The influence of a surface irregularity on the fatigue life of a metal bellows is evaluated, with emphasis on accidental defects in ducting bellows which are impossible to avoid short of completely eliminating human contact.

B68-10235
TUBE SWAGING DEVICE USES EXPLOSIVE FORCE
MC SMITH, D. G. /DATE- JUL. 1968
LANGLEY/10092
Tool joins a sleeve to a tube by explosive swaging, thus providing a leakproof, lightweight, and strong assembly. No new or different material is used in this method and therefore the thermal and galvanic properties are maintained.

B68-10237
DUAL RATE PRESSURE RELIEF VALVE
STEENEKEN, J. /GARRETT CORP./ DATE- JUL. 1968
MSC-11606
Pressure relief valve vents at a slow bleed rate at one pressure level and at a high bleed rate at a higher pressure level. The valve housing contains a sleeve, inlet port, outlet port, an orifice, a ball and seat arrangement, and a Belleville spring diaphragm.

B68-10239
MANUAL OF INDUSTRIAL DIAMONDS PLUS DRESSING AND GRINDING CRITERIA FOR MACHINING SUPERALLOYS
CARR, W. L. /N. AM. ROCKWELL CORP./ DATE- JUL. 1968
M-FS-14582
Manual combines important and controlling factors for the proper selection and use of diamond stones for cutting and dressing grinding wheels. This manual is a compilation of empirical data and incorporates an original companion treatise on the physical description of the diamond stones, their grading, and their applications.

B68-10247
DYNAMICALLY STABLE CHECK VALVE CONCEPT FOR WIDE FLOW RANGE
ABSALON, J. G. /N. AM. ROCKWELL CORP./ DATE- JUL. 1968
M-FS-14079
Poppet-type check valve design accommodates a wide flow range without the usual chatter problem at low flow conditions. This pressure isolation check valve is proposed for the J-2 rocket pneumatic package.

B68-10248
TENSILE TESTING GRIPS ENSURE UNIFORM LOADING OF BIMETAL TUBING SPECIMENS
DRISCOL, S. D. HUNT, V. /AEROJET-GEN. CORP./ DATE- SEP. 1968
LEWIS-10267
Tensile testing grip uniformly distributes stresses to the internal and external tube of bimetal tubing specimens. The grip is comprised of a slotted external tube grip, a slotted internal tube grip, a machine bolt and nut, an internal grip expansion cone, and an external grip compression nut.

B68-10249
HIGH-TEMPERATURE BEARING LUBRICANTS
ANDERSON, W. J. PARKER, R. J. ZARETSKY, E. V. DATE- SEP. 1968
LEWIS-10466
Synthetic paraffinic oil lubricates ball bearings at temperatures in the 600 degrees F range. The lubricant contains antiwear and antifoam additives, is thermally stable in the high temperature range, but requires protection from oxygen.

B68-10250
QUICK-ATTACH CLAMP
VANG, A. L. /DATE- JUL. 1968
XFR-05421
Clamp of the slideable jaw type can be applied to moving lines such as cables or ropes. The clamp has a trigger-operated jaw that can be attached to a redrop parachute on a moving tow cable. The trigger mechanism maintains the jaw retracted in the housing until they are released for clamping.

B68-10257
INSPECTION CRITERIA ENSURE QUALITY CONTROL OF PARALLEL GAP SOLDERING
BURKA, J. A. /SPACEC, INC./ DATE- JUL. 1968
M-FS-14530
Investigation of parallel gap soldering of electrical leads resulted in recommendation on material preparation, equipment, process control, and visual inspection criteria to ensure reliable solder joints. The recommendations will minimize problems in heat-dwell time, amount of solder, bridging conductors, and damage of circuitry.

B68-10261
DYNAMIC-RESERVOIR LUBRICATING DEVICE
M-FS-14652
Dynamic-reservoir lubricating device supplies controlled amounts of lubricating oil to ball bearings during operation of the bearings. The dynamic reservoir lubricating device includes a rotating reservoir nut, a hollow cylinder filled with lubricating oil, flow restrictors and a ball bearing retainer.

B68-10266
SHOCK-ABSORBING CASTER WHEEL IS SIMPLE AND COMPACT
KINDLEY, R. J. DATE- JUL. 1968
SAN-10919
Compact shock-absorbing caster wheel mitigates or absorbs shock by a compressible tire which deforms into a cavity between its inner edge and the wheel hub. A tee-shaped annular ring embedded in the tire distributes loads more uniformly throughout both wheel and tire.

B68-10270
SPIRAL-GROOVED SHAFT SEALS SUBSTANTIALLY REDUCE LEAKAGE AND WEAR
LEWIS-10397
Rotating shaft seals used in space power systems have spiral grooves in one or both of the opposing seal faces. These grooves induce a pumping action which displaces the intervening fluid radially inward toward the shaft and counters the centrifugal forces which tend to displace the
between the pump bearings, reduces the shaft overhang length and overall turbopump length. This arrangement of the components in the pump removes the seals from the hot turbine region.

B68-10295
VENTURI METER WITH SEPARABLE DIFFUSER
DUDZINSKI, T. J. JOHNSON, R. C. KRAUSE, L. N.
LEWIS-1043
The diffuser and nozzle of venturi meters are made as separate pieces for easier fabrication. Venturi meter efficiency is affected by the diffuser inlet diameter being greater than two percent larger than the throat diameter, by Reynolds number and by mach number.

B68-10297
PREPARING ROCK POWDER SPECIMENS OF CONTROLLED SIZE DISTRIBUTION
BLUM, P. /MORTON RES. CORP./ DATE- AUG. 1968
NPD-10007
Apparatus produces rock powder specimens of the size distribution needed in geological sampling. By cutting grooves in the surface of the rock sample and then by milling these shallow, parallel ridges, the powder specimen is produced. Particle size distribution is controlled by changing the height and width of ridges.

B68-10299
HIGH-TORQUE POWER WRENCH, A CONCEPT
COL, E. F. /N. AM. ROCKWELL CORP./ DATE- AUG. 1968
M-FS-18194
High-torque power wrench is small enough to be handled by one or two men yet has sufficient torque to remove 1-1/2- to 4-inch nuts from high-pressure tanks and valves. The action can be made automatic by use of solenoid-operated valves and suitable switches.

B68-10300
CONCEPTUAL HERMETICALLY SEALED ELBOW
ACTUATOR
WIENSCHE, H. F. DATE- AUG. 1968
M-FS-14710
Electrically or hydraulically powered, hermetically sealed and actuated elbow deflects mechanical members over a range of plus or minus 180 degrees. The actuator design provides incremental flexures which keep the local deflection rate within elastic limits.

B68-10318
COMPRRESSIBLE SLEEVE PROVIDES AUTOMATIC CENTERING FOR GRINDING OR TURNING OF CYLINDERS
ROHMER, J. A. DATE- AUG. 1968
SAN-10021
Electromeric sleeve supported on a threaded mandrel automatically centers cylindrical castings for grinding or turning. By expanding the diameter of the sleeve with pressure against the ends, the casting becomes rigidly supported and the machining operation can be completed.

B68-10338
ELECTRON BEAM SELECTIVELY SEALS POROUS METAL FILTERS
SNYDER, J. A. /HUGHES AIRCRAFT CORP./ TULISIAK, G.
DATE- SEP. 1968
LEWIS-10162
Electron beam welding selectively seals the outer surfaces of porous metal filters and impedances used in fluid flow systems. The outer surface can be sealed by melting a thin outer layer of the porous material with an electron beam so that the melted material fills all surface pores.

B68-10343
X-RAY FILM HOLDER PERMITS SINGLE CONTINUOUS PICTURE OF TUBING JOINT
DIAMOND, J. W. MUNN, V. M. BUECHE, C. /AEROJET-GEN. CORP./ DATE- SEP. 1968
LEWIS-10362
X-ray technique produces a clear continuous picture of a welded brazed tubing joint on a single film with one exposure. A stationary X-ray source located in the plane of the joint to be inspected, a means of rotating the tube, and a unique internal film holder and positioning fixture are used.

B68-10364
MACHINING TECHNIQUE PREVENTS UNDERCUTTING IN TENSILE SPECIMENS
MOSCATER, R. E. KOYSTER, D. M. DATE- SEP. 1968
LANGLEY-10281
Machining technique prevents undercutting at the test section in tensile specimens when machining
the four corners of the reduced section. Made with a gradual taper in the test section, the width of the center of the tensile specimen is less than the width at the four corners of the reduced section.

B68-10353
SHOCK AND VIBRATION RESPONSE OF MULTISTAGE STRUCTURE
M-FS-14972
Study of the shock and vibration response of a multistage structure employed analytically, lumped-mass, continuous-beam, matrix, and matrix-iteration methods. The study was made on the load paths, transmissibility, and attenuation properties along a longitudinal axis of a long, slender structure with increasing degree of complexity.

B68-10359
REMOtELY OPERATED GRIPPER PROVIDES VERTICAL CONTROL ROD MOVEMENT
HUTTER, E. KUCH, L. J. DATE- SEP. 1968
ARG-10160
Remote actuation of a gripper shaft affects vertical engagement between a drive shaft and control rod. A secondary function of the gripper is to provide remote indication of positive completion of the gripping or ungripping operation.

B68-10371
VERSATILE IMPACT HAND TOOL
HODIL, E. R. /OLIN WINCHESTER/ DATE- OCT. 1968
M-FS-20140
Improved cartridge-actuated impact hand tool includes a common power head and four attachments to punch holes, drive forced entry fasteners, hammer, and shear. The attachments are self-contained and easily fitted to the power head assembly.

B68-10372
IMPROVED ELECTROMECHANICAL MASTER-SLAVE MANIPULATOR
ARG-10267
Electric master-slave manipulator uses force multiplication and allows the operator to remotely control the slave arm. Both the master and slave arms execute seven distinct motions by a specially designed force-reflecting servo having a one to one correspondence between the motion at the master and slave.

B68-10383
EFFECTS OF HIGH FREQUENCY CURRENT IN WELDING ALUMINUM ALLOY 6061
FISH, R. E. /N. AM. ROCKWELL CORP./ DATE- OCT. 1968
M-FS-18337
Uncontrolled high frequency current causes cracking in the heat-affected zone of aluminum alloy 6061 weldments during tungsten inert gas arc welding. Cracking developed when an improperly adjusted superimposed high frequency current was agitating the semisolid metal in the areas of grain boundary.

B68-10387
MINIATURE PAINT-SPRAY GUN FOR RECESSED AREAS
VANASSE, W. A. /N. AM. ROCKWELL CORP./ DATE- OCT. 1968
MSC-13660
Miniature spray gun regulates paints and other liquids to spray at close range, facilitating spraying of remote or recessed areas. Individual valves for regulating air pressure and paint maximizes atomization for low pressure spraying.

B68-10393
DETERMINING GAS LEAKAGE FROM BUBBLE FORMATIONS
DECASTRA, J. E. WELLS, P. E. DATE- OCT. 1968
M-FS-14481
Gas leakage rates are quantitatively estimated using threaded and flanged fittings by standardizing bubble appearance. Three classes of bubble formations have been proposed.

B68-10395
DESIGN OF FLUID-DUCT BENDS WITH LOW PRESSURE LOSSES
GERLACH, R. /SOUTHWEST RES. INST./ DATE- OCT. 1968
M-FS-14976
Duct bends are designed in which pressure losses and velocity profile distortions due to centrifugal force gradients are significantly reduced. The correction is achieved by properly changing the cross sectional area through the bend without affecting the shape of the duct at the upstream and downstream sides.

B68-10398
BATTERY-PACKAGE DESIGN PROVIDES FOR CELL COOLING AND CONSTRAINT
GRUNE, S. /BOEING CORP./ DATE- OCT. 1968
MSC-11839
Lightweight battery-package provides for even cooling of individual alkaline cells, constraint against cell expansion, and convenient placement of cells. The battery package also provides for venting of the cells and includes instrumentation to measure cell temperature, pressure, and voltage.

B68-10401
COMPACT MONITORING AND CONTROL CONSOLE FOR PRESSURIZED GAS BOTTLES
FREEMAN, B. PILICHI, C. A. /N. AM. ROCKWELL CORP./ DATE- NOV. 1968
M-FS-14497
Compact monitoring and control console dispenses gas over a range of pressures from conventional compressed-gas cylinders. It incorporates in a single assembly the necessary equipment for a portable pressurization system that can be used in welding and other operations requiring a controlled gas supply.

B68-10407
AN INVESTIGATION OF PARTICLE MIXING IN A GAS-FLUIDIZED BED
CARLSON, R. E. GABOR, J. B. DATE- DEC. 1968
ARG-10182
Mechanism for particle movement in gas-fluidized beds was studied both from the theoretical and experimental points of view. In a **two-dimensional** fluidized bed particle trajectories were photographed when a bubble passed through.

B68-10417
HAND-TIGHTENED, HIGH-PRESSURE SEAL
MCGIRY, W. R. /N. AM. ROCKWELL CORP./ DATE- DEC. 1968
M-FS-18416
To provide flared tubing and hose connections for high-pressure hand tightened cryogenic service, a 1/4-inch male AN seal was modified by machining to receive a special, double-truncated-cone-shaped Kel-F washer between it and the flared flex hose connector.

B68-10439
HYDROSTATIC TESTING OF POROUS ASSEMBLIES
BICELOW, W. L. /N. AM. ROCKWELL CORP./ DATE- DEC. 1968
M-FS-18298
Pores of the material were plugged with dust particles suspended in water. The plugging material used was a standard test dust prepared as a slurry in distilled water. This technique provides a permanent high-integrity seal for porous material without affecting its physical properties, yet permitting pressure testing to verify structural adequacy.

B68-10440
LOW FRICTION SERVO VALVE
DUSTIN, M. O. DATE- NOV. 1968
LEWIS-10574
Valve was developed using air bearings which
provide frictionless operation. The servo valve is of the flat plate type with rectangular meter openings. Fluid bearings support the metering plate. The overlap is adjustable by means of a variable hinge block support.

B68-10441
LOW COST TECHNIQUES FOR FABRICATING LOBED BEARINGS
SCHULLER, F. T. DATE- NOV. 1968
LEWIS-10296
New low cost technique utilizes shims to create the lobes in bearing. Conventional methods of manufacture require accurate off-center grinding of the inside diameter of a bearing in a housing at various arc lengths depending on the number of lobes required.

B68-10442
AIR BEARING LIFT PAD /ABLP/
BLAISE, H. T. DANE, D. H. DATE- DEC. 1968
M-FS-14605
ABLP is a hybrid between the precision air bearings and hovercraft vehicles. The ABLP floats above the surface to clear cracks, roughness, and unevenness with the almost nonexistent friction of precision air pads.

B68-10444
COAXIAL CABLE STRIPPER FOR CONFINED AREAS
BROWN, J. B. LIPSCOMB, W. G. /BOEING CO./ DATE- NOV. 1968
KSC-10167
Manual coaxial cable stripper quickly and accurately prepares a coaxial cable in a confined area. With this tool, preparation time is greatly reduced, and a completely inexperienced technician can perform the operation.

B68-10503
FLUID POWER-TRANSMITTING GAS BEARING
COLLING, D. DE FURIA, R. EZEKIEL, P. YANG, P. DATE- NOV. 1968
ERC-10097
Fluid power-transmitting gas bearing was designed that is essentially frictionless, stable, and highly efficient. The two basic components of this design are the base assembly and the upper plate. System could be a fluidic control system, a momentum exchange or reaction jet device.

B68-10507
ELECTRONIC COMPONENT RELIABILITY ANALYSIS
BY DATA REDUCTION SYSTEM
DIHM, A. H. HUNT, D. G. /BOEING CO./ DATE- NOV. 1968
NPD-10243
Mechanized data reduction system has been designed to take advantage of the data handling capacity of computers and to reduce voluminous and unrelated test and performance data to a format useful for the rapid analysis of electronic component reliability.

B68-10509
ROTARY-KNIFE STRIPPER FACILITATES REMOVAL OF X-RAY FILM FROM PACK
MITCHELL, D. K. /BOEING CO./ DATE- NOV. 1968
M-FS-14837
Rotary-knife stripper facilitates removal of X-ray film from the daylight pack paper sleeve. The new stripper is rectangular, approximately 4 inches wide, 6 inches high, and 7 inches long.

B68-10512
BOYDBOLT, A POSITIVE-LATCH, SIMPLE-RELEASE FASTENER
BRUEGER, J. FENSTE, T. HAMILT, W. KATZ, M. /MENDICIA CORP./ DATE- NOV. 1968
MSC-10601
Fastener /Boydbolt/ has recently been designed to furnish positive lock and release characteristics that positively prevent accidental adverse functions of lock or release.

B68-10515
FATIGUE OF REINFORCED CONCRETE BEAMS UNDER DYNAMIC LOADING
CHEN, C. C. /AVLIE LABS./ DATE- NOV. 1968
M-FS-14900
Study, consisting of a literature survey and experiments, determined the strength properties of reinforced concrete beams subjected to vibrational stresses.

B68-10530
VERTICAL BORING MILL CAPACITY IS INCREASED
YOUNG, R. J. /AM. ROCKWELL CORP./ DATE- NOV. 1968
M-FS-16196
Commercially available vertical boring mill with a nominal capacity to 27 feet in diameter of workpiece has been modified in-shop to handle work up to 36 feet in diameter. Capacity was increased by adding extension saddles to the mill support columns on each side.

B68-10531
DESIGN ELIMINATES RADIAL THERMAL EXPANSION IN TURBINE STATOR COMPONENTS
ANDERSON, M. J. DIETRICH, J. A. /AM. ROCKWELL CORP./ DATE- NOV. 1968
M-FS-10146
Stress levels created in turbine stator components because of differential thermal expansion was eliminated by incorporation of a semifloating design, in which the stator vanes are retained by the outer ring assembly and radially piloted in the inner ring.

B68-10534
IMPROVED THERMAL TREATMENT OF ALUMINUM ALLOY 7075
CUCKS, F. H. /TYCO LABS./ DATE- DEC. 1968
M-FS-20083
Newly developed tempering treatment considerably increases the corrosion resistance of 7075-T6 alloy and concomitantly preserves its yield strength. The results of tests on samples of the alloy subjected to the above treatments show that when the overaging period is 12 hours /at 325 degrees F/, the alloy exhibits a yield strength of 72,000 psi.

B68-10535
PYROTECHNIC-ACTUATED CABLE RELEASE
HANSON, R. W. DATE- DEC. 1968
XNP-10849
Remote, unattended means has been designed and reduced to practice that retains and then releases an attached load by means of a restrained cable. The cable is released by an electrical impulse on signal.

B68-10537
FLUIDIC TRANSDUCER GIVES PRESSURE OUTPUT AS FUNCTION OF TEMPERATURE
WALL, R. /MARTIN CO./ DATE- DEC. 1968
SEE ALSO B68-10538
ERC-10093
Fluidic transducer gives a pressure output signal that is a direct function of the differential temperature sensed by the device. The transducer is arranged as a bridge.

B68-10538
FLUIDIC ANALOG AMPLIFIER
MC KENZIE, C. P. /MARTIN CO./ DATE- DEC. 1968
SEE ALSO B68-10537
ERC-10102
Five-stage, high-gain, push-pull fluidic amplifier provides increased range and improved linearity. The fluidic amplifier was designed to operate in conjunction with a fluidic transducer.

B68-10540
TUBE JOINT LEAK REPAIR COUPLING
FERGUSON, W. B. /AM. ROCKWELL CORP./ DATE- DEC. 1968
MSC-15022
Tube joint leak repair coupling consists of 2 split seals, 1 male split nut, 1 female split nut, and two aligning pins. Each split nut consists of 2 half-shell sections which, when engaged, are held together by a dovetail joint and an aligning pin.
B68-10549
HIGH-TORQUE PRECISION STEPPING DRIVE
KASPAreck, W. E. DATE- NOV. 1968
MPS-14772
Stepping drive has been designed for precise incremental angular positioning of scale models of spacecraft about a horizontal axis in order to accurately measure antenna receiving characteristics. Positioning is insured by spring-loaded, self-locking plungers.

B68-10550
CONTACT-SPRING FORMING MACHINE FOR FLAT CONDUCTOR CABLE RECEPACTILES
ANGELE, W. MARTINECK, H. G. DATE- DEC. 1968
SEE ALSO NASA-SP-5043
MPS-20126
Machine tool produces beryllium-copper contact springs for FCC flat conductor cable/ feed-through receptacles. The springs are heat-treated and plated to impart the required electrical contact properties.

B68-10561
WELD PREPARATION TOOL FOR PIPES AND TUBING
WALLACE, E. D. DATE- DEC. 1968
KSC-09955
Improved scarfing tool consists of a mount-table, roller-guided assembly. It converts a conventional routing machine for relatively precise field preparation of pipes for welding.

B68-10567
RADIAL INFLOW TURBINE DESIGN CHARTS
ROHLIK, H. L. DATE- DEC. 1968
LEWIS-10720
Design charts were prepared for the selection of turbine geometry corresponding to maximum turbine efficiency. Optimum values can be determined as functions of specific speed.

B68-10579
HOISTING FRAME FACILITATES HANDLING OF LARGE OBJECTS
COLPEAN, K. V. HOLCOMB, D. F. /N. AM. ROCKWELL
CMD.- DATE- DEC. 1968
MPS-16166
Hoisting frame can be used with a standard 5-ton forklift to handle the large spreader bars, or other bulky pieces of equipment, much faster and more efficiently than with a boom or gantry crane. In addition forklifts of this type are more readily available.

06 COMPUTER PROGRAMS

B68-10005
MOP /MATRIX OPERATION PROGRAMS SYSTEM/
MULLER, P. M. DATE- JAN. 1968
NPD-10429
MOP /Matrix Operation Programs/ system consists of a set of FORTRAN 4 subroutines which are related through a small common allocation. The system accomplishes all matrix algebra operations plus related input-output and housekeeping details.

B68-10006
COMPUTER PROGRAM PERFORMS FREQUENCY ANALYSIS OF NONUNIFORM TURBINE DISC SUBJECTED TO TEMPERATURE GRADIENTS
SOO, P. P. /AEROJET-GEN. CORP./ DATE- JAN. 1968
NOC-10361
Computer program determines the natural frequencies of a turbine disk of variable thickness subjected to uniform rotation and radial temperature gradients by using *Rayleigh-Ritz* procedure. The program involves the potential and kinetic energy expressions for a circular flat plate of variable thickness.

B68-10009
COMPUTER PROGRAM CALCULATES AND PLOTS SURFACE AREA AND PORE SIZE DISTRIBUTION DATA
HALPERT, G. DATE- MAY 1968
GD/-P362
Computer program calculates surface area and pore size distribution of powders, metals, ceramics, and catalysts, and prints and plots the desired data directly. Surface area calculations are based on the gas adsorption technique of Brunauer, Emmett, and Teller, and pore size distribution calculations are based on the gas adsorption technique of Pierce.

B68-10025
COMPUTER PROGRAM FOR INTERPLANETARY CONIC PATCHING
DAVIS, D. A. /BOEING CO./ DATE- FEB. 1968
MPS-14296
Computer program enables study of one-way transfers, single and double planet flybys, single and double planet stopovers, or mixed flyby and stopover trajectories. In each operation it first computes the heliocentric conic which connects the centers of the launch and target planets and requires a given trip time.

B68-10044
GENERAL COMPUTER PROGRAM FOR CALCULATION OF RADIATION FROM INHOMOGENEOUS, NONISOBARIC, NONISOTHERMAL ROCKET EXHAUST PLUME
DASH, M. J. HUFFAKER, R. M. DATE- FEB. 1968
MPS-14314
Computer program evaluates radiation from an axisymmetric gas body with water vapor, carbon dioxide, carbon monoxide, and solid carbon particles as radiating constituents, and hydrogen as a nonradiating constituent. The program provides a convenient method of evaluating a great many problems of radiation from rocket exhaust plumes.

B68-10045
CONCEPT FOR SIMPLIFIED SERIAL DIGITAL DECORDER
GREEN, R. R. DATE- FEB. 1968
NPD-10570
Modular decoder, which lends itself best to special purpose digital equipment using sequential access memories, decodes the first order Reed-Muller codes. It functions as a maximum-likelihood exhaustive-search decoder and is a modular implementation to accommodate codes of any length.

B68-10056
SITE SURVEY FOR OPTIMUM LOCATION OF OPTICAL COMMUNICATION EXPERIMENTAL FACILITY
INNOVATOR NOT GIVEN /SYLVANIA ELECTRON. SYSTEMS-EAST/ DATE- MAR. 1968
MPS-13155
Site survey was made to determine the optimum location for an Optical Communication Experimental Facility /OCIF/ and to recommend several sites, graded according to preference. A site was desired which could perform two-way laser communication with a spacecraft and laser tracking...
66 COMPUTER PROGRAMS

with a minimum of interruption by weather effects.

B68-10056
THREAD CUTTING WITH 3-AXIS N/C MILLING MACHINE
SALLEY, G. C., WOOD, C. H., JR. DATE- MAR. 1968

LANGELEY-1017
TAPDR, a generalized macro written for the APT numerical control system, cuts threads in stock too big for conventional machines or for which conventional methods are unsuitable. TAPDR computes the machine tool path necessary and the information is passed on to a post-processor which produces a control tape.

B68-10096
COMPUTER PROGRAM PERFORMS STIFFNESS MATRIX
STRUCTURAL ANALYSIS
BAMFORD, R., BATELDER, R. SCHMIELE, L. WADA, B. K. DATE- APR. 1968
NPO-10502
Computer program generates the stiffness matrix for a particular type of structure from geometrical data, and performs static and normal mode analyses. It requires the structure to be modeled as a stable framework of uniform, weightless members, and joints at which loads are applied and weights are lumped.

B68-10097
COMPUTER PROGRAM CALCULATES VELOCITIES AND STREAMLINES IN TURBOMACHINES
LEWIS-10252
Computer program calculates the velocity distribution and streamlines over widely separated blades of turbomachines. It gives the solutions of a two dimensional, subsonic, compressible nonviscous flow problem for a rotating or stationary circular cascade of blades on a blade-to-blade surface of revolution.

B68-10127
AUTOMATIC PLANNING CONCEPT - AN ANALYSIS OF OPTIMUM SCHEDULING
REBELEIN, P. N. TRUENBELS, P. /HONEYWELL, INC./ DATE- MAR. 1968
M-10-1498
Study considers resource costs, mission constraints, and experiment results as linear functions, insofar as possible, in an effort to develop optimum scheduling by the use of linear programming. It involves a mathematical approach in which a number of constraints are considered operative.

B68-10137
COMPUTER PROGRAM CONDUCTS FACILITIES UTILIZATION AND OCCUPANCY SURVEY
NPO-10439
Computer program identifies the uses of all facilities and provides information on the net area in each room as well as the number and classification of people occupying them. The system also provides a means to indicate unsatisfactory work areas and may be able to be updated each month.

B68-10139
COMPUTER PROGRAM AIDS DUAL REFLECTOR ANTENNA SYSTEM DESIGN
FIRMETT, P. GERRITSEN, R. JAVIE, P. /INFORMATICS, INC./ LUDWIG, A. DATE- APR. 1968
NPO-10501
Computer program aids in the design of maximum efficiency dual reflector antenna systems. It designs a shaped Cassagranian antenna which has nearly 100 percent efficiency input and output variables specifying an existing conventional antenna and produces as output the modifications necessary to conform to a shaped design.

B68-10150
COMPUTER PROGRAMS FOR THERMODYNAMIC AND TRANSPORT PROPERTIES OF HYDROGEN
HALL, W. J. MC CARTY, R. B. RODER, H. M. /NATL. BUR. OF STD./ DATE- MAY 1968

NLC-10557
Computer program subroutines provide the thermodynamic and transport properties of hydrogen in tabular form. The programs provide 18 combinations of input and output variables. This program is written in FORTRAN 4 for use on the IBM 7044 or CDC 3600 computers.

B68-10158
COMPUTER PROGRAM DETERMINES EXACT TWO-SIDED TOLERANCE LIMITS FOR NORMAL DISTRIBUTIONS
M-10-18045
Computer program determines by numerical integration the exact statistical two-sided tolerance limits, when the proportion between the limits is at least a specified number. The program is limited to situations in which the underlying probability distribution for the population sampled is the normal distribution with unknown mean and variance.

B68-10159
COMPUTER PROGRAM DETERMINES VIBRATION IN THREE-DIMENSIONAL SPACE OF HYDRAULIC LINES EXCITED BY FORCED DISPLACEMENTS
DODGE, W. G. /N. AM. AVIATION/ DATE- MAY 1968
M-10-12226
Computer program determines the forced vibration in three dimensional space of a multiple degree of freedom beam type structural system. Provision is made for the longitudinal axis of the analytical model to change orientation at any point along its length. This program is used by industries in which structural design dynamic analyses are performed.

B68-10164
DIGITAL FILTER SYNTHESIS COMPUTER PROGRAM
MOYER, R. A. MUNOZ, R. M. DATE- MAY 1968
ARC-10130
Digital filter synthesis computer program expresses any continuous function of a complex variable in approximate form as a computational algorithm or difference equation. Once the difference equation has been developed, digital filtering can be performed by the program on any input data list.

B68-10187
ELAS - A GENERAL PURPOSE COMPUTER PROGRAM FOR THE EQUILIBRIUM PROBLEMS OF LINEAR STRUCTURES
AKYUZ, F. A. UTKU, S. DATE- JUN. 1968
NPO-10508
Digital computer program ELAS handles the equilibrium problems of linear structures of one, two, or three dimensional continua. ELAS generates the governing equations for the unknown deflections of the mesh points that define the stationary point of the total potential energy function associated with the given loading and unknown deflections.

B68-10193
DIGITAL FILTER SUPPRESSES EFFECTS OF NONSTATISTICAL NOISE BURSTS ON MULTICHANNEL SCALER DIGITAL AVERAGING SYSTEMS
GOODMAN, L. S. SALTER, F. O. DATE- JUN. 1968
ARC-90143
Digital filter suppresses the effects of nonstatistical noise bursts on data averaged over multichannel scaler. Interposed between the sampled channels and the digital averaging system, it uses binary logic circuitry to compare the number of counts per channel with the average number of counts per channel.

B68-10208
JPKWIC - GENERAL KEY WORD IN CONTEXT AND SUBJECT INDEX REPORT GENERATOR
JIRKA, R. KABASHIMA, N. KELLY, D. PLESSET, H. DATE- JUN. 1968
NPO-10580
JPKWIC computer program is a general key word in context and subject index report generator specifically developed to help nonprogrammers and nontechnical personnel to use the computer to
access files, libraries and mass documentation. This program is designed to produce a KWIC index, a subject index, an edit report, a summary report, and an exclusion list.

**B68-10216**

**COMPUTER PROGRAM DETERMINES SYSTEM STABILITY /DIGITA/**

LORENZO, C. F. SCALZOTT, L. L. DATE- JUN. 1968

LEWIS-10395

Computer program implements a stability criterion that can be applied directly to the numerical solutions of systems of differential equations. The program accepts as input the time function of the system, a time to view the transient, and an acceptable amplitude boundary for any steady-state oscillation.

**B68-10217**

**COMPUTER PROGRAM OFFERS NEW METHOD FOR CONSTRUCTING PERIODIC ORBITS IN NONLINEAR DYNAMICAL SYSTEMS**


M-FS-14654

Computer program uses an iterative method to construct precisely periodic orbits which dynamically approximate solutions that converge to periodic solutions in the limit of the sequence. The method used is a modification of the generalized Newton-Raphson algorithms used in analyzing two point boundary problems.

**B68-10226**

**COMPUTER PROGRAM ANALYZES BUCKLING OF SHELLS OF REVOLUTION WITH VARIOUS WALL CONSTRUCTIONS, BOSOR**


LANGLEY-10290

Computer program performs stability analyses for a wide class of shells without unduly restrictive approximations. The program uses numerical integration, finite difference of finite element techniques to solve with reasonable accuracy almost any buckling problem for shells exhibiting orthotrophic behavior.

**B68-10227**

**SEAL /SUBNETWORK ENUMERATION AND LISTING/ HADDENAU, K. H. MC MILLEN, G. C. /BOEING CO./**

DATE- AUG. 1968

M-FS-14659

Graphics data conditioning program expedites graphic data processing, in a matter of a few months at very moderate cost. Such a system lends itself to continuous refinement.
lags and will perform calculations for contoured and conical nozzles.

B68-10376
ONE-DIMENSIONAL REACTING GAS NONEQUILIBRIUM PERFORMANCE PROGRAM

MSC-11777
Computer program calculates the inviscid one-dimensional equilibrium, frozen, and nonequilibrium nozzle expansion of gaseous propellant exhaust mixtures containing the elements - carbon, hydrogen, oxygen, nitrogen, fluorine and chlorine. The program performs calculations for conical nozzles only.

B68-10376
ONE-DIMENSIONAL TWO-PHASE REACTING GAS NONEQUILIBRIUM PERFORMANCE PROGRAM

MSC-11780
Computer program calculates the inviscid one-dimensional equilibrium, frozen, and nonequilibrium nozzle expansion of propellant exhaust mixtures containing carbon, hydrogen, oxygen, nitrogen, fluorine, chlorine and either aluminum, beryllium, boron or lithium. This program performs calculations for conical nozzles only.

B68-10377
AXISYMMETRIC REACTING GAS NONEQUILIBRIUM PERFORMANCE PROGRAM

MSC-11781
Computer program calculates the inviscid one-dimensional equilibrium, frozen, and nonequilibrium nozzle expansion of propellant exhaust mixtures containing these six elements - carbon, hydrogen, oxygen, nitrogen, fluorine, and chlorine plus either aluminum, beryllium, boron or lithium. This program performs calculations for contoured and conical nozzles.

B68-10403
INTERNAL VELOCITY FACTORS

MSC-15002
Computer program analyzes the entries and planetary trajectories of space vehicles. It obtains the equivalence of altitude and flight path angle, respectively, to acceleration load factor with respect to velocity for a given inertial velocity.

B68-10405
ANALYSIS OF FILAMENT REINFORCED METAL-SHELL PRESSURE VESSELS
LANDES, R. L. MORRIS, E. E. /AEROJET GEN. CORP./ DATE= NOV. 1968

LEWIS-10352
Computer program analyzes design requirements and computes designs for metal-lined filament-wound pressure vessels with either geodesic /helical/ or in-plane filament winding patterns on the cylindrical portion and over the ends, reinforced by circumferential windings on the cylindrical portion.

B68-10410
DSN SEVEN DAY/ELEVEN WEEK SCHEDULE PROGRAM
HOLZMAN, R. E. DATE= DEC. 1968

NPO-10752
Deep Space Network scheduling program allocates resources based on the user's requirements. The system reviews and allocates the requests for equipment and resources. Depending upon the program input either the seven day or the twelve week schedule is generated.

B68-10416
CIRCUS--A DIGITAL COMPUTER PROGRAM FOR

TRANSIENT ANALYSIS OF ELECTRONIC CIRCUITS
MOORE, W. T. STEINMETZ, L. L. /BOEING CO./ DATE= DEC. 1968

M-53-15002
Computer program simulates the time domain response of an electronic circuit to an arbitrary forcing function. CIRCUS uses a charge-control parameter model to represent each semiconductor device. Given the primary photocurrent, the transient behavior of a circuit in a radiation environment is determined.

B68-10421
COMPUTER PROGRAM FOR MACHINE DESIGN OF CASSEGRAIN FEED SYSTEMS
POTTER, F. D. DATE= NOV. 1968

NPO-10588
Program designs the feed system geometry and the subreflector surface, with the main reflector configuration and frequency of operation as input data. Although the feedhorn is not designed, its required gain, beamwidth, and approximate radiation pattern are specified.

B68-10422
GENERALIZED NEWTON-RAPHSON TRAJECTORY OPTIMIZATION-GENERATOR 1

M-53-15020
Computer program constructs a sequence of optimal solutions to dynamically-approximate linear equations. Specification of the number and type of subarcs in the optimal solution allows simultaneous satisfaction of all switching criteria.

B68-10423
SYMBOLIC REDUCTION OF BLOCK DIAGRAMS USING FORMAC
LORENZI, C. F. SWIGERT, P. DATE= NOV. 1968

LEWIS-10499
Two computer programs - one written in FORMAC to generate the desired symbolic expressions, the other in FORTRAN 4 to numerically evaluate the expressions are announced. The FORTRAN program accepts the symbolic punched output from the FORMAC program in either unexpanded or expanded form. It numerically evaluates the expressions.

B68-10435
GERT EXCLUSIVE-OR COMBINING PATHS AND LOOPS OF ELECTRICAL NETWORKS
ALAN, A. PRITSKER, R. /ARIZONA STATE UNIV./ DATE= OCT. 1968

ERC-10206
Program takes a network with multi-parameter branches and reduces it to a network having a single branch connecting source nodes to sink nodes. The program calculates probability, expected time, and variance in the time to go from each source node to each sink node of the GERT network.

B68-10445
ENVIRONMENTAL TEST PLANNING, SELECTION AND STANDARDIZATION AIDS AVAILABLE
COPPLEND, E. H. FOLEY, J. T. DATE= DEC. 1968

SAN-10028
Requirements for instrumentation, equipment, and methods to be used in conducting environmental tests on components intended for use by a wide variety of technical personnel of different educational backgrounds, experience, and interests is announced.

B68-10446
MODIFIED MULTIHOP MEAN CAMBER COMPUTER PROGRAM
LAMAR, J. E. DATE= DEC. 1968

LANGLY-10376
Computer program which determines the mean camber surface required to support a given set of loadings on a composite wing in subsonic compressible flow has been developed.

B68-10447
PLUME RADIATION PROGRAM
DE SOTO, S. VOK, C. A. /N. AM. ROCKWELL CORP./
Computer program determines the radiant flux to the base region of a real gas system with an axisymmetric geometry and any axisymmetric property distribution.

Automated statistical and worst case computer program has been designed to perform d.c. and a.c. steady circuit analyses. The program determines the worst case circuit performance by solving circuit equations.

Computer program optimizes the accuracy of pointing a radio-frequency antenna at a target whose position is time varying but known with respect to a certain reference frame.

Computer program called TRACK was developed by combining a transient fluid flow computer code and the existing modified TOSS heat conduction code to perform the computation.

General purpose information retrieval program written entirely in FORTRAN 4 was developed and can be used with any file of fixed format documents. This program is easily used by noncomputer personnel and provides flexibility in search requests and output format.

Computer program determines the longitudinal subsonic aerodynamic characteristics of composite wings. The program uses the basic theoretical method of Multhopp in predicting the loading data.

Flexible, large scale digital computer program was designed for the solution of a wide range of multivariable parameter optimization problems. The program has the ability to solve constrained optimization problems involving up to one hundred parameters.

GERT Simulation Program simulates GERT networks to obtain statistics on specified nodes of the network. It performs sampling experiments to determine which branches of the network are taken and how long it takes to traverse a branch of the network.
**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. B68-10148, is located under and to the right of the title and is followed by a two-digit number, e.g. 03, which designates the subject category in which the entire entry can be found.

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- High temperature alloy
- Dual wire weld feed proportioner
- Electromotive series established for metals used in aerospace technology

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- Analysis and design of a class-D amplifier
- Concept to convert electrical power

AIRCRAFT DESIGN
- Modified Mullthrop lifting surface loading program
- Alternating current electromagnetic servo induction meter

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### HIGH CONDUCTANCE VAPOR THERMAL SWITCH

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### SIGNAL MIXING

- Improved communication system for large operations center
  - M-FS-15016 01

### SIGNAL PROCESSING

- Portable Pulse Code Modulation/PCM
  - MSC-11369 01
- Analysis and design of a class-D amplifier
  - M-FS-14803 01

### SIGNAL TO NOISE RATIOS

- Improved phase locked loop receiver
  - GSFC-09561 01
- Harmonic distortion analyzer speeds setup of magnetic tape recorders
  - GSFC-10198 01
- Acquisition of pseudonoise signals by sequential estimation
  - M-FS-13098 01
- Laser Doppler gas-velocity instrument
  - M-FS-20039 02
- Readout system for radiation detector
  - MSC-90180 01

### SILICATES

- Manganese-alumina-ceramic glass eliminates rigid controls necessary in bonding metals to ceramics
  - SAN-10012 03
- Thermal conductivity and dielectric constant of silicate materials
  - M-FS-14856 03

### SILICON

- Small, low power analog-to-digital converter
  - M-FS-13954 01
- Silicon solar cell monitors high temperature furnace operation
  - NUC-10163 01
- Silicon strain sensors enable pressure measurement at cryogenic temperatures
  - M-FS-14703 01
- Temperature or pressure controller
  - LEWIS-10297 01
- Improved process for epitaxial deposition of silicon on prefused substrates
  - M-FS-14910 03
- Electron beam recrystallization of amorphous semiconductor materials
  - LEWIS-10443 02

### SILICON ALLOYS

- Weld microfissuring in Inconel 718 minimized by minor elements
  - M-FS-10165 03

### SILICON CARBIDES

- UV detector monitors organic contamination of optical surfaces
  - M-FS-20246 01
- Ambient temperature catalyst for hydrogen ignition
  - LEWIS-10501 03

### SILICON DIOXIDE

- Study of behavior of sterols at interfaces
  - ARG-10085 01
- Miniaturized King furnace permits absorption spectroscopy of small samples
  - ARG-10177 02

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NASA-Langley, 1969
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