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ESD-TDR-63-159 Suppl. 1

SR-79
Supplement #1

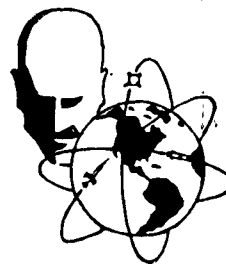
**MARK I EXPERIMENTAL CORPUS AND DESCRIPTOR SET
FOR THE STATISTICAL ASSOCIATION PROCEDURES
FOR MESSAGE CONTENT ANALYSIS**

TECHNICAL DOCUMENTARY REPORT NO. ESD-TDR-63-159 SUPPL. 1

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FOREWORD

This report was prepared from "Mark I Experimental Corpus and Descriptor Set for the Statistical Association Procedures for Message Content Analysis," MITRE SR-79-1, Information System Language Studies, Number 1, by J. Spiegel of the System Sciences Department.

ABSTRACT

This supplement to TDR-63-159 describes the corpus initially used for experiments with the Statistical Association Procedures for Message Content Analysis Program. The ASTIA TABs served as a source from which the initial experimental corpus was drawn. ↑

MARK I EXPERIMENTAL CORPUS AND DESCRIPTOR SET
FOR THE STATISTICAL ASSOCIATION PROCEDURES
FOR MESSAGE CONTENT ANALYSIS

This supplement to MITRE SR-79 describes the corpus initially used for experiments with the Statistical Association Procedures for Message Content Analysis Program.

The original need was for a corpus which could be used readily as an input to the Statistical Association program and which, in addition, had a variety of kinds of messages contained within it. Documents have titles, textual material, and, not infrequently, indexes and abstracts as well. Each can be considered as a type of message representing the document. Because of this variety of potentially useful message forms, we considered it rather important to examine the efficacy of the program for such alternative corpus types.

✓ The Armed Services Technical Information Agency's Technical Abstract Bulletins (ASTIA TABs) served as the source from which we drew our initial experimental corpus. In the ASTIA TABs each document referenced by a TAB contains a title, an abstract, and a set of index terms referred to as descriptors. The material is heterogeneous in terms of subject matter, spanning some 33 major fields of science.^[1] Additionally, the material is available on punched paper tape and can be easily transferred to a computer-compatible magnetic tape. The TABs used do not involve classification with respect to security.

These advantages outweigh the several disadvantages of using the ASTIA TABs. The major disadvantage is that the complete documents themselves are not part of the TAB. Rather, the Technical Abstract Bulletin contains only a series of representations of the document; that is, title, abstract and index term. This, then, restricts our use of the Statistical

¹ Rather than list these fields, the reader is referred to any recent issue of the ASTIA TABs.

Association Procedures on "normal language"^[2] to that contained in the abstract. Although, at the moment, there does not seem to be any evidence that abstract writing is very different from straight textual writing, it does seem reasonable to suppose that there is more information-packing in abstracts.

The two issues used in the present study were ASTIA TAB #U62-1-6, dated 15 March 1962, and ASTIA TAB #U62-2-1, dated 1 April 1962.^[3] The original two TABs contained 1898 individual entries. However, when we transferred the information to the magnetic tape, we found we had received only about 1500 individual entries.

The paper-tape-to-magnetic-tape conversion program was written and executed for us by the IBM Service Bureau on the IBM 1011 Paper Tape Reader, and a printout of the entire unedited corpus was obtained. In writing this conversion program we ran into a series of problems which we solved in an ad hoc fashion. The first arises from the difference in the size of the character set available in the MITRE computer facility and that available with the punched paper tape. The MITRE set contains 47 distinct characters whereas the punched paper tape set contains 95 characters. The paper tape operates in two modes -- shift and unshift -- thus providing it with the additional characters. One must select from this larger set that subset of symbols most useful for the problem at hand.

A comparison of the paper tape character set compared to the MITRE set for its computer facility is shown in Fig. 1. It should be noted that for some characters we duplicate a previously used character. We

²By "normal language" corpus, we mean writing which has sentential structure and is textual in form.

³These were obtained from the Office of Technical Services, United States Department of Commerce in punched paper tape form. The Office of Technical Services is responsible for the release of the unclassified portions of the ASTIA TABs to the public.

do this because the proper or correct character can be readily determined by the context. For example, the MITRE set does not include the % sign; we use instead the \$ sign.

The paper tape is generated by ASTIA for printing purposes. As a result, it contains printing instructions which add to the complexity of the conversion program; examples of such instructions are "PRINT RESTORE," "STOP CODE," etc. Fig. 2 shows a sample of the unedited printout we obtain directly from the conversion program. This printout program does not interpret the shift and unshift control character, and, therefore, prints everything from its primary mode. Blanks between letters of words are caused by the occurrence of a mark on the magnetic tape that is not being interpreted. For example, in the printout sample of Fig. 2, the (character is shown as a 9, and the) as a 0. In these instances, the shift mode control character is shown as a blank before the 9 and after the 0.

Since this type of printout is very difficult to read and edit for hash, we reorganized the corpus in line with our thinking about experimenting with varying types of corpora. Accordingly, we divided the original corpus into three parts: one dealing only with the titles of each entry; one dealing with the sets of descriptors assigned each entry; and one dealing with the abstract portion of each entry. Each of these portions then was initially separated and edited on the IBM 1410, by a program which was able to recognize the two mode (shift-unshift) instructions. In addition, the program eliminated those entries that were incomplete or that had machine-recognizable hash intermixed. As a last step the three corpora were printed out. The automatic editing considerably reduced the total number of entries available for experimentation. In the case of the abstracts and the titles corpora, we had a remainder of 1281 individual entries, and for the descriptor set corpus, 1240 individual entries. A sample of the edited titles corpus is shown in Fig. 3, the edited descriptor set corpus in Fig. 4, and the edited abstracts corpus in Fig. 5.

While this preparatory work was being completed, the various sub-routines of the Statistical Association Procedures for Message Content Analysis program were being coded and checked out. However, debugging of the program had to wait until we had selected the particular corpus, since proper debugging required an input close or identical to the ultimate input, and an input of such size as to allow manual checking of each major subroutine. Accordingly, we selected the descriptor set corpus for our initial debugging and experimentation.

When ASTIA was developing their automation program in 1959 and 1960, they realized that an indexing scheme was required which would allow them to automatically retrieve documents (or, rather, representations of documents) coded by the particular index term. The specific scheme they chose was based on a three-way hierarchical structure. The largest grouping, 19, is that of "descriptor fields." These major fields are each subdivided into "descriptor groups" which serve to identify the extent of each descriptor field. In turn, these descriptor groups, which number 292, are each subdivided into descriptors identifying the extent of the descriptor group. There are 7000 of these descriptors. A descriptor may be one or more terms, e.g., air sea rescues, bromo-carbons, etc., and are assigned to each input document by trained analysts; there are an average of eight descriptors per document.^[4]

The full set of descriptors assigned to a document entry can be considered as a set of string of index terms related to the document subject or content matter. Such a string is used as an input to the Statistical Association Procedures for Message Content Analysis program. Among the advantages of using strings of descriptors is that they would yield a

⁴For further information about descriptors the reader is referred to the Thesaurus of ASTIA Descriptors, First Edition, dated May 1960, and Guidelines for Using ASTIA Descriptors, dated February 1961. Both are available either from ASTIA or from the Office of Technical Services, U.S. Department of Commerce.

relatively small matrix and thus require less time on the computer in order to perform the necessary computations.^[5] Additionally, in the literature many papers^[6] argue for an a priori deletion of common or function words since they presumably add little if at all to the retrieval process. Such words do not appear to any great extent in the descriptor corpus and, if the presumption is accurate, they could not add to the normal difficulty of debugging the program. The disadvantage of using the descriptor corpus is, of course, that it is not normal language usage as we have defined it previously.

The descriptor corpus was manually edited to remove duplicate entries; entries which were incomplete but not automatically recognizable as incomplete; entries which contained hash (a) caused by the paper-tape-to-magnetic-tape conversion, (b) carried from the paper tape to the magnetic tape, or (c) inherent in the magnetic tape itself, as well as to eliminate any other possible problem areas. In addition to these deletions, we added an end of descriptor set symbol (a negative zero punch) at the end of each descriptor set entry. The edited descriptor corpus then was used as an input to the Statistical Association Procedures for Message Content Analysis program.

The titles and the abstracts corpora were edited subsequently in an identical fashion, and printouts of the final edited version were obtained. Experimental work has just begun on these latter two corpora.

The three edited corpora then were remerged according to the ASTIA entry number to provide a formatted printout for retrieval purposes. The retrieval algorithm, described in MITRE SR-79, selects the relevant documents and then, for each, prints out the title, the abstract, and the descriptor set. The format of a typical printout of one entry in response

⁵For details of the Statistical Association Procedures for Message Content Analysis program, the reader is referred to MITRE SR-79, October 1962.

⁶Luhn (1958), Borko (1961), Edmundson (1961), Maron (1961), among others.

to a query is shown in Fig. 6. The internal accounting number should be disregarded by the reader since it is used only for bookkeeping internal to the editing program.

For retrieval, any word or combination of words can be used to key a response provided that only the words chosen for the query are themselves contained in the corpus. If a query word is chosen that does not appear in the corpus, a message is printed out requesting that another query word be used. To circumvent such occurrences, a list of all of the unique words contained in the descriptor set corpus is given in Appendix A.

As indicated, descriptors can be made up of several terms. Since the Statistical Association Procedures for Message Content Analysis program takes each word in a string (the descriptor set assigned to a document) and pairs it with every other word contained in the string it is working on, the number of individual terms found in the corpus is greater than the simple number of descriptors found in the corpus. It should be noted that there are some misspelled terms on this list. When editing the descriptor set corpus, we do not edit out or correct misspellings. In addition, in the case of hyphenated words, the hyphen is deleted and the parts combined to make one word. Thus, the hyphenated descriptor "analog-to-digital" becomes the unique word "analogtodigital."

The complete experimental corpus is given in Appendix B. It should be noted that, when we remerged the three separately edited corpora, we found that for some documents for which we have machine usable descriptors and abstracts we have no machine usable titles, and for some which have titles and descriptors we have no abstracts. This artifact arose when we deleted entries from one of the three corpora without deleting the corresponding entries from the other two corpora. We have indicated these occurrences by a statement such as "No abstract available."

Additional experimentation will be performed on the corpus of abstracts, we will issue a second Supplement setting forth the list of words encountered within that abstract corpus.

REFERENCES

- Borko, H. The construction of an empirically based mathematically derived classification system. SDC Document SP-585, 26 October 1961.
- Edmundson, H.W. and Wyllys, R.E. Automatic abstracting and indexing -- survey and recommendations. Communications of the Association of Computing Machinery, Vol. 8, #5, 1961 May, 226-234.
- Luhn, H.P. Auto-encoding of documents for information retrieval systems. Paper presented at the Symposium on Documentation or a Study of Information Retrieval Systems, University of Southern California School of Library Sciences, 1958 April, 9-11.
- Luhn, H.P. The automatic creation of literature abstracts. IBM Journal of Research and Development, Vol. 2, #2, 1958 April, 159-165.
- Maron, M.E. Automatic indexing: an experimental inquiry. Journal of the Association of Computing Machinery, Vol. 8, #5, 1961 July, 404-417.

Punched Paper Tape	MITRE Computer Facility	Punched Paper Tape	MITRE Computer Facility
A	A	a	A
B	B	b	B
C	C	c	C
D	D	d	D
E	E	e	E
F	F	f	F
G	G	g	G
H	H	h	H
I	I	i	I
J	J	j	J
K	K	k	K
L	L	l	L
M	M	m	M
N	N	n	N
O	O	o	O
P	P	p	P
Q	Q	q	Q
R	R	r	R
S	S	s	S
T	T	t	T
U	U	u	U
V	V	v	V
W	W	w	W
X	X	x	X
Y	Y	y	Y
Z	Z	z	Z

Fig. 1 Comparison of the Character Sets

Punched Paper Tape	MITRE Computer Facility	Punched Paper Tape	MITRE Computer Facility
0	0	Carriage return	omit
1	1	Hyphen	-
2	2	Shift	Control Character††
3	3	Unshift	Control Character
4	4	Punch off	omit
5	5	Comma	,
6	6	Period	.
7	7	Skip end	omit
8	8	Print disc	omit
9	9	Print restore	omit
)	)	Punch on	omit
±	+	Nonprint select end	omit
<	omit †	Stop code	omit
#	\$	#1 Code	omit
\$	\$	Plus or equals	=
%	\$	Semi-colon	delete
>	omit	Apostrophe	'
&	+	Slash	/
*	*	Delete	omit
(	(	Switch code	omit
Space	delete ‡	Colon	omit
Tab	omit		

† These characters were omitted by the paper-tape-to-magnetic-tape conversion program and do not appear on the magnetic tape.

‡ These characters are on the magnetic tape but are deleted by the printing program.

†† These characters control the mode of the printing program.

Fig. 1 (Cont.)

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P OLYTECHNIC I NST. OF B ROOKLYN, N.Y.
 FUEL CELL AND ITS RELATED TECHNOLOGY. I. CORRE-
 LATION BETWEEN MAGNETIC SUSCEPTIBILITY AND
 CATALYTIC ACTIVITY OF ELECTRODE.

F INAL REPT., 16 J ULY 60-15 J ULY 61,
 BY J U C HIN C HU AND S. M. H U. 15 J ULY 61, 20P.
 INCL. ILLUS. 40 REFS.

9C ONTRACT DA 44-009-ENG-4586 0
 U NCLASSIFIED REPORT

DESCRIPTORS 98F UEL CELLS, 8M AGNETIC SUSCEPTI-
 BILITY, C HEMICAL REACTIONS, 8C ATALYSIS, 8E LEC-
 TRODES. 0 9M AGNETISM, T HIN FILMS, I MPURITIES,
 O XYGEN, R EACTION KINETICS, T HEORY. 0 9K ESO-
 NANCE, T ORQUE, M AGNETOMETERS, M EASUREMENT. 0
 9T EST EQUIPMENT, E LECTROMAGNETS, P OWER SUP-
 PLIES, A DSORPTION, E LECTROLYTIC CELLS, V ACUUM
 SYSTEMS, T EMPERATURE CONTROL, T EST METHODS. 0

M AGNETIC SUSCEPTIBILITY SERVES AS GOOD INDEX
 FOR CATALYTIC ACTIVITY OF THE HALF CELL ELECTRODE
 IN A FUEL CELL. T HE THEORY OF MAGNETISM WAS
 OUTLINED WITH A BRIEF ACCOUNT OF THE MOLECULAR

FIELD THEORY OF PARAMAGNETISM AND DOMAIN THEORY
 OF FERROMAGNETISM. C ONTAMINATION, NOTABLY
 OXYGEN, OF THE FERROMAGNETIC FILM HAS A MARKED
 EFFECT ON THE MAGNETIC PROPERTY. T HE CONTROL
 MECHANISM FOR THE CATALYTIC REACTION AT THE
 ELECTRODE IS POSTULATED TO INVOLVE CHEMISORPTION.

F OR THE MEASUREMENT OF MAGNETIC SUSCEPTIBILITY,
 THREE METHODS WERE PROPOSED. T HE METHOD FINALLY
 ADOPTED FOR THE MAGNETIC SUSCEPTIBILITY MEASURE-
 MENT IS A MODIFIED VERSION OF G OUY S METHOD.

T HE MECHANICAL DETAILS AND COMPLETE LAYOUT AS
 WELL AS THEORETICAL ANALYSES ARE FULLY DESCRIBED.
 9A UTHOR 0

Fig. 2 Sample of Unedited Printout

270 081 0015 DETERMINATION OF NUCLEAR-ROCKET POWER LEVELS FOR UNMANNED MARS VEHICLES STARTING FROM ORBIT ABOUT EARTH,

270 082 0016 ANALYSIS OF LIQUID-HYDROGEN STORAGE PROBLEMS FOR UNMANNED NUCLEAR-POWERED MARS VEHICLES,

Fig. 3 Edited Titles Corpus

270 081 0014 (SPACE FLIGHT, *SPACE PROBES, MARS, SPACESHIPS, *NUCLEAR PROPULSION, HYDROGEN, TEMPERATURE, THRUST, SPECIFIC IMPULSE, DESIGN, FEASIBILITY STUDIES, MILITARY REQUIREMENTS, THEORY, MATHEMATICAL ANALYSIS.)

270 082 0015 (SPACE PROBES, NUCLEAR PROPULSION, *PROPELLANTS, HYDROGEN, LIQUEFIED GASES, STORAGE, SHIELDING, THERMAL INSULATION, METEORS, SPACE ENVIRONMENTAL CONDITIONS.)

Fig. 4 Edited Descriptor Set Corpus

270 081 0015 NUCLEAR-POWERED EARTH-ORBITAL-LAUNCH PROBES CAN PLACE GREATER PAYLOADS IN ORBIT ABOUT MARS THAN CHEMICAL VEHICLES IF REACTOR POWER EXCEEDS 50 MW. SUITABLE REACTOR POWERS FOR THIS MISSION ARE ABOUT 150, 400, AND 1000 MW FOR 33,000-, 81,000-, AND 200,000-LB VEHICLES, RESPECTIVELY. WHEREAS A 33,000-LB VEHICLE REQUIRES GREATER THAN A 200-DAY COAST, A 145-DAY COAST IS FEASIBLE FOR AN 81,000-LB VEHICLE. A HYDROGEN TEMPERATURE OF 4000 F IN THE NOZZLE APPEARS TO BE A GOOD COMPROMISE. USE OF A SOLID-PROPELLANT ROCKET TO ACHIEVE AN ORBIT ABOUT MARS FROM COAST YIELDS NO PAYLOAD ADVANTAGE. USING OPTIMUM FIRING DATES, A 33,000-LB VEHICLE COULD ORBIT AN ACCEPTABLE PAYLOAD ABOUT MARS, AND AN 81,000-LB VEHICLE COULD LAND FREIGHT ON MARS.

270 082 0016 TANKAGE, NUCLEAR SHIELDING, AND HYDROGEN HEAT INPUT PROBLEMS ARE INVESTIGATED FOR THREE UNMANNED NUCLEAR VEHICLES INTENDED FOR PROBING IN THE VICINITY OF MARS AND LANDING FREIGHT ON MARS. TANK GEOMETRY, TANK AND SUPPORTING-STRUCTURE WEIGHT, AND TANK PROTECTION FROM METEORIDS ARE DISCUSSED. THE SIZE AND WEIGHT OF THE NUCLEAR SHIELD AS REQUIRED BY A PRESCRIBED ALLOWABLE DOSE AND/OR THE HEAT PUT TO THE HYDROGEN ARE DETERMINED. THE HYDROGEN HEAT INPUT INCLUDES NUCLEAR, ONBOARD THERMAL, SOLAR, AND PLANETARY SOURCES.

Fig. 5 Edited Abstracts Corpus

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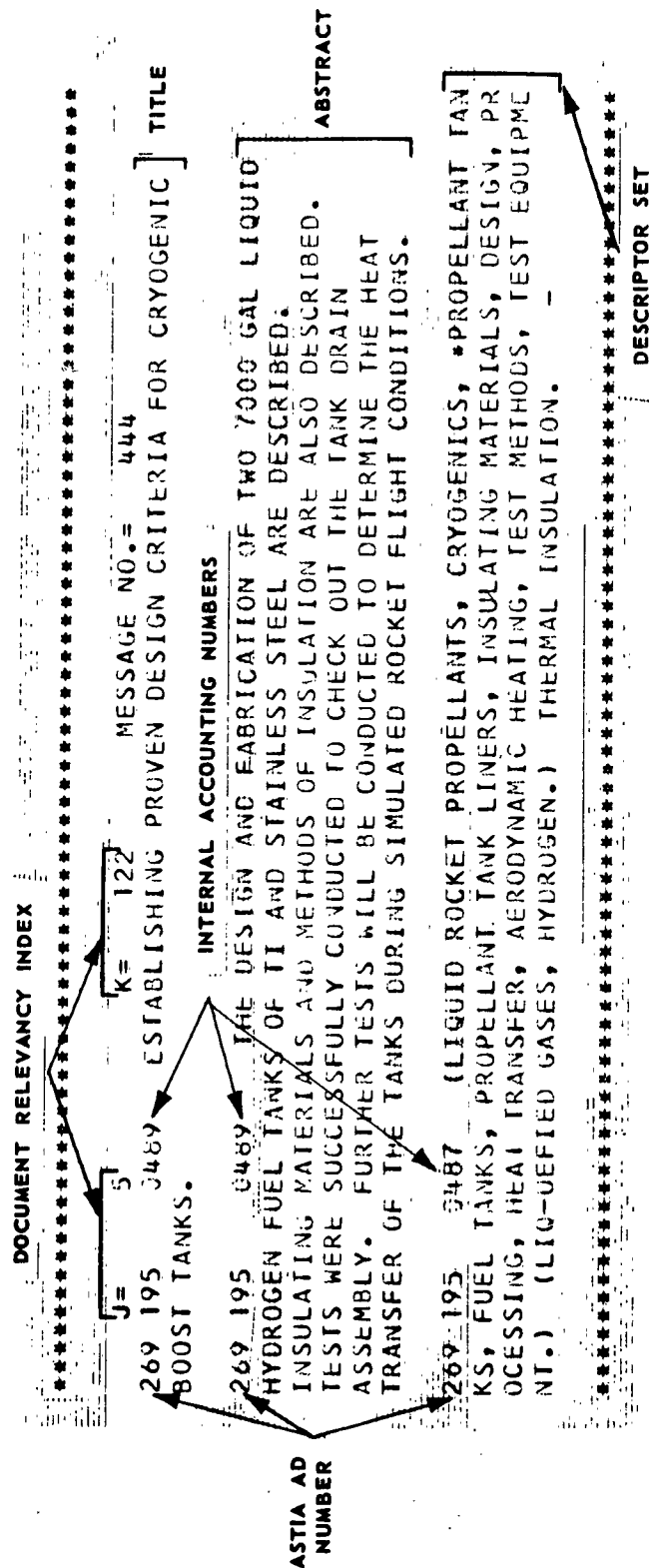


Fig. 6 Format of Typical Retrieval Printout

APPENDIX A

LIST OF UNIQUE WORDS

ABLATION
ABRASION
ABSORPTION
ABSTRACTING
ACCELERATION
ACCELERATORS
ACCELEROMETERS
ACCIDENTS
ACETYLENES
ACID
ACIDS
ACOUSTIC
ACOUSTICS
ACRYLIC
ACTION
ACTUATORS
ACUITY
ADDITIVES
ADENOSINE
ADHESION
ADHESIVES
ADIABATIC
ADJUSTMENT
ADMINISTRATION
ADSORPTION
AERIAL
AERODYNAMIC
AERODYNAMICS
AERONAUTICS
AEROSOLS
AGAINST
AGENTS
AGING
AIR
AIRBORNE
AIRCRAFT
AIRFOILS
AIRFRAMES
AIRPLANE
AIRPLANES
AIRPORTS
ALASKA
ALBUMINS
ALGAE
ALGEBRA
ALGEBRAIC
ALKALI
ALKALINE
ALKOXY
ALKYL

ALLEN
ALLOYS
ALLWEATHER
ALLYL
ALTERNATING
ALTIMETERS
ALTITUDE
ALUMINIZED
ALUMINUM
AMINES
AMINO
AMMONIA
AMMONIUM
AMMUNITION
AMPLIFIERS
AMPLITUDE
ANALOG
ANALOGTODIGITAL
ANALYSIS
ANALYTIC
ANALYZERS
ANAZERS
AND
ANGLE
ANHYDRIDES
ANILINES
ANIMALS
ANODES
ANTENNA
ANTENNAS
ANTHROPOMETRY
ANTI-AIRCRAFT
ANTIOXIDANTS
APPARATUS
APPLIED
APPROACH
APTITUDE
ARC
ARCHAEOLOGY
ARCS
AREA
AREAS
ARGON
ARMAMENT
ARMATURES
ARMIES
ARMOR
ARMY
AROUND
ARREST

ARSENIC
ARSENIDES
ARTHROPLASTY
ARTILLERY
ASBESTOS
ASSEMBLIES
ASSISTED
ASSOCIATION
ASTRONOMICAL
ASTRONOMY
ATMOSPHERE
ATMOSPHERES
ATMOSPHERIC
ATMOSPHERICS
ATOMIC
ATOMIZATION
ATOMS
ATTACK
ATTENUATION
ATTITUDES
AUDIOFREQUENCY
AUDITORY
AURORAE
AUSTENTITE
AUTOMATIC
AUTOMATION
AUTORADIOGRAPHY
AUXILIARY
AVIATION
AZIMUTH
AZO
BACTERIA
BACTERIAL
BAINITE
BALANCES
BALL
BALLISTICS
BALLOONS
BAND
BANDPASS
BANDS
BANDSELECTIVE
BARIUM
BARRELS
BASES
BATTERIES
BEACONS
BEAMS
BEARING
BEARINGS

BEHAVIOR
BELT
BELTS
BENZENES
BENZOYL
BERYLLIUM
BESSEL
BIBLIOGRAPHY
BINDERS
BIOCHEMICAL
BIOCHEMISTRY
BIOLOGICAL
BIOLOGY
BIOPHYSICS
BIOSYNTHESIS
BISMUTH
BLACKBODY
BLADES
BLAST
BLOOD
BLUNT
BOARDS
BODIES
BODY
BOMB
BOMBARDMENT
BOMBERS
BOMBING
BOMBS
BONDING
BONDS
BONE
BOOSTER
BORATES
BORIDES
BORON
BOUNDARY
BRACKETS
BRAIN
BRAKE
BRAKES
BRASS
BRAZING
BRIDGES
BRIGHTNESS
BRILLOUIN
BRITTLE
BROADBAND
BROMIDES
BROMINATION

BROMINE
BROMOCARBONS
BUCKLING
BULLDOZERS
BUOYANT
BURNS
BUTADIENES
BUTANES
BUTTERFLY
BUTYL
BY
C
CABINS
CABLES
CADMIUM
CALCIFICATION
CALCIUM
CALCULUS
CALIBRATION
CALORIMETERS
CAMERA
CAMERAS
CAMOUFLAGE
CANTILEVER
CAPACITORS
CAPSULES
CARBIDES
CARBOHYDRATES
CARBON
CARBONATES
CARBONIZATION
CARBOXYLIC
CARGO
CARRIERS
CARTRIDGE
CARTRIDGES
CASES
CASTING
CATALYSIS
CATALYSTS
CATAMARANS
CATHODE
CATHODES
CAVITATION
CELESTIAL
CELL
CELLS
CENTERS
CENTRIFUGES
CERAMIC
CERMETS
CESIUM

CHAMBER
CHAMBERS
CHARGE
CHARGES
CHARTS
CHECK
CHEMICAL
CHEMICALS
CHEMOTHERAPEUTIC
CHLORIDES
CHLORINATION
CHLORINE
CHLOROCARBONS
CHOLESTEROL
CHONDROITIN
CHROMATOGRAPHIC
CHROMIUM
CIRCUITS
CIRCULATION
CLASSIFICATION
CLEANING
CLIMATE
CLIMATIC
CLOSEDCYCLE
CLOSTRIDIUM
CLOTHING
CLOUDS
CLUSTERS
COATINGS
COAXIAL
COBALT
COCKPITS
CODING
COILS
COLLIMATORS
COLLOIDS
COLOR
COLORS
COMBINATORIAL
COMBUSTION
COMMAND
COMMERCE
COMMUNICATION
COMMUNICATIONS
COMMUNISM
COMMUTATORS
COMPLEX
COMPOUNDS
COMPRESSED
COMPRESSIBLE
COMPRESSOR

COMPRESSORS
COMPUTER
COMPUTERS
CONCRETE
CONDENSATION
CONDENSER
CONDENSERS
CONDITIONED
CONDITIONING
CONDITIONS
CONDUCTIVITY
CONDUCTORS
CONFERENCES
CONFIGURATION
CONFIGURATIONS
CONICAL
CONNECTORS
CONSTRUCTION
CONSUMPTION
CONTAINERS
CONTAMINATION
CONTINUED
CONTINUOUS
CONTINUUM
CONTROL
CONTROLLED
CONTROLLERS
CONVECTION
CONVERSION
CONVERTERS
CONVEYORS
COOLANTS
COOLING
COPOLYMERIZATION
COPPER
CORAL
CORDAGE
CORE
CORES
CORRECTION
CORRELATION
CORROSION
CORROSIONRESISTANT
CORROSIVE
COSMIC
COSTS
COTTON
COUNTERMEASURES
COUNTERS
COUPLING

COUPLINGS
COVERINGS
CRATERING
CRAZING
CREEP
CRESYL
CRITICAL
CRUCIBLES
CRYOGENICS
CRYSTAL
CRYSTALLIZATION
CRYSTALS
CUMENES
CURRENT
CURRENTS
CURVE
CUTOFF
CYANATES
CYBERNETICS
CYCLOBUTANES
CYCLOHEXANES
CYCLOHEXENES
CYCLOIDAL
CYCLONES
CYCLOPENTANES
CYCLOPENTENES
CYLINDRICAL
DACRON
DAMAGE
DAMPING
DATA
DECABORANES
DECAY
DECELERATION
DECKS
DECOMPOSITION
DEFENSE
DEFLECTION
DEFORMATION
DEGASIFICATION
DEHYDRATION
DELAY
DENSITY
DEPOSITS
DEPOTS
DESIGN
DETECTION
DETECTORS
DETERIORATION
DETERMINANTS

DETERMINATION
DETONATION
DETONATORS
DEVICES
DIAGNOSIS
DICTIONARIES
DIELECTRIC
DIELECTRICS
DIENE
DIENES
DIES
DIFFERENCE
DIFFERENTIAL
DIFFRACTION
DIFFUSION
DIGITAL
DIODES
DIOXIDE
DIOXIDES
DIPOLE
DIRECT
DIRECTION
DISCHARGE
DISCHARGES
DISEASES
DISPLAY
DISSOCIATION
DISTRIBUTION
DISTRIBUTIONS
DISTURBANCES
DIURNAL
DIVERSITY
DOCUMENTATION
DOPPLER
DOSE
DRAG
DRAWING
DROP
DROPS
DUCT
DURING
DYNAMICS
EARTH
EARTHQUAKES
ECHINODERMS
ECHO
ECOLOGICAL
ECOLOGY
ECONOMIC
ECONOMICS

EFFECT
EFFECTIVENESS
EFFECTS
ELASTIC
ELASTICITY
ELASTOMERS
ELECTRIC
ELECTRICAL
ELECTRICITY
ELECTROCARDIOGRAPH
ELECTROCHEMISTRY
ELECTRODEPOSITION
ELECTRODES
ELECTROLYSIS
ELECTROLYTES
ELECTROLYTIC
ELECTROMAGNETIC
ELECTROMAGNETS
ELECTROMECHANICAL
ELECTRON
ELECTRONIC
ELECTRONICS
ELECTRONS
ELECTROPLATING
ELECTROSTATIC
ELECTROSTATICS
ELEMENTS
ELIMINATORS
EMISSION
ENERGY
ENGINE
ENGINEERING
ENGINES
ENTHALPY
ENTROPY
ENTRY
ENVIRONMENTAL
ENZYMES
EPOXIDES
EPOXY
EQUATION
EQUATIONS
EQUILIBRIUM
EQUIPMENT
EROSION
ERRORS
ESTERS
ETHANOLS
ETHERS
ETHYL

ETHYLENE
ETHYLENES
EUTECTICS
EVAPORATION
EXCHANGE
EXCHANGERS
EXCITATION
EXCRETION
EXHAUST
EXHOCK
EXPANDED
EXPANDERS
EXPANSION
EXPECTANCY
EXPERIMENTAL
EXPLOSIONS
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EXPLOSIVES
EXTERNAL
EXTRACTION
EXTRATERRESTRIAL
EXTREMELY
EXTRUSION
FABRICS
FACILITIES
FACTOR
FACTORS
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FALLOUT
FATIGUE
FATIGUE
FATTY
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FEEDBACK
FEEDING
FERRITES
FERROELECTRIC
FERROELECTRICITY
FERROMAGNETIC
FERROMAGNETISM
FIBERS
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FIGHTERS
FILAMENT
FILAMENTS
FILM
FILMS
FILTERS

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FINISHES
FIRE
FISHES
FISSION
FITNESS
FITTING
FLAME
FLAMES
FLAPS
FLARES
FLASH
FLIGHT
FLIGHTS
FLOTATION
FLOW
FLOWMETERS
FLUID
FLUIDS
FLUORESCENCE
FLUORESCENT
FLUORIDES
FLUORINATION
FLUOROCARBONS
FLUXES
FOCUSING
FOG
FOILS
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FORGING
FORMATION
FORMING
FOURIER
FRACTIONATION
FRACTIONS
FRACTURE
FRAGMENTATION
FREE
FREQUENCY
FRICTION
FROM
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FUNCTIONS

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FURAN
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GALLIUM
GALVANOMETERS
GAMES
GAMMA
GARNET
GAS
GASES
GEAR
GEARS
GENERATING
GENERATORS
GEODESICS
GEODETIC
GEOLOGY
GEOMETRY
GEOPHYSICAL
GEOPHYSICS
GERMANIUM
GIMBALS
GLASS
GLIDERS
GLYCOLS
GLYCOSIDES
GOLD
GRAINS
GRAPHITE
GRATINGS
GRAVITY
GREENLAND
GREENS
GROUND
GROUP
GROWTH
GUANIDINES
GUIDANCE
GUIDE
GUIDED
GUN
GUNS
GYRO
GYROSCOPES
HAFNIUM
HAIL

HALIDES
HALL
HALOCARBONS
HALOGENATION
HAMMERS
HANDBOOKS
HANDLING
HARDENING
HARDNESS
HARDWARE
HARMONIC
HARNESS
HAWAII
HAZARDS
HEARING
HEART
HEAT
HEATING
HEATRESISTANT
HEIGHT
HELICOPTER
HELICOPTERS
HELIUM
HELIXES
HELMETS
HETEROCYCLIC
HETEROGENEOUS
HEXANES
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HISTOLOGICAL
HISTOLYTICUM
HOLDERS
HONEYCOMB
HORMONES
HORNS
HOSE
HULLS
HUMAN
HUMIDITY
HYDRACHLORIC
HYDRAULIC
HYDRAZINES
HYDRIDES
HYDROCARBONS
HYDRODYNAMICS
HYDROFOILS
HYDROGEN
HYDROSTATIC
HYDROXIDES

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HYPERSONICS
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ICONOSCOPES
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IMAGE
IMAGES
IMMUNIZATION
IMPACT
IMPEDANCE
IMPELLERS
IMPREGNATION
IMPULSE
IMPURITIES
IN
INCENDIARY
INDICATORS
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INDUCTANCE
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INELASTIC
INEQUALITIES
INERTIAL
INFECTIONS
INFORMATION
INFRARED
INHIBITION
INHIBITORS
INJURIES
INLETS
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INSTRUCTION
INSTRUMENT
INSTRUMENTATION
INSTRUMENTS
INSULATING
INSULATION
INTAKE
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INTEGRATION
INTELLIGENCE
INTELLIGIBILITY

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INTENSITY
INTERCEPTION
INTERFERENCE
INTERFEROMETERS
INTERMETALLIC
INTERSTELLAR
INTERVAL
IODATES
IODIDES
IODINE
ION
IONIC
IONIZATION
IONOSPHERE
IONOSPHERIC
IONS
IRON
ISLANDS
ISOLATORS
ISOMERS
ISOPRENE
ISOTOPES
JAMMING
JET
JETS
JOB
JOINTS
JUPITER
KEROSENE
KETONES
KEYERS
KIDNEYS
KINETIC
KINETICS
KITS
KLYSTRONS
L
LABELED
LABOR
LABORATORIES
LABORATORY
LAMINAR
LAMINATES
LAMPS
LANDING
LANDINGS
LANGUAGE
LATERAL
LATHES

LATTICES
 LAUNCHERS
 LAUNCHING
 LAYER
 LEAD
 LEADERSHIP
 LEARNING
 LEAST
 LIAISON
 LIFE
 LIFT
 LIGHT
 LIMITERS
 LINEAR
 LINERS
 LINES
 LININGS
 LIQUEFIED
 LIQUID
 LIQUIDS
 LITERATURE
 LITHIUM
 LIVER
 LOAD
 LOADING
 LOBING
 LOGIC
 LOGISTICS
 LONGITUDINAL
 LOOP
 LOW
 LUBRICANTS
 LUBRICATION
 LUMINESCENCE
 LUMINESCENT
 LUNAR
 LYZERS
 MACH
 MACHINE
 MACHINERY
 MACHINES
 MACHINING
 MAGNESIUM
 MAGNET
 MAGNETIC
 MAGNETISM
 MAGNETITE
 MAGNETOHYDRODYNAMI
 MAGNETOMETERS
 MAGNETOOPTIC

MAGNETRONS
 MAGNETS
 MAIN
 MAINTENANCE
 MAMMALS
 MANAGEMENT
 MANGANESE
 MANNED
 MANOMETERS
 MANUALS
 MANUFACTURING
 MAP
 MAPPING
 MAPS
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 MARS
 MARTENSITE
 MASER
 MASERS
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 MEASUREMENT
 MEASUREMENTS
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 MEMORY
 MERCURY
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 METABOLISM
 METAL
 METALLIC
 METALLURGICAL
 METALLURGY
 METALORGANIC
 METALS
 METAMATHEMATICS
 METEORITES
 METEOROLOGICAL
 METEOROLOGY

METEORS
METERS
METHANES
METHOD
METHODS
METHYL
MICA
MICROMETEOROLOGY
MICRONESIA
MICROORGANISMS
MICROPHOTOGRAPHY
MICROSCOPES
MICROSCOPY
MICROSTRUCTURE
MICROWAVE
MICROWAVES
MILITARY
MILLING
MILLS
MINERAL
MINIATURE
MINING
MISSILE
MISSILES
MIXED
MIXERS
MIXING
MIXTURES
MOBILE
MOBILIZATION
MODEL
MODELS
MODULATION
MOISTURE
MOLECULAR
MOLECULES
MOLYBDENUM
MOMENT
MOMENTS
MONEY
MONITORS
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MONOCYCLIC
MONOMOLECULAR
MONOXIDES
MOON
MOTION
MOTOR
MOTORCYCLES
MOTORS

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MOVING
MULTICHANNEL
MULTIPATH
MULTIPLY
MULTIPLIERS
MUSCLES
NAVAL
NAVIGATION
NAVIGATORS
NEBULAE
NEGATIVE
NERVES
NERVOUS
NETS
NETWORKS
NEUTRINOS
NEUTRON
NICKEL
NIOBIUM
NITRATES
NITRATION
NITRIC
NITRIDES
NITROGEN
NOISE
NOMOGRAPHS
NONDESTRUCTIVE
NONLINEAR
NOSES
NOZZLES
NUCLEAR
NUCLEI
NUCLEIC
NUCLEOTIDES
NUMBER
NUMERICAL
NUTRITION
NYLON
ODOMETERS
OF
OHIO
OILS
OMENTUM
ON
OPERATION
OPERATIONAL
OPERATIONS
OPERATORS
OPTICAL

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 OR
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 OZONE
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 PACKAGED
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 PANEL
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 PARABOLIC
 PARACHUTE
 PARAMAGNETIC
 PARAMETRIC
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 PARTICLE
 PARTICLES
 PASS
 PATHOLOGY
 PATHS
 PATTERNS
 PAVEMENTS
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 PENTABORANES
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 PERIODIC
 PEROXIDES
 PERSONALITY
 PERSONNEL

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 PHENOLS
 PHENYL
 PHOSPHATES
 PHOSPHIDES
 PHOSPHINES
 PHOSPHONYL
 PHOSPHOROUS
 PHOSPHORS
 PHOSPHORUS
 PHOTOCHEMICAL
 PHOTOCHEMISTRY
 PHOTOELECTRIC
 PHOTOELECTRONS
 PHOTOEMISSION
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 PHOTOMETERS
 PHOTOMULTIPLIERS
 PHOTONS
 PHOTOSYNTHESIS
 PHTHALIC
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 PHYSIOLOGY
 PICKLING
 PICTURE
 PIEZOELECTRIC
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 PLANES
 PLANETS
 PLANTS
 PLASMA
 PLASTIC
 PLASTICITY
 PLASTICS
 PLATES
 PLATING
 PLATINUM
 PNEUMATIC
 POISONOUS
 POLAND
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POLYCYCLIC
POLYMERIZATION
POLYMERS
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POLYNOMIALS
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POTASSIUM
POTENTIAL
POWDER
POWER
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PROBABILITY
PROBES
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PROCESSES
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PROCUREMENT
PRODUCTION
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PRODUCTS
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PROJECTORS
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PROPELLED
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PROPELLERS
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PROPULSION
PROPYL
PROSPECTING
PROTECTIVE
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QUANTUM
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RADIOACTIVE
RADIOACTIVITY
RADIOBIOLOGY
RADIOFREQUENCY
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RADIOLOGICAL
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RADIOSONDES
RADIOUS
RADOMES
RAFTS
RAILROADS
RANGE
RARE
RATE
RATIO
RATIOS
RAY
RAYS
RDX
REACTION
REACTIONS
REACTIVITY
REACTOR
REACTORS
READING
REAGENTS
RECEIVERS
RECEPTION
RECOMBINATION

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REFLECTORS
REFLEX
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REFUELING
REGENERATION
REGULATORS
REINFORCING
RELATIONS
RELATIVITY
RELAXATION
RELAY
RELAYS
RELIABILITY
REPORTS
REPRESENTATION
REQUIREMENTS
RESCUE
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RESISTANCE
RESISTANT
RESISTORS
RESONANCE
RESONATORS
RESPIRATION
REVOLUTION
REYNOLDS
RIBOSE
RINGS
RIVETED
ROADS
ROCK
ROCKE
ROCKET
ROCKETS
RODS
ROLL
ROLLER
ROLLING

ROTARY
ROTATING
ROTATION
ROTORS
RUBBER
RUPTURE
RUTHENIUM
S
SAFETY
SALTS
SAMPLING
SANDWICH
SATELLITE
SATELLITES
SCANNERS
SCATTERING
SCHEDULING
SCIENCE
SCIENTIFIC
SCINTILLATION
SCREENS
SEA
SEALING
SEALS
SEARCH
SECONDARY
SECTIONS
SEISMIC
SEISMOGRAPHS
SELECTION
SELENIDES
SEMICONDUCTING
SEMICONDUCTOR
SEMICONDUCTORS
SEMI PERMEABILITY
SENSITIVE
SENSITIVITY
SEPARATION
SEQUENCES
SEQUENTIAL
SERIES
SERVO
SERVOMECHANISMS
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SHELTERS
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SHIPS
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SIDEBANDS
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SIGNALS
SIGNALTNOISE
SILANES
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SILICIDES
SILICON
SILICONES
SILVER
SIMULATION
SIMULATORS
SINGLE
SINTERING
SKIN
SLEDS
SMALLPOX
SMOKE
SOCIAL
SOCIOLOGY
SOCIOMETRICS
SOCK
SODIUM
SOILS
SOLAR
SOLDERED
SOLDERING
SOLDERS
SOLENOIDS
SOLID
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SOLUBILITY
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SOLVENT
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SOUND
SOUNDING

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SPACESHIPS
SPARK
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SPECTROGRAPHIC
SPECTROMETERS
SPECTROPHOTOMETERS
SPECTROSCOPY
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SPEECH
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STABILIZERS
STAINLESS
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STARTER
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STATIONS
STATISTICAL
STATISTICS
STEAM
STEEL
STEREOCHEMISTRY
STERIODS
STORAGE
STORMS
STRAIN
STRATEGIC
STRATOSPHERE
STRATUS
STREAMS
STRESS
STRESSES
STROBOSCOPES

STRONTIUM
STRUCTURAL
STRUCTURE
STRUCTURES
STUDIES
STYRENES
SUBLIMATION
SUBMARINE
SUBMARINES
SUBMINIATURE
SUBSTANCES
SUBSTITUTES
SUBSTITUTION
SUITS
SULFAMYL
SULFATE
SULFIDES
SULFONATES
SULFUR
SUN
SUNSPOTS
SUPER
SUPERAERODYNAMICS
SUPERSONIC
SUPERSONICS
SUPPLIES
SUPPLY
SUPPORT
SURFACE
SURFACES
SURGERY
SURGICAL
SURVIVAL
SUSCEPTIBILITY
SUSPENSION
SWEDEN
SWEEP
SWITCHES
SWITCHING
SWITZERLAND
SYMPOSIA
SYNCHROTRONS
SYNTHESIS
SYNTHETIC
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TABLES
TAKEOFF
TANK

TANKS
TANTALUM
TAPE
TARGETS
TAYLORS
TECHNIQUES
TELEMETER
TELEMETERING
TELEPHONE
TELESCOPES
TELEVISION
TELLURIDES
TEMPERATUE
TEMPERATURE
TEMPERATURES
TENSILE
TENSOR
TERMINAL
TERRAIN
TERRESTRIAL
TEST
TESTING
TESTS
TETROXIDES
TEXTILES
THEORY
THERAPY
THERMAL
THERMIONIC
THERMISTORS
THERMOCHEMISTRY
THERMOCOUPLES
THERMODYNAMICS
THERMOELECTRICITY
THERMOMETERS
THERMONUCLEAR
THERMOPILES
THERMOSTATIC
THERMOSTATS
THESES
THICKNESS
THIN
THRESHOLDS
THRUST
THYROID
THYROXINE
TIME
TIMING
TIN

TISSUES
TITANATES
TITANIUM
TO
TOLERANCE
TOLUENES
TOOLS
TOPOLOGY
TOPOLOGY
TORPEDOES
TORQUE
TOWED
TOXICITY
TRACER
TRACKED
TRACKING
TRAFFIC
TRAILS
TRAINING
TRAJECTORIES
TRANSDUCERS
TRANSFER
TRANSFORMATIONS
TRANSFORMERS
TRANSFORMS
TRANSISTOR
TRANSISTORS
TRANSITION
TRANSITIONS
TRANSLATIONS
TRANSMISSION
TRANSMISSIONS
TRANSMITTERS
TRANSMITTING
TRANSONIC
TRANSONICS
TRANSPARENT
TRANSPLANTATION
TRANSPORT
TRANSPORTATION
TRAUMA
TRAUMATIC
TRAVELING
TREATMENT
TRIANGULAR
TRIAZINES
TRIGGER
TRIODES
TUBE
TUBES

TUMOR
TUNED
TUNGSTEN
TUNING
TUNNEL
TUNNELS
TURBINE
TURBINES
TURBOJET
TURBORAMJETS
TURBULENCE
TURBULENT
ULTRA
ULTRASONIC
ULTRASONICS
ULTRAVIOLET
UNDERGROUND
UNDERWATER
UNIONS
UPPER
URANIUM
UREA
USSR
VACCINES
VACUUM
VALVES
VAN
VANADIUM
VANES
VAPOR
VAPORIZATION
VAPORS
VARIABLE
VARIABLES
VARIANCE
VARIATIONS
VECTOR
VEHICLE
VEHICLES
VELOCITY
VERBAL
VERTICAL
VERY
VESSELS
VIBRATION
VIBRATORS
VIDEO
VINYL
VIRUS

VIRUSES
VISCOSITY
VISIBILITY
VISUAL
VOCABULARY
VOICE
VOLTAGE
VOLUME
VOLUMETRIC
VORTICES
VS
WAGES
WAKE
WAR
WARFARE
WARHEADS
WARNING
WASTE
WATER
WAVE
WAVEGUIDE
WAVEGUIDES
WAVES
WEAPONS
WEATHER
WEBBING
WEDGES
WEIGHT
WEIGHTLESSNESS
WELDED
WELDING
WELDS
WETTING
WIDE
WIND
WINDING
WINDOWS
WINGS
WIRE
WITH
WOUND
WOUNDS
X
XRAY
YAW
YTTRIUM
ZINC
ZIRCONIUM
ZONE
ZONES

APPENDIX B

COMPLETE EXPERIMENTAL CORPUS

270 200 0005 ON PROCEDURES FOR COMPUTING METEOROLOGICAL QUANTITIES
IN THE STRATOSPHERE WITH THE IBM 650,

270 200 0005 A DETAILED DISCUSSION IS GIVEN OF PROCEDURES FOR
COMPUTING GEOSTROPHIC WIND COMPONENTS, VORTICITY, VERTICAL MOTION,
TERMS IN THE VORTICITY EQUATION, AND DIVERGENCE, ALL FOR THE 100-, 50-,
AND 25-MB SURFACE. NO JUSTIFICATION IS GIVEN FOR THE PROCEDURES AND
NO DISCUSSION OF THE RESULTS IS INCLUDED.

270 200 0005 (WEATHER FORECASTING, *STRATO-SPHERE, AIR, *WIND, MATHE-
MATICAL ANALYSIS, DIGITAL COMPUTERS, PROGRAMMING.) -

269 970 0007 TERMINAL FORECASTING MANUAL FOR DETACHMENT 3, 8TH
WEATHER SQUADRON LOCKBOURNE AFB, OHIO.

269 970 0007 NO ABSTRACT AVAILABLE

269 970 0006 (OHIO, AIR FORCE, AIRPORTS, CLIMATE, *METEOROLOGICAL DA-
TA, DIURNAL VARIA-TIONS, PERIODIC VARIATIONS, *HANDBOOKS.) (METEOROLOGIC
AL CHARTS, TABLES.) (AIR FORCE OPERATIONS, WEATHER FORECASTING.) -

269 992 0008 MINIATURE CRYSTAL OVEN.

269 992 0008 THE INVESTIGATION OF METHODS AND DEVICES BY WHICH
THE TEMPERATURE OF A SINGLE QUARTZ CRYSTAL BLANK CAN BE MAINTAINED AT
85 C IN ENVIRONMENTAL TEMPERATURES RANGING FROM 80 C TO -55 C IS
CONTINUING. VACUUM TESTING WAS BEGUN ON 5 PARTIALLY SILVERED PYREX
DEWARS WHICH WERE FOR USE AS THE INSULATION OF 500-MW OVENS. AN
INITIAL HEAT LEAK TEST OF ONE OF THESE WAS MADE IN CONJUNCTION WITH A
STAINLESS STEEL DEWAR TO DETERMINE WHETHER SUCH A DOUBLE DEWAR HAD
PROMISE FOR USE AS THE INSULATION FOR THE LESS-THAN 500-MW OVENS. IN
ADDITION, 3 DIFFERENT TYPES OF INSULATION SYSTEMS FOR USE WITH 50-MW
CRYSTAL OVENS WERE CONSTRUCTED FOR VACUUM-LIFE TESTING. THE SYSTEM
REQUIRED TO SUSPEND THE CORE IN TWO OF THESE INSULATION SYSTEMS WAS
MODIFIED TO REDUCE HEAT LEAK THROUGH IT.

269 992 0007 (*QUARTZ CRYSTALS, *TEMPERATURE CONTROL, SINGLE CRYSTAL
S.) (*THERMAL INSULA-TION, EFFECTIVENESS, HEAT-RESISTANT GLASS, STAINLE
SS STEEL.) (*CRYSTAL OVENS, MINIATURE ELECTRONIC EQUIPMENT, LIFE EXPECT
ANCY, TESTS.) (VACUUM SYSTEMS, LIFE EXPECTANCY.) -

269 999 0009 FUEL CELL AND ITS RELATED TECHNOLOGY. I. CORRELATION
BETWEEN MAGNETIC SUSCEPTIBILITY AND CATALYTIC ACTIVITY OF ELECTRODE.

269 999 0009 MAGNETIC SUSCEPTIBILITY SERVES AS GOOD INDEX FOR
CATALYTIC ACTIVITY OF THE HALF CELL ELECTRODE IN A FUEL CELL. THE
THEORY OF MAGNETISM WAS OUTLINED WITH A BRIEF ACCOUNT OF THE MOLECULAR
FIELD THEORY OF PARAMAGNETISM AND DOMAIN THEORY OF FERROMAGNETISM.
CONTAMINATION, NOTABLY OXYGEN, OF THE FERROMAGNETIC FILM HAS A MARKED
EFFECT ON THE MAGNETIC PROPERTY. THE CONTROL MECHANISM FOR THE
CATALYTIC REACTION AT THE ELECTRODE IS POSTULATED TO INVOLVE
CHEMISORPTION. FOR THE MEASUREMENT OF MAGNETIC SUSCEPTIBILITY, THREE
METHODS WERE PROPOSED. THE METHOD FINALLY ADOPTED FOR THE MAGNETIC
SUSCEPTIBILITY MEASUREMENT IS A MODIFIED VERSION OF GOUY'S METHOD. THE
MECHANICAL DETAILS AND COMPLETE LAYOUT AS WELL AS THEORETICAL ANALYSES
ARE FULLY DESCRIBED.

269 999 0008 (*FUEL CELLS, *MAGNETIC SUSCEPTIBILITY, CHEMICAL REACTIONS, *CATALYSIS, *ELECTRODES.) (MAGNETISM, THIN FILMS, IMPURITIES, OXYGEN, REACTION KINETICS, THEORY.) (RESONANCE, TORQUE, MAGNETOMETERS, MEASUREMENT.) (TEST EQUIPMENT, ELECTROMAGNETS, POWER SUPPLIES, ADSORPTION, ELECTROLYTIC CELLS, VACUUM SYSTEMS, TEMPERATURE CONTROL, TEST METHODS
- -

.)
270 184 0010 AN INVESTIGATION OF A DIGITAL COMPUTER METHOD OF DETERMINING THE OPTIMUM DESIGN PARAMETERS OF SHROUDED PROPELLERS.

270 184 0010 A DIGITAL COMPUTER METHOD OF DETERMINING THE OPTIMUM DESIGN PARAMETERS OF LIGHTLY LOADED SHROUDED PROPELLERS IS PRESENTED. FOR SUCH A CASE THE GEOMETRY OF THE VORTEX WAKE MAY BE IDEALLY DESCRIBED AS A HELICAL SHEET OF EQUALPITCH VORTEX FILAMENTS ARISING FROM EACH BLADE TRAILING EDGE AND A RIGHT CIRCULAR BOUNDARY SHEET COMPOSED OF EQUAL-PITCH HELICAL FILAMENTS ARISING AT THE SHROUD TRAILING EDGE. THE OPTIMUM CONDITION FOR LIGHT LOADING REQUIRES THAT THIS WAKE VORTEX PATTERN MOVE AS A RIGID BODY. THIS PATTERN OF DISTRIBUTED VORTICITY IS ARBITRARILY REPLACED WITH A FINITE NUMBER OF FINITE, BUT UNKNOWN STRENGTH, VORTEX FILAMENTS. USING THE BIOT-SAVART RELATION, AN EXPRESSION FOR THE VELOCITY COMPONENTS ASSOCIATED WITH EACH FILAMENT IS OBTAINED. APPLYING THE BOUNDARY CONDITIONS TO THESE SETS OF EQUATIONS RESULTS IN A SET OF SIMULTANEOUS EQUATIONS IN TERMS OF THE UNKNOWN FILAMENT STRENGTHS. THE BLADE BOUND VORTEX DISTRIBUTION OBTAINED FROM THE SIMULTANEOUS SOLUTION IS COMPARED WITH THE MEASUREMENTS PREVIOUSLY OBTAINED FROM POTENTIAL TANK MODELS OF A TWO- AND FOUR-BLADED SHROUDED PROPELLER. IT IS CONCLUDED THAT THIS DIGITAL COMPUTER METHOD YIELDS RESULTS THAT ARE ADEQUATE FOR DESIGN PURPOSES, AND IT IS RECOMMENDED THAT THIS METHOD BE USED INSTEAD OF THE POTENTIAL TANK METHOD FOR OBTAINING THE NECESSARY CHARTS AND TABLES COVERING THE RANGE OF DESIGN PARAMETERS FOR SHROUDED PROPELLERS.

270 184 0009 (*SHROUDED PROPELLERS, AERIAL PROPELLERS, LOAD DISTRIBUTION, DESIGN, AERO-DYNAMIC CONFIGURATION, VORTICES, FOURIER ANALYSIS, SERIES, DIGITAL COMPUTERS, MATHEMATICAL PREDICTION, MATHEMATICAL ANALYSIS
.)

269 997 0011 PREIMPREGNATED ROVING STUDY.

269 997 0011 A DESCRIPTION IS GIVEN OF THE TEST SPECIMENS BEING CONSTRUCTED FOR THE RESIN MIGRATION STUDY AND THE REASONS FOR CHOICE OF THE DESIGN USED. PRELIMINARY EXPERIMENTS OF THE EFFECT OF TACKINESS OF THE ROVING ON THE ABILITY TO WIND AN UNSTABLE PATTERN ARE DESCRIBED. THE WORK WAS DONE ON A PLASTER MANDREL OF THE ABL CONFIGURATION IN A POLAR WRAPPING MACHINE. THE MANDREL WAS COATED WITH A PLASTIC FILM COVERED WITH A NONSLIPPERY WAX. DETAILED PLANS ARE PRESENTED FOR THE FABRICATION OF 6 ABL CASES FOR THE STUDY OF THE EFFECT OF VOIDS AND ROVING BAND WIDTH ON THE PROPERTIES OF WOUND CASES. (AUTHOR) AD-269 99710N1

269 997 0010 (*ROCKET CASES, PROPELLANT TANKS, CYLINDRICAL BODIES, *FILAMENT WOUND CONSTRUCTION, WIRE WINDING MACHINES.) (FIBERS, SYNTHETIC FIBERS, GLASS TEXTILES, IMPREGNATION, RESINS, EPOXY RESINS, LAMINATES, FILAMENTS.) (*PRESSURE VESSELS, PROCESSING.) -

270 068 0012 RESEARCH AND DEVELOPMENT STUDY OF STRESS-STRAIN CHARACTERISTICS OF SHELLS AND HIGH EXPLOSIVES.

270 068 0012 NO ABSTRACT AVAILABLE

270 068 0011 (*HIGH EXPLOSIVE AMMUNITION, *PROJECTILES, CYLINDRICAL BODIES, *CARTRIDGE CASES, ROTATING BANDS, EXPLOSIVES, STRESSES, DEFORMATION, MECHANICAL PROPERTIES, DESIGN, TESTS.) -

270 071 0013 DEVELOPMENT OF PULSE RECORDER, QRC-122(T),

270 071 0013 PULSE RECORDER, QRC-122(T) CONSISTS OF A DUAL BEAM, HIGH FREQUENCY OSCILLOSCOPE THAT IS PHOTOGRAPHED BY A 16 MM HIGH SPEED SHUTTERLESS CAMERA WHILE ANOTHER DUAL BEAM OSCILLOSCOPE IS EMPLOYED FOR MONITORING AND RAPID INTERNAL CHECKING. OPERATOR CONTROLS ARE CENTRALLY LOCATED. TIMING AND REFERENCE MARKERS APPEAR ON THE PROCESSED FILM TO INDICATE SUCH VARIABLES AS HORIZONTAL SWEEP SPEED, VERTICAL SENSITIVITY, VIDEO INPUT IN USE AND TIME OF DAY INFORMATION. THE DESIGN EMPHASIZED EASE OF INSTALLATION AND OPERATION, RUGGEDNESS, PORTABILITY, RELIABILITY, MAINTAINABILITY AND STRICT RFI CONTROL.

270 071 0012 (RADAR PULSES, *VIDEO SIGNALS, *RECORDING DEVICES, *PHOTOGRAPHIC RECORDING SYSTEMS, HIGH-SPEED PHOTOGRAPHY, PULSE ANALYZERS, *OSCILLOSCOPES, CATHODE RAY TUBE SCREENS, DISPLAY SYSTEMS, TIME INTERVAL COUNTERS, SWEEP GENERATORS, ELECTRONIC CIRCUITS, POWER SUPPLIES, DESIGN.) -

270 095 0014 NO TITLE AVAILABLE

270 095 0014 A SERIES OF NEW ORGANOSILAZANE MONOMERS WAS PREPARED AND CHARACTERIZED. THESE NEW MONOMERS INCLUDE THE AMMONIA, METHYLAMINE, AND ANILINE DERIVATIVES OF 1,3-BIS(CHLORODIMETHYLSILYL)-2,2-DIMETHYL-1,3 DIAZA-2-SILACYCLOHEXANE AND 1,3-BIS(CHLORODIMETHYLSILYL)2,2-DIMETHYL-1,3DIAZA-2-SILACYCLOPENTANE, AND THE METHYLAMINE DERIVATIVE OF

270 095 0013 (*HEAT RESISTANT POLYMERS, *ELASTOMERS, *SILICON COMPOUNDS, *NITROGEN COMPOUNDS, SYNTHESIS.) (POLYMERS, CHLORINE COMPOUNDS, METHYL RADICALS, PHENYL RADICALS, SILANES, AZO RADICALS, CYCLOPENTANES, CYCLO-HEXANES, AMINES, PROPYL RADICALS.) (POLY-MERIZATION, MOLECULAR STRUCTURE, SOLUBILITY, CATALYSTS, EFFECTIVENESS.) INFRARED SPECTROSCOPY.

270 081 0015 DETERMINATION OF NUCLEAR-ROCKET POWER LEVELS FOR UNMANNED MARS VEHICLES STARTING FROM ORBIT ABOUT EARTH,

270 081 0015 NUCLEAR-POWERED EARTH-ORBITAL-LAUNCH PROBES CAN PLACE GREATER PAYLOADS IN ORBIT ABOUT MARS THAN CHEMICAL VEHICLES IF REACTOR POWER EXCEEDS 50 MW. SUITABLE REACTOR POWERS FOR THIS MISSION ARE ABOUT 150, 400, AND 1000 MW FOR 33,000-, 81,000-, AND 200,000-LB VEHICLES, RESPECTIVELY. WHEREAS A 33,000-LB VEHICLE REQUIRES GREATER THAN A 200-DAY COAST, A 145-DAY COAST IS FEASIBLE FOR AN 81,000-LB VEHICLE. A HYDROGEN TEMPERATURE OF 4000 F IN THE NOZZLE APPEARS TO BE A GOOD COMPROMISE. USE OF A SOLID-PROPELLANT ROCKET TO ACHIEVE AN ORBIT ABOUT MARS FROM COAST YIELDS NO PAYLOAD ADVANTAGE. USING OPTIMUM FIRING DATES, A 33,000-LB VEHICLE COULD ORBIT AN ACCEPTABLE PAYLOAD ABOUT MARS, AND AN 81,000-LB VEHICLE COULD LAND FREIGHT ON MARS.

270 081 0014 (SPACE FLIGHT, *SPACE PROBES, MARS, SPACESHIPS, *NUCLEAR PROPULSION, HYDROGEN, TEMPERATURE, THRUST, SPECIFIC IMPULSE, DESIGN, FEASIBILITY STUDIES, MILITARY REQUIREMENTS, THEORY, MATHEMATICAL ANALYSIS.)

270 082 0016 ANALYSIS OF LIQUID-HYDROGEN STORAGE PROBLEMS FOR UNMANNED NUCLEAR-POWERED MARS VEHICLES,

270 082 0016 TANKAGE, NUCLEAR SHIELDING, AND HYDROGEN HEAT INPUT PROBLEMS ARE INVESTIGATED FOR THREE UNMANNED NUCLEAR VEHICLES INTENDED FOR PROBING IN THE VICINITY OF MARS AND LANDING FREIGHT ON MARS. TANK GEOMETRY, TANK AND SUPPORTING-STRUCTURE WEIGHT, AND TANK PROTECTION FROM METEORIDS ARE DISCUSSED. THE SIZE AND WEIGHT OF THE NUCLEAR SHIELD AS REQUIRED BY A PRESCRIBED ALLOWABLE DOSE AND/OR THE HEAT INPUT TO THE HYDROGEN ARE DETERMINED. THE HYDROGEN HEAT INPUT INCLUDES NUCLEAR, ONBOARD THERMAL, SOLAR, AND PLANETARY SOURCES.

270 082 0015 (SPACE PROBES, NUCLEAR PROPULSION, *PROPELLANTS, HYDROGEN, LIQUEFIED GASES, STORAGE, SHIELDING, THERMAL INSULATION, METEORS, SPACE ENVIRONMENTAL CONDITIONS.)

269 980 0017 POTENTIAL OF FILAMENT WOUND COMPOSITES.

269 980 0017 A STUDY ON THE EFFECT OF WATER IMMERSION ON THE TENSILE STRENGTH OF SINGLE E-GLASS FIBERS, COATED WITH A-1100 COUPLING AGENT AND EPON 820 RESIN, WAS CONDUCTED. THE FIBERS WERE TESTED BEFORE AND AFTER WATER IMMERSION OF ONE DAY AND SEVEN DAYS. NO RINGS WERE WOUND DIRECTLY FROM THE MONOFILAMENT FIBER-FORMING APPARATUS. THESE RINGS WERE TESTED BY THE SPLIT-DISC METHOD. ANALYTICAL STUDY WAS MADE TO DETERMINE THE MAXIMUM LOAD AND LOCATION OF FAILURE FOR A COMPOSITE BAR REINFORCED WITH 2 DISCONTINUOUS FIBERS AND A BAR REINFORCED WITH ONE DISCONTINUOUS FIBER. COMPARISON WAS MADE BETWEEN THE THEORY AND TEST DATA. FIBER REINFORCED BEAMS WERE TESTED.

269 980 0016 (*BEAMS, *FILAMENT WOUND CONSTRUCTION, *REINFORCING MATERIALS, GLASS TEXTILES, RESINS, EPOXY RESINS, FIBERS, COATINGS, AMINES, SILANES, THEORY, BONDING.) (HUMIDITY, TENSILE PROPERTIES, SHEAR STRESSES, FRACTURE (MECHANICS), FAILURE (MECHANICS), TEST EQUIPMENT, TEST METHODS.)

269 405 0018 EVALUATION OF ARCTIC ICE-FREE LAND SITES KRONPRINS CHRISTIAN LAND AND PEARY LAND, NORTH GREENLAND 1960,

269 405 0018 A REPORT IS GIVEN OF TERRAIN INVESTIGATIONS CONDUCTED IN NORTH GREENLAND, IN JUNE AND JULY 1960, TO LOCATE POTENTIAL AIRFIELD SITES. EIGHT SITES WERE STUDIED. ALL REQUIRE A SMALL AMOUNT OF GRADING TO MAKE A 5000-FT (1500-M) RUNWAY. IN ADDITION THE BROENLUND FJORD AIRFIELD, SITE OF A TEST LANDING ON A NATURAL SURFACE IN 1957, WAS RE-EXAMINED AND THE EAST HALF OF THE RUNWAY WAS FOUND UNUSABLE AT THE TIME OF VISIT BECAUSE OF LATE SNOW MELT AND POOR DRAINAGE. SCIENTIFIC OBSERVATIONS SHOWED THAT NORTHERN PEARY LAND WAS COVERED ONLY BY VALLEY GLACIERS DURING THE LAST GLACIAL PERIOD AND THAT AN EXTENSIVE MARINE INVASION WHICH DEPOSITED MARINE AND RELATED LACUSTRINE SILT OCCURRED WHEN THE ICE RETREATED ABOUT 6000 YEARS AGO. THIS WAS FOLLOWED BY A READVANCE OF GLACIERS DOWN MAJOR FJORDS AND SUBSEQUENT RETREAT TO PRESENT ICE FRONTS.

269 405 0017 (*LANDING FIELDS, *GREENLAND, CONSTRUCTION, GEOPHYSICS, TERRAIN, CLIMATIC FACTORS.) (GREENLAND, METEOROLOGICAL DATA.) (GREENLAND, AIR DROP OPERATIONS.) -

269 406 0019 EVALUATION OF CONTROL MONITOR AN/GGS-11 PROTOTYPE,

269 406 0019 THE AN/GGA-11 PROVIDES A MEANS FOR A STATION TO SUBSCRIBE TO RECEIVE ONLY DESIRED INFORMATION FROM TRAFFIC PASSING ON A HIGH-SPEED PARTY LINE TYPE OF COMMUNICATIONS NETWORK. THE CONTROL MONITOR IS ALSO CAPABLE OF ACTIVATING ONE OF SIX TRANSMITTERS TO TRANSMIT INFORMATION UPON REQUEST FROM A MASTER CONTROL STATION. THE REQUEST IS A CALL-UP CODE CONSISTING OF A 5-CHARACTER, 25BIT, CALL-UP WORD. EACH STATION COMPARES THE INCOMING CALL-UP WORD WITH AS MANY AS 1000 SUCH WORDS STORED ON A MYLAR DISK WITHIN THE MONITOR. BETWEEN EACH CALL-UP WORD, A COMPLETE MESSAGE IS TRANSMITTED, AND AN END OF MESSAGE INDICATION ALERTS EACH STATION TO RECEIVE THE NEXT CALL-UP WORD, EVEN THOUGH A PARTICULAR STATION MAY NOT HAVE BEEN INTERESTED IN THE PREVIOUS MESSAGE.

269 406 0018 (*COMMUNICATION EQUIPMENT, *COMMUNICATION SYSTEMS, *ELECTRONIC EQUIPMENT, *CONTROL SYSTEMS, CIRCUITS, TRIGGER CIRCUITS, *ELECTRICAL NETWORKS, DISPLAY SYSTEMS, DATA PROCESSING SYSTEMS, DATA TRANSMISSION SYSTEMS, MULTICHANNEL TELEPHONE SYSTEMS, SWITCHING CIRCUITS, MAGNETIC TAPE, MEMORY DEVICES.) (WEATHER COMMUNICATIONS, DESIGN, TESTS.) -

269 412 0020 STUDY AND INVESTIGATION OF THE APPLICATION OF SYNTHETIC MAGNETIC WHISKERS TO MICROWAVE CIRCUITS.

269 412 0020 A FEASIBILITY STUDY WAS PERFORMED WHICH SHOWED THAT FERRITE WHISKERS COULD BE USED TO LIMIT X-BAND POWER FROM 0.3 WATT TO 5 KILOWATTS WITH SPIKE ENERGIES WHICH DO NOT EXCEED 50 ERGS. THE LIMITER UNIT IS EXTREMELY COMPACT AND INEXPENSIVE TO MANUFACTURE. USED WITH A VARIABLE REACTANCE DIODE LIMITER, THE FERRITE LIMITER IS CAPABLE OF PROTECTING RECEIVER DIODES IN THE MICROWAVE RANGE. THE THEORY FOR A VERY FAST VARIABLE REACTANCE SWITCH WAS DEVELOPED UNDER THIS CONTRACT. THE RESULTS OF ANALYSIS SHOWED THAT AN EXTREMELY FAST (LESS THAN 50 NANoseconds) SWITCHING ACTION COULD BE OBTAINED WITH FERRITE MATERIAL. THE SWITCH COULD OPERATE AT FREQUENCIES GREATER THAN 3 KMC WITH REASONABLE DRIVE POWERS. PRELIMINARY ANALYSIS OF A WHISKER AMPLIFIER INDICATES THAT A MARKED IMPROVEMENT SHOULD RESULT IN THE GAIN BANDWIDTH PRODUCT AT REASONABLE PUMP LEVELS OVER SINGLE CRYSTAL YIG TYPES.

269 412 0019 (*ELECTRONIC CIRCUITS, MICROWAVE EQUIPMENT, *LIMITERS, *ELECTRONIC SWITCHES, FERROMAGNETIC MATERIALS, ELECTRIC WIRE, X BAND, FERRITES, DESIGN, FEASIBILITY STUDIES.) (AMPLIFIERS, WAVEGUIDES, *WAVEGUIDE SWITCHES, CRYSTAL LIMITERS, PHASE SHIFTERS, TESTS.) -

269 416 0021 AN ANALYSIS OF A TRAJECTORY AND VELOCITY MATCH TECHNIQUE FOR INTERCEPTING INTERCONTINENTAL BALLISTIC MISSILES.

269 416 0021 A MID-COURSE, TRAJECTORY-MATCH INTERCEPT OF INTERCONTINENTAL BALLISTIC MISSILES IS ANALYZED. THE INTERCEPT IS ACCOMPLISHED BY USING A MULTISTAGE ROCKET TO BOOST AN INTERCEPTOR VEHICLE ONTO A BALLISTIC TRAJECTORY IN THE SAME DIRECTION OF FLIGHT AS THE WARHEAD TRAJECTORY, SO THAT THE TWO TRAJECTORIES ARE ALMOST TANGENT

AT A SELECTED INTERCEPT POINT. NEAR THE INTERCEPT POINT, A FINAL ROCKET IS IGNITED TO ACCELERATE THE VEHICLE AND MATCH THE WARHEAD'S POSITION AND VELOCITY. A SIMPLIFIED ANALYSIS IS PERFORMED FOR THE CASE OF A CO-PLANAR INTERCEPT OVER A SPHERICAL, NONROTATING EARTH. INTERCEPT TRAJECTORIES ARE DETERMINED FROM THE TRAJECTORY GEOMETRY AND THE ROCKET EQUATIONS OF MOTION. AN APPROXIMATE METHOD IS DERIVED TO ESTIMATE THE THRUSTS AND ROCKET WEIGHTS REQUIRED TO BOOST AN INTERCEPTOR VEHICLE ONTO THESE TRAJECTORIES.

269 416 0020 (*INTERCEPTION OF SURFACE TO SURFACE, *GUIDED MISSILES.) (EQUATIONS OF MOTION FOR *GUIDED MISSILE TRAJECTORIES.) (GUIDED MISSILE WARHEADS, FLIGHT PATHS.) (INTERCEPTION OF GUIDED MISSILES BY SIMULATION OF VELOCITY AND FLIGHT PATHS OF GUIDED MISSILE WARHEADS.) GUIDED MISSILE TRAJECTORIES, MATHEMATICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS, ANTIAIRCRAFT DEFENSE SYSTEMS. -

269 418 0022 ASYNCHRONOUS DIGITAL LOGIC CIRCUITS USING NEURISTORS.

269 418 0022 A STUDY WAS MADE OF THE USE OF NEURISTORS IN THE CONSTRUCTION OF ASYNCHRONOUS DIGITAL LOGIC CIRCUITS. SPECIFICALLY, THE PRIMARY OBJECTIVE WAS THE DEVELOPMENT OF A FORMALIZED METHOD FOR THE DESIGN AND THE CONSTRUCTION OF ASYNCHRONOUS SEQUENTIAL CIRCUITS. THE NEURISTOR IS AN ACTIVE DEVICE WHICH ACTS AS A ONE-DIMENSIONAL CHANNEL ALONG WHICH A PULSE MAY PROPAGATE AT A CONSTANT VELOCITY. NEURISTORS CAN BE JOINED IN 2 BASIC JUNCTION TYPES T AND S JUNCTIONS. A T-S JUNCTION IS A COMBINATION OF THE 2 BASIC JUNCTION TYPES. USING THESE 3 JUNCTION TYPES, AND, OR AND NOT CIRCUITS CAN BE CONSTRUCTED. THESE BASIC CIRCUITS CAN BE COMBINED WITH A VARIABLE TREE TO CONSTRUCT ANY ARBITRARY COMBINATIONAL CIRCUIT. THE NEURISTOR HAS BUILT-IN DELAY. SEQUENTIAL CIRCUITS CAN BE ANALYSED AS DELAY DEVICES AND REDUCED TO COMBINATIONAL CIRCUITS, WHICH CAN BE CONSTRUCTED USING NEURISTORS.

269 418 0021 (THESES, *COMPUTER LOGIC, *DIGITAL COMPUTERS, *ELECTRONIC CIRCUITS, COMBINATORIAL ANALYSIS, SEQUENTIAL ANALYSIS, DELAY CIRCUITS .) -

269 420 0023 STUDY OF THE DISSIPATION OF INTERNAL ENERGY IN A VIBRATING BEAM.

269 420 0023 EFFORTS WERE DEVOTED TO THE DISSIPATION OF INTERNAL ENERGY IN A VIBRATING CANTILEVER BEAM REPRESENTED BY THE AREA OF THE HYSTERESIS LOOP FORMED BY THE LOADING AND UNLOADING CURVES. IN A CANTILEVER BEAM UNDERGOING FORCED TRANSVERSE VIBRATION, THE PHENOMENON OF INTERNAL DAMPING APPEARS AS A SMALL NON-LINEAR TERM IN THE EQUATION FOR THE ENERGY CONTAINED IN THE BEAM DUE TO THE DEFLECTION OF THE BEAM. THE ENERGY LOSS PER CYCLE IN THE BEAM, MEASURED BY EXPERIMENTAL TECHNIQUES, IS EQUAL TO THE AREA OF THE HYSTERESIS LOOP. THE EQUATIONS OF THE HYSTERESIS LOOP CONTAIN PARAMETERS WHICH ARE CHARACTERISTIC OF THE MATERIAL IN THE BEAM. A DETAILED EXPERIMENTAL STUDY, BASED ON THE PRESENT ANALYSIS AND DESIGN, WILL DETERMINE THE NATURE AND APPLICABILITY OF THE CHARACTERISTIC PARAMETERS.

269 420 0022 (THESES, *CANTILEVER BEAMS, *VIBRATION, *DAMPING, HYSTERESIS, TEST METHODS, TESTS, MATHEMATICAL ANALYSIS, DIFFERENTIAL EQUATIONS.) (*SATELLITE VEHICLES, DESIGN, THEORY, STRESSES, STRUCTURES.) -

269 423 0024 A FEASIBILITY STUDY OF A MAGNETO-HYDRODYNAMIC CENTRIFUGE.

269 423 0024 A STUDY WAS MADE OF THE MAGNETO-HYDRODYNAMIC CENTRIFUGE, A DIRECT-CURRENT MOTOR WITH A MERCURY ARMATURE. CENTRIFUGING ACTION IS DERIVED FROM THE ROTATING MERCURY WHICH, AT SUFFICIENT SPEEDS, ASSUMES THE SHAPE OF A HOLLOW RING. A DEVELOPMENT PROTOTYPE IS DESIGNED AND TESTED TO DETERMINE THE FEASIBILITY OF SUCH A CENTRIFUGE. RESULTS WERE PROMISING AND INDICATED THAT THE BASIC OPERATIONAL PRINCIPLE IS SOUND AND FEASIBLE. A PADDLE WHEEL WAS ROTATED AT 2000 RPM BY A ROTATING RING OF MERCURY AT AN ESTIMATED MERCURY INPUT POWER OF 5 WATTS.

269 423 0023 (*MAGNETOHYDRODYNAMICS, *CENTRIFUGES, THEORY, DESIGN, MATHEMATICAL ANALYSIS, TESTS.) (DIRECT CURRENT, ELECTRIC MOTORS, MERCURY, ARMATURES, LIQUID METALS, VORTICES.) THESES. -

269 426 0025 AUTOMATIC COMPUTATION OF ROOT LOCUS USING DIGITAL COMPUTER.

269 426 0025 THE PROBLEM OF COMPUTING THE ROOT LOCUS IS TRANSFORMED INTO THE FORMAT OF REPEATED SOLUTIONS OF THE CHARACTERISTIC EQUATION EXPRESSED AS A POLYNOMIAL EQUATION OF DEGREE N. TO RESOLVE THE PROBLEM OF CONVERGENCE, A SIMULTANEOUS NEWTON-RAPHSON AND BAIRSTOW ITERATION, WITH SUBSTITUTION OF VARIABLES WHEN REQUIRED, IS EMPLOYED TO SOLVE THE POLYNOMIAL EQUATION. BY MEANS OF A SYSTEMATIZED ITERATIVE PROCESS, A PROGRAM IS DEVELOPED IN FORTRAN LANGUAGE FOR THE IBM 1620 WHICH COMPUTES THE ROOT LOCUS AUTOMATICALLY. SEVERAL ROOT LOCI FORMED BY PLOTTING THE ROOTS EVALUATED BY THE COMPUTER, WHICH ARE ACCURATE TO AT LEAST FOUR FIGURES, ARE PROVIDED IN THE APPENDICES.

269 426 0024 (*DIGITAL COMPUTERS, AUTOMATION, *PROGRAMMING, POLYNOMIALS, PARTIAL DIFFERENTIAL EQUATIONS.) (DATA, TABLES.) (FEEDBACK, SERVO SYSTEMS.) THESES. -

269 427 0026 A STUDY OF PARAMETRIC AMPLIFICATION.

269 427 0026 THE PARAMETRIC AMPLIFIER IS STUDIED BEGINNING WITH SEVERAL MECHANICAL MODELS AND PROGRESSING TO SEVERAL PARALLEL RESONANT ELECTRICAL CIRCUITS. TWO REGENERATIVE PARAMETRIC AMPLIFIERS, THE DEGENERATE AND THE NON-DEGENERATE CASE, ARE ANALYZED BY LINEAR CIRCUIT THEORY AND COMPARED TO THE NEGATIVE RESISTANCE AMPLIFIER. THE MANLEY-ROWE ENERGY EQUATIONS ARE THEN DERIVED BY A SIMPLIFIED METHOD. FINALLY, THE DEGENERATE CASE OF THE PARAMETRIC AMPLIFIER IS ANALYZED BY THE MATHIEU EQUATION AND ON THE ANALOG COMPUTER.

269 427 0025 (*PARAMETRIC AMPLIFIERS, TUNED CIRCUITS, NEGATIVE RESISTANCE CIRCUITS, ENERGY, EQUATIONS, DIFFERENTIAL EQUATIONS, MATHEMATICAL ANALYSIS, THEORY, THESES.) (AMPLIFIERS, SIMULATION, ANALOG COMPUTERS.) -

269 430 0027 DIRECT USE OF SOLAR-ENERGY FOR COMMUNICATION. PART
I. ANALYSIS OF SOLAR-OPTICAL COMMUNICATION.

269 430 0027 THE ANALYTICAL PART OF THE SOCOM (SOLAR OPTICAL
COMMUNICATIONS) PROGRAM CONSISTED OF STUDIES OF THE THEORETICAL AND
PRACTICAL LIMITATIONS OF SPACE COMMUNICATION SYSTEMS USING SUNLIGHT AS
A CARRIER, TOGETHER WITH EXPLORATION OF WAYS OF SIMULATING AND TESTING
SUCH SYSTEMS ON THE EARTH. THE AREAS STUDIED INCLUDED WAVELENGTH
SPECTRUM, OPTICAL SYSTEMS, MODULATION AND DEMODULATION TECHNIQUES,
TRACKING AND STABILIZATION PROBLEMS, SYSTEM DESIGN, AND SIMULATION
TECHNIQUES.

269 430 0026 (*LIGHT COMMUNICATION SYSTEMS, SOLAR ENERGY, FEASIBILI
TY STUDIES.) (SPACE FLIGHT, COMMUNICATION SYSTEMS.) -

269 484 0028 EXPERIMENTAL VERIFICATION OF THE FRICTIONAL PRESSURE
DROP THROUGH POROUS MEDIA,

269 484 0028 THE FRICTIONAL PRESSURE DROP ACROSS A POROUS (36\$)
PEBBLE BED WAS MEASURED. THE RATIO OF BED-TO-PEBBLE DIAMETER WAS 72,
SPHERICITY OF THE PEBBLES WAS 1, AND AIR FLOW RATES VARIED FROM 0.13 TO
1.3 LB/SEC-SQ FT, BASED ON THE BED AREA. THE DATA OBTAINED IS COMPARED
TO THE DATA PREDICTED BY G. G. BROWN, AND TO THE WORK OF P. C. CARMAN,
D. E. RANDALL, AND S. S. MILLWRIGHT. PEBBLE MOTION WITHIN THE BED AND
THE EFFECT OF THE METHOD OF FLOW INITIATION ON THE FRICTIONAL PRESSURE
DROP WERE ALSO INVESTIGATED.

269 484 0027 (*POROUS MATERIALS, *AIR INTAKE FILTERS, ROCK, PRESSURE
, FLUID FLOW, MOTION, FRICTION.) (EXPERIMENTAL DATA, TEST EQUIPMENT, TE
STS.) -

269 486 0029 THE POSITIONAL ACCURACY OF MAPS,

269 486 0029 IN THE POSITIONAL EVALUATION OF FOREIGN MAPS, THE
SCALED POSITIONS OF HORIZONTAL CONTROL ARE COMPARED WITH AVAILABLE
COORDINATES, AND FROM THE DIFFERENCES THE ROOT-MEAN-SQUARE ERROR OF
SCALED POSITIONS IS COMPUTED.

269 486 0028 (*NUMERICAL ANALYSIS, ERRORS, *TERRAIN, *MAPS, *POSITIO
N FINDING, AERIAL PHOTOGRAPHS.) (AERIAL PHOTOGRAPHY, MAPPING, MILITARY
INTELLIGENCE.) -

269 324 0031 REMARKS ON GENERAL TAUBERIAN THEOREMS,

269 324 0031 LET $K(x)$ BE A FUNCTION OF THE CLASS $L_1(K(x) dx)$,
, AND $H(x)$ A BOUNDED FUNCTION ON THE REAL LINE. CONSIDER THE FUNCTION
 $H(x) \int_{-\infty}^{\infty} K(x-y)H(y)dy$. IN THE THEORY OF GENERAL TAUBERIAN THEOREMS,
THE BEHAVIOUR OF $H(x)$, WHEN x TENDS TO INFINITY, IS CONSIDERED. WIENER
USING THE THEORY OF FOURIER TRANSFORMS, PROVED THAT IN CERTAIN CASES
THE EXISTENCE OF THE LIMIT $\lim_{x \rightarrow \infty} H(x)$ FOR A PARTICULAR FUNCTION $K \in L_1$,
IMPLIES THE EXISTENCE OF THE SAME LIMIT FOR ALL FUNCTIONS OF THE CLASS
 L_1 . THE MAIN WIENER'S TAUBERIAN THEOREM IS PRESENTED.

269 324 0030 (*SERIES, INTEGRAL TRANSFORMS, TAYLOR S SERIES, INEQUA
LITIES.) -

269 400 0032 APPRAISAL OF VARIOUS MECHANICAL TRANSMISSIONS,
APPENDIX 13.

269 400 0032 AN APPRAISAL IS MADE OF VARIOUS MECHANICAL MEANS OF
TRANSFORMING THERMAL POWER INTO HYDRAULIC POWER, I.E., STEAM ENERGY
INTO SHIP THRUST. THE STEAM MOTOR DIRECT DRIVE FOR A PROPELLER MAKES A
VERY ATTRACTIVE TRANSMISSION. IT IS BEING EXPLORED IN DETAIL UNDER A
SEPARATE PHASE OF THE PROGRAM. THE TORQUE CONVERTER DEVELOPMENT COULD
RESULT IN SUBSTANTIALLY IMPROVED PROPULSION SYSTEMS WITH EITHER TURBINE
OR RECIPROCATING STEAM PRIME MOVERS. OTHER MECHANICAL TRANSMISSION
SCHEMES WHICH WERE INVESTIGATED INCLUDE (1) HYDRAULIC SPLIT
TRANSMISSIONS USING BOTH HYDROKINETIC AND HYDROSTATIC ELEMENTS (2)
BELT DRIVES AND (3) VARIABLE PITCH PROPELLERS. HYDRODYNAMIC SHEAR
DRIVES ARE BEING EVALUATED SEPARATELY. OF THE TRANSMISSION CURRENTLY
THOUGHT FEASIBLE, THE FOTTINGER TRANSFORMER AND THE STEAM MOTOR
DIRECT-DRIVE OFFER THE GREATEST INCENTIVE FOR FURTHER INVESTIGATION.

269 400 0031 (*TRANSMISSIONS, AUTOMATIC TRANSMISSIONS, TORQUE COUPLI
NGS, EXTERNAL COMBUSTION ENGINES, STEAM TURBINES, GENERATORS, MAIN PROP
ULSION PLANTS, SUBMARINE ENGINES, *NUCLEAR PROPULSION, UNDERWATER PROPU
L-SION, ELECTRIC PROPULSION, MARINE PROPELLERS, VARIABLE PITCH PROPELLER
S, SUBMARINES.) -

269 401 0033 CONDENSER ANALYSIS, APPENDIX 14.

269 401 0033 NO ABSTRACT AVAILABLE

269 401 0032 (STEAM TURBINES, GENERATORS, SHIP TURBINES, STEAM POWER
PLANTS, *STEAM CONDENSERS, CONDENSER TUBE EXPANDERS, CON-FIGURATION, DE
SIGN.) *NUCLEAR PROPULSION, ELECTRIC PROPULSION, MAIN PROPULSION PLANT
S, SUBMARINES.) -

269 402 0034 MACHINERY SYSTEMS AND CONTROL CONSIDERATIONS,
APPENDIX 15.

269 402 0034 CONSIDERATION IS GIVEN TO EQUIPMENT AND PROCEDURES
THAT WILL PROVIDE SUBMARINE MACHINERY FOR PROPULSION, AUXILIARY, AND
HOTEL SERVICE THAT WILL BE CHARACTERIZED BY (1) LOW MAINTENANCE
AFLOAT (2) REDUCE SURVEILLANCE AFLOAT (3) FAILSICK IN PLACE OF
FAIL-DEAD CHARACTERISTIC (4) REDUCED MAN-HOURS AND DOWN TIME FOR MOST
PROBABLE SERVICE (5) REDUCED SKILL TO OPERATE, SUPERVISE,
TROUBLE-SHOOT, AND REPLACE (6) REDUCED APPARENT COMPLEXITY THRU
PACKAGED COMPONENTS AND FUNCTIONS (7) ENHANCED EFFICIENCY TO PROLONG
CRUISES AND (8) CAPABILITY TO OPERATE AT ALL SPEEDS AT ALL DEPTHS AND
UNDER HIGH SHOCK LOADS.

269 402 0033 (*CONTROL SYSTEMS, PNEUMATIC SYSTEMS, HYDRAULIC SYSTEMS
, *SERVOMECHANISMS, *ELECTRIC SERVOMECHANISMS, *HYDRAULIC SERVO-MECHANIS
MS, *PNEUMATIC SERVOMECHANISMS, PRES-SURE REGULATORS, *VALVES, *CONTROL
VALVES, SAFETY VALVES, THERMOSTATIC VALVES, *EXTERNAL COMBUSTION ENGINES
, *STEAM TURBINES, GENERATORS, MAINTENANCE, RELIABILITY, DESIGN, FEA-SI
BILITY STUDIES.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDERWATER
PROPULSION, *NUCLEAR PROPULSION, ELECTRIC PROPULSION, SUBMARINES.) -

269 404 0035 DEVELOPMENT OF AN IMPROVED JAN 6299.

269 404 0035 THE STUDY TO EVALUATE CERTAIN AREAS OF ADVANCED TUBE MANUFACTURING TECHNIQUES AND TO APPLY THEM WHERE FEASIBLE TO THE JAN 6299 WAS CONTINUED. TABLES ARE PRESENTED LISTING ECCENTRICITY DATA AND HUMIDITY TEST RESULTS FOR PRESENT PRODUCTION TUBES. A DESCRIPTION OF THE PROPOSED REDESIGN OF THREE SEALS FROM LEAD TO HARD SOLDER IS INCLUDED. LIFE RESULTS OF THE CATHODE SPRAY DENSITY EVALUATION ARE SUMMARIZED.

269 404 0034 (*ELECTRON TUBES, SEALS, COAT-INGS, DESIGN, PROCESSING, *MANUFACTURING METHODS, LIFE EXPECTANCY, HUMIDITY, TESTS.) -

269 888 0036 DETERMINATION OF THE SURFACE TEMPERATURE OF WATER DURING EVAPORATION STUDIES. A COMPARISON OF THERMISTOR WITH INFRARED RADIOMETER MEASUREMENTS.

269 888 0036 THE TEMPERATURE OF A WATER SURFACE WAS MEASURED BY TWO TECHNIQUES, ONE UTILIZING A COMMERCIAL IR RADIOMETER, AND THE OTHER, THERMISTOR PROBES. BOTH METHODS WERE SATISFACTORY FOR FOLLOWING THE CHANGES IN SURFACE TEMPERATURE DURING EVAPORATION STUDIES. THE RADIOMETER WAS LESS SENSITIVE TO CHANGES IN TEMPERATURE THAN THE THERMISTORS, BEING LIMITED TO CHANGES IN TEMPERATURE OF 0.1 C OR GREATER. THE RADIOMETER HAS THE ADVANTAGE OF MEASURING THE TEMPERATURE OF A MUCH THINNER LAYER OF WATER NEAR THE SURFACE THAN THE THERMISTOR (0.1 MM AS COMPARED TO 2 OR 3 MM). IT ALSO RESPONDS MORE RAPIDLY TO CHANGES IN WATER TEMPERATURE THAN THE THERMISTOR AND DOES NOT REQUIRE CONTACT WITH THE WATER.

269 888 0035 (*WATER, EVAPORATION, *SURFACE TEMPERATURES, THIN FILMS, MONOMOLECULAR FILMS, TEMPERATURE, MEASUREMENT, *THERMISTORS, RESIST-ANCE THERMOMETERS, *RADIOMETERS, INFRARED RADIATION, SENSITIVITY.) -

269 891 0037 ON THE DESIGN OF A HIGHLY RELIABLE HF DIGITAL COMMUNICATION SYSTEM. PROBLEMS, DESIGN PROCEDURES AND THE DESCRIPTION OF A PROPOSED DESIGN,

269 891 0037 FOR THE OPTIMUM DESIGN OF A DIGITAL HF SYSTEM USING PULSE REDUNDANCY, IT WAS CONCLUDED THAT STATISTICAL INFORMATION ON THE CORRELATION BETWEEN DISTURBANCES MUST BE KNOWN. THIS INFORMATION IS NOT AVAILABLE. FROM OTHER INFORMATION AND BY ANALOGY, IMPORTANT DESIGN CHARACTERISTICS AND REQUIREMENTS FOR AN OPTIMUM DESIGN CAN BE QUALITATIVELY EXTRAPOLATED (1) WIDE BANDWIDTH (GREATER THAN 3 KC) TO PERMIT EFFECTIVE UTILIZATION OF FREQUENCY DIVERSITY, (2) INTERLEAVING OF SUB-BITS FROM VARIOUS INFORMATION-BITS TO PERMIT EFFECTIVE UTILIZATION OF TIME DIVERSITY, (3) USE OF SHORT-DURATION PULSES FOLLOWED BY LONG DEAD PERIODS TO PROVIDE HIGH POTENTIAL PROTECTION AGAINST MULTIPATH DISTORTION BY SELFINTERFERENCE, AND (4) USE OF A DEMODULATION TECHNIQUE WHICH UTILIZES, RATHER THAN REJECTS, MULTIPATH SIGNAL CONTRIBUTIONS. HOWEVER, IT WAS ALSO CONCLUDED THAT IT IS ENTIRELY FEASIBLE TO DESIGN AND BUILD A 3 KC BANDWIDTH SYSTEM WHICH WILL OFFER SUBSTANTIAL PERFORMANCE ADVANTAGES OVER AN FSK (FREQUENCY SHIFT KEYING) SYSTEM.

269 891 0036 (DESIGN OF HIGH FREQUENCY, AIR TO SURFACE; *RADIO COMMUNICATION SYSTEMS, *DATA TRANSMISSION SYSTEMS, *DIGITAL SYSTEMS.) (MULTIPATH TRANSMISSION, FREQUENCY SHIFT KEYERS, DIVERSITY RECEPTION, DIVERSITY SYS-TEMS.) -

269 487 0038 CONTROL PERFORMANCE UNDER ACCELERATION WITH SIDEARM ATTITUDE CONTROLLERS,

269 487 0038 THIS PAPER PRESENTS PROCEDURES, DATA, AND CONCLUSIONS BASED ON CLOSED-LOOP CENTRIFUGE EXPERIMENTS IN WHICH SIDE-ARM CONTROLLERS WERE USED BY PILOTS TO PERFORM SPECIFIC CONTROL TASKS. UNDER CERTAIN CONDITIONS THE PILOTS COULD PERFORM AS WELL IN ADVERSE ACCELERATION FIELDS AS THEY COULD STATICALLY, EVEN THOUGH THEY WERE EXERTING MORE PHYSICAL EFFORT AND PSYCHOLOGICAL CONCENTRATION, AND WERE ENDURING VISUAL IMPAIRMENT, CHEST PAINS, BREATHING DIFFICULTIES, AND OTHER STRESSFUL EFFECTS OF ACCELERATION. THE PILOTS DEMONSTRATED A REMARKABLE ABILITY TO ADAPT TO PHYSIOLOGICALLY SEVERE ACCELERATION ENVIRONMENTS, AND THEY MAINTAINED CONTROL PERFORMANCE WITHIN ACCELERATION TIME HISTORY PROFILES WHICH CONTAINED VECTORS WITH AMPLITUDES AS HIGH AS 15 G (CHEST TO BACK), -7 G (BACK TO CHEST), AND 7 G (HEAD TO FOOT). SOME CLOSED-LOOP HUMAN CENTRIFUGE SIMULATIONS WERE CONDUCTED WHICH PROVIDED HUMAN FACTORS DATA WHICH MAY HAVE APPLICATION TO THE DESIGN AND EVALUATION OF SIDE-ARM CONTROLLERS FOR USE WITHIN PROPOSED SPACE VEHICLES.

269 487 0037 (*ACCELERATION TOLERANCE, CENTRIFUGES, LABORATORY EQUIPMENT, PILOTS, STRESS (PHYSIOLOGY), STRESS (PSYCHOLOGY), CONTROL, EFFECTIVENESS, SIMULATION.) -

269 497 0039 BIBLIOGRAPHY OF PUBLICATIONS. SUPPLEMENT I.

269 497 0039 NO ABSTRACT AVAILABLE

269 497 0038 (*GEOPHYSICS, *ALASKA, GEO-PHYSICAL PROSPECTING, EARTHQUAKES, *BIBLIOGRAPHY.) -

269 498 0040 HIGH LATITUDE GEOPHYSICAL DATA FOR AUGUST-SEPTEMBER 1961.

269 498 0040 NO ABSTRACT AVAILABLE

269 498 0039 (*GEOPHYSICS, *DATA, TABLES, ALASKA.) (EARTH, ELECTRIC CURRENTS, *TERRESTRIAL MAGNETISM, NOISE (RADIO), SOLAR NOISE, EXTRATERRESTRIAL RADIO WAVES, ABSORPTION BY IONOSPHERE, AURORAE, RADAR ECHO AREA S, DIURNAL VARIATIONS, PERIODIC VARIATIONS, TABLES.) -

269 499 0041 DIAGNOSTICS OF A PLASMA FLAME EXHAUSTING TO ATMOSPHERIC PRESSURE,

269 499 0041 A SPECTROMETRIC METHOD TO MEASURE TEMPERATURE IN A HIGH TEMPERATURE GAS STREAM PRODUCED BY A GERDIEN-TYPE ARC PLASMA GENERATOR WAS DEVELOPED. THE FOWLER-MILNE PEAKING FUNCTION METHOD WAS EMPLOYED WHICH UTILIZED BOTH THE SPECTRAL LINE AND CONTINUUM RADIATION IN THE 4000 Å RANGE FROM AN ARGON PLASMA. EXCITATION TEMPERATURES MEASURED FROM LINE RADIATION AND ELECTRON TEMPERATURES DETERMINED FROM THE CONTINUUM RADIATION AGREED WITHIN ABOUT FIVE PERCENT. THE METHOD WAS APPLICABLE PROVIDED TEMPERATURES LARGER THAN 16,000 K EXISTED AT THE CENTER OF THE AXISYMMETRIC JET. THE RANGE OF TEMPERATURE MEASUREMENT WAS THEN FROM ABOUT 7000 TO 28,000 K. COMPARISON OF THE AVERAGE TEMPERATURE OBTAINED USING THE SPECTROMETRIC METHOD WITH THE AVERAGE TEMPERATURE OBTAINED USING AN ENERGY BALANCE INDICATED SERIOUS DISAGREEMENT. COMPARISON OF THE TOTAL ENTHALPY OBTAINED USING THE

SPECTRAL TEMPERATURE WITH THAT OBTAINED FROM THE ENERGY BALANCE ALSO INDICATED DISAGREEMENT. THE REASON FOR THE DISAGREEMENT WAS THAT THE JET CONSISTED OF HIGH FREQUENCY ARC CHANNELS MOVING ABOUT IN THE STREAM AND THAT THE RADIANT EMISSION RESULTED FROM THESE HIGH TEMPERATURE ELECTRONS RATHER THAN FROM THE AVERAGE GAS ATOMS.

269 499 0040 (PLASMA PHYSICS, *PLASMA JETS, GAS IONIZATION, HELIUM, *ARGON, TEMPERATURE, MEASUREMENT, INSTRUMENTATION, SPECTROGRAPHIC ANALYSIS.) (PLASMA JETS, EXHAUST GASES, EXHAUST FLAMES, THERMAL RADIATION, MATHEMATICAL ANALYSIS.) -

269 504 0042 INFRARED FIBER OPTICS.

269 504 0042 VITREOUS INFRARED TRANSMITTING MATERIALS WERE DRAWN INTO COATED AND UNCOATED FIBERS BY EMPLOYING TECHNIQUES DEVELOPED FOR THE FORMATION OF VISIBLE RADIATION TRANSMITTING GLASS COATED-GLASS FIBER. INFRARED TRANSMITTING FIBER WAS FABRICATED FROM GERMANATE, SILICATE AND ARSENIC TRISULFIDE. CRYSTALLINE SODIUM CHLORIDE WAS EXTRUDED INTO RELATIVELY LARGE DIAMETER FIBER. PLASTIC MATERIALS SUCH AS THE EPOXIES AND LUCITE ARE SHOWN TO BE SUITABLE POTTING MATERIALS FOR UNCOATED FIBER. ABSORPTION BANDS OF THESE MATERIALS DO NOT SERIOUSLY INFLUENCE THE TRANSMITTED RADIATION, HOWEVER, COMPOUNDS HAVING FEW ABSORPTION BANDS ARE TO BE FAVORED. THE PERFORMANCE OF FIBERS OF DIAMETER COMPARABLE TO THE WAVELENGTH OF THE TRANSMITTED RADIATION IS ANALYZED BY USING DIELECTRIC WAVEGUIDE THEORY, AND THE RESULTS ARE INTERPRETED FROM THE OPTICAL VIEWPOINT OF THIN FILM INTERFERENCE AND FRUSTRATED TOTAL REFLECTION.

269 504 0041 (*INFRARED OPTICAL SYSTEMS, FIBERS, OPTICS, *WAVE TRANSMISSION, INFRARED OPTICAL MATERIALS, INFRARED RADIATION, INFRARED DETECTORS.) (COATINGS, ARSENIC COMPOUNDS, SULFIDES, MAGNESIUM, OXIDES, POLYMERS, STYRENES, SILVER, CHLORIDES, EPOXY RESINS, ACRYLIC RESINS.) (INSTRUMENTATION, DESIGN, OPTICAL COATINGS, WAVEGUIDES, THEORY, DIELECTRICS, ENERGY.) -

269 507 0043 STUDY OF A CARBON DIOXIDE REDUCTION SYSTEM.

269 507 0043 AN ENGINEERING MODEL OF A SYSTEM FOR REDUCING CO₂ AT A RATE OF 500 CC/MIN BY REACTION WITH H₂ OVER HEATED CATALYSTS WAS DEVELOPED. THE PRIMARY PRODUCTS OF THE REACTION WERE SOLID C AND WATER VAPOR. TO RECOVER BREATHABLE O₂, CONDENSED WATER VAPOR WOULD BE FED TO AN ELECTROLYSIS CELL THE H₂ BY-PRODUCT OF THE ELECTROLYSIS WOULD THEN BE USED TO REDUCE MORE CO₂. SOLID CARBON IS REMOVED PERIODICALLY FROM THE APPARATUS AND DISCARDED. IN THE FINAL TEST, THE APPARATUS WAS OPERATED CONTINUOUSLY FOR A PERIOD OF 11 HR. AT ABOUT 10% ABOVE THE TARGET CONVERSION RATE. WE ESTIMATE THAT THE C DEPOSITS COULD BE ACCUMULATED FOR AT LEAST 2 DAYS IN THE PRESENT REACTOR BEFORE INTERRUPTING THE PROCESS FOR REMOVAL OF C AND RENEWAL OF CATALYST. WITH APPROPRIATE MAINTENANCE PROCEDURES, THE APPARATUS SHOULD OPERATE FOR THE SPECIFIED MAXIMUM OF 3 YR WITHOUT DIFFICULTY.

269 507 0042 (*CARBON DIOXIDE, *DECOMPOSITION, *REDUCTION, HIGH TEMPERATURE RESEARCH, RADIATION EFFECTS, PHOTOCHEMISTRY, ALKALI METALS, ALKALI METAL COMPOUNDS, HYDRIDES, HYDROGEN, CATALYSIS, CATALYSTS, IRON, WATER, SEPARATION, CARBON DEPOSITS.) (WATER, ELECTROLYSIS.) (SPACESHIPS, SATELLITE VEHICLES, *AIR CONDITIONING EQUIPMENT, PRODUCTION, OXYGEN.)

269 557 0044 EXPERIMENTS IN THE IMPROVEMENT OF THE IMPULSE RESPONSE OF TELEPHONE CIRCUITS,

269 557 0044 THE PROBLEM OF SHORTENING THE DURATION OF THE TELEPHONE CIRCUIT IMPULSE RESPONSE BY FILTERING IS CONSIDERED. IT IS SHOWN THAT HIGH-PASS FILTERING ACHIEVES THE DESIRED RESULT WITH AN ATTENDANT LOSS IN CIRCUIT BANDWIDTH, WHILE PERFECT PHASE EQUALIZATION (MATCHED FILTERING) OBTAINS BETTER RESULTS WITH NO LOSS IN BANDWIDTH. IT IS ALSO SHOWN THAT MATCHED FILTERING RESULTS IN A MORE DESIRABLE PULSE THAN IS OBTAINED BY THE COMBINATION OF BOTH MATCHED AND HIGH-PASS FILTERING.

269 557 0043 (*HIGH PASS FILTERS, *TELEPHONE COMMUNICATION SYSTEMS, MULTICHANNEL TELEPHONE SYSTEMS, CIRCUITS.) (PULSE TRANSMITTERS, PHASE MODULATION, *SIGNAL-TO-NOISE RATIO.) (DATA TRANSMISSION SYSTEMS, TELEPHONE LINES, TELEPHONE SIGNALS, ATTENUATION.) -

269 561 0045 RESEARCH ON MAGNETIC ROD STORAGE AND CONTROL UNITS FOR A SWITCHING CENTRAL OFFICE.

269 561 0045 WORK WAS CONTINUED ON THE DESIGN OF A HIGH-SPEED, DIGITAL SWITCHING CENTRAL SYSTEM WITH A MINIMUM USE OF SEMI-CONDUCTOR DEVICES AND A MAXIMUM UTILIZATION OF THE MAGNETIC ROD AS A LOGICAL AND STORAGE ELEMENT. DIGITAL SWITCHING TECHNIQUES COMBINED WITH AN EFFICIENT USE OF THE MAGNETIC ROD WILL RESULT IN A SWITCHBOARD DESIGN WITH HIGH RELIABILITY, COUPLED WITH MINIMAL SIZE, WEIGHT, AND COST. A DESCRIPTION OF THE MODIFIED TIMING CYCLE FOR THE DIGITAL SWITCHING CENTRAL IS PRESENTED. MAGNETIC LOGIC MIRROR NOTATION IS DESCRIBED. MAJOR PORTIONS OF THE REMOTE CONCENTRATOR ARE PRESENTED IN DETAIL.

269 561 0044 (*TELEPHONE COMMUNICATION SYSTEMS, DIGITAL SYSTEMS, SWITCHING CIRCUITS, PANEL BOARDS (ELECTRICITY), MULTIPLEX TRANSMISSION, STORAGE, CONTROL, DESIGN.) (*MULTI-CHANNEL TELEPHONE SYSTEMS, DATA TRANSMISSION SYSTEMS, ELECTRONIC SWITCHES, TIME INTERVAL COUNTERS, *MAGNETIC CORE SWITCHES.) -

269 562 0046 TRANSIENT ANALYSIS OF INTERACTING DYNAMICAL SYSTEMS BY THE PRINCIPLE OF ENERGY TRANSFORMATION,

269 562 0046 AN ENERGY TRANSFORMER IS DEFINED AS A REVERSIBLE DEVICE WHICH CONVERTS FREE ENERGY OF ONE FORM INTO ANOTHER AND VICE VERSA. BASIC TRANSFORMER EQUATIONS ARE DERIVED FOR THESE DEVICES WHICH ARE GOOD FOR BOTH STEADY-STATE AS WELL AS TRANSIENT OPERATIONS. USING THE TRANSFORMER ANALOGY, INTERACTING SYSTEMS CAN BE REPRESENTED BY A SINGLE EQUIVALENT CIRCUIT FROM WHICH TRANSIENT AND STEADY-STATE RESPONSES AND INTERACTING EFFECTS CAN BE CALCULATED. THE METHOD IS APPLICABLE TO NONLINEAR AS WELL AS LINEAR SYSTEMS. EXAMPLES ARE GIVEN TO ILLUSTRATE ITS APPLICATIONS IN ELECTROMECHANICAL AND HYDROMECHANICAL SYSTEMS.

269 562 0045 (ENERGY, *TRANSFORMERS, TRANS-DUCERS, *ELECTROMECHANICAL CONVERTERS, CIRCUITS, ELECTRICAL NETWORKS.) (NON-LINEAR DIFFERENTIAL EQUATIONS, LINEAR SYSTEMS.) -

269 568 0047 THEORY OF OPTIMUM MULTIPLE MEASUREMENTS.-

269 568 0047 MULTIPLE MEASUREMENTS WITH RANDOM INPUTS ARE STUDIED. METHODS OF WEIGHTING AND COMBINING THE MEASURED SIGNALS ARE PROPOSED. THE RELATIONSHIPS BETWEEN THE MEASURED SIGNALS AND THE DESIRED SIGNAL ARE ASSUMED LINEAR AND TIME-INVARIANT THE RANDOM INPUTS ARE ASSUMED STATIONARY WITH RATIONAL SPECTRAL DENSITY FUNCTIONS THE CRITERION OF PERFORMANCE USED IS TO MINIMIZE THE MEAN SQUARED VALUE OF THE CONTINUOUS ERROR BETWEEN THE ESTIMATE AND THE DESIRED SIGNAL AND THE WEIGHTING OPERATIONS ARE ASSUMED LINEAR. TWO KINDS OF SINGLE-RATE SYSTEMS ARE STUDIED SINGLE-RATE MULTIPLE MEASUREMENTS WITH KNOWN SPECTRAL DENSITY FUNCTIONS OF SIGNAL AND NOISE, AND SINGLE-RATE MULTIPLE MEASUREMENTS WITH KNOWN NOISE BUT UNKNOWN SIGNAL SPECTRAL DENSITY FUNCTIONS. A NEW METHOD EMPLOYING THE FREQUENCY DOMAIN OPTIMIZATION THEOREMS TOGETHER WITH FACTORIZATION THEOREMS OF RATIONAL MATRICES IS PROPOSED FOR OBTAINING THE OPTIMUM SYSTEM OF THE FIRST KIND.

269 568 0046 (*INTEGRAL TRANSFORMS, INTEGRAL EQUATIONS, MATRIX ALGEBRA, SPECTROGRAPHIC ANALYSIS.) (RADIO SIGNALS, NOISE (RADIO), INFORMATION THEORY.) THESES. -

269 570 0048 ELEMENTARY LATTICE THEORIES AND THEIR APPLICATION TO GAS ADSORPTION PHENOMENA,

269 570 0048 A REVIEW OF CERTAIN LATTICE THEORIES IS PRESENTED FOR DERIVING FLORY'S FORMULA FOR THE FREE ENERGY OF A SOLUTION CONSISTING OF MONOMER AND POLYMER MOLECULES. THE RESULTS ARE THEN REFORMULATED, MAKING THEM APPLICABLE TO SIMPLE LIQUIDS REQUARED AS A BINARY MIXTURE OF HIGHLY SYMMETRIC MOLECULES AND FRACTIONAL-SIZED HOLES. THESE RESULTS ARE ADAPTED TO PROVIDE A THEORY OF GAS ADSORPTION IN WHICH THE FRACTIONAL HOLE SIZE CONCEPT IS UTILIZED. ONE OBTAINS ISOTHERM EQUATIONS AND EXPRESSIONS FOR THE PARTIAL MOLECULAR CONFIGURATIONAL ENTROPIES IN WHICH THE HOLE SIZE PARAMETER R MAKES ITS APPEARANCE. FOR R EQUALS 1, THE RESULTS REDUCE TO THE ZERO-ORDER FOWLER-GUGGENHEIM RESULTS IT IS POINTED OUT THAT CERTAIN SYMMETRY PROPERTIES NO LONGER OBTAIN WHEN R EXCEEDS 1. THE THEORY IS COMPARED WITH EXPERIMENTAL WORK ON CERTAIN TYPES OF ADSORBENT-ADSORBATE SYSTEMS.

269 570 0047 (*LATTICES, THEORY, *LIQUIDS, *GASES, *SOLIDS, ABSORPTION, PHYSICAL PROPERTIES.) (MOLECULES, PARTICLES, VELOCITY, DENSITY, ENTROPY.) (*QUANTUM STATISTICS, PROBABILITY, INTEGRATION, STATISTICAL DISTRIBUTION.) -

269 574 0049 QUANTUM DETECTOR FOR MEASUREMENT OF EED BRIDGE WIRE TEMPERATURE RISE.

269 574 0049 THE CONSTRUCTION AND TESTING OF AN EXPERIMENTAL MODEL SQUIB QUANTUM DETECTOR IS DISCUSSED. A SECOND EXPERIMENTAL MODEL WAS ALSO STARTED. IN THIS MODEL, THE MIRROR AND THE DETECTOR WAS LEFT UNCEMENTED SO THAT ALIGNMENT COULD BE MADE BY ELECTRICAL MEANS. CERTAIN DESIGN CHANGES WERE ALSO MADE. TWO HOLES WERE DRILLED THROUGH THE SQUIB PLUG AND THE MICRODOT SHIELDED CABLES WERE CEMENTED INTO THESE HOLES. THE ELECTRICAL CONNECTIONS FROM THE DETECTOR AND THE VIBRATOR COIL COULD BE MADE WITH FINE WIRES SOLDERED TO THE MICRODOT CABLE, WHICH WAS RIGIDLY CEMENTED INTO THE PLUG.

269 574 0048 (*ELECTRIC DETONATORS, *ELECTRIC IGNITERS, ELECTRIC BRIDGE, EMPERARE ELECT GETS, L T W R, AZARD, DE E

CTORS, OPTICAL EQUIPMENT, *TEMPER-ATURE WARNING SYSTEMS, DESIGN, SENSITORS, OPTICAL EQUIPMENT, *TEMPER-ATURE WARNING SYSTEMS, DESIGN, SENSITIVITY, TESTS.) -

269 577 0050 BALLISTIC PROTECTIVE BUOYANT MATERIALS.

269 577 0050 ORLON NEEDLED BATTS WHICH WERE COMMERCIALY PROCESSED WERE INEFFECTIVE BUOYANTLY. ADDITIONAL CURING UPGRADED THE MATERIAL SLIGHTLY BUT A SUBSTANTIAL INCREASE IN THE BUOYANCY WAS OBTAINED BY COMPARTMENTATION (USING 6-IN. STRIPS OF THE ORLON BATT SEPARATED BY PLASTIC FILM TO FORM LARGER SECTIONS). THE EFFECT OF VARIOUS SURFACE FINISHES ON THE BALLISTIC PERFORMANCE OF 42 OZ/SQ YD BATTS CONTAINING ORLON STAPLE WAS INVESTIGATED. THE 3 FINISHES STUDIED WERE THE MANUFACTURER'S ORIGINAL ANTI-STATIC AGENT, HYDROPHOBED AEROGEL AND DECETEX-104 SILICON WATER-REPELLENT. THE ABILITY OF THE BATTS TO WITHSTAND FRAGMENT PENETRATION INCREASED AS THE FIBER-TOFIBER FRICTION DECREASED. A COMPARISON OF THE BALLISTICS OF 2 TYPES OF DACRON STAPLES, HYDROPHOBED, WAS OBTAINED. TYPE 5400 WAS VASTLY SUPERIOR TO TYPE 64. A 50/50 BLEND OF HYDROPHOBED ACRILAN AND DACRON WAS EQUAL BALLISTICALLY TO A 50/50 COMPOSITE OF THE SAME MATERIALS.

269 577 0049 (*BUOYANT MATERIALS, *PROTECTIVE CLOTHING, TERMINAL BALLISTICS.) (FIBERS, SYNTHETIC FIBERS, TEXTILES, *DACRON, *ORLON, *NYLON, RESINS, ACRYLIC RESINS, FLOTATION, CLEANING.) (FRAGMENTATION, PENETRATION, TESTS.) (*BODY ARMOR, MATERIALS.) -

269 583 0051 STARK EFFECTS IN THE NEAR INFRARED SPECTRA OF SIMPLE POLYATOMIC MOLECULES,

269 583 0051 A SURVEY WAS MADE OF STARK EFFECTS IN THE VIBRATION-ROTATION SPECTRA OF SIMPLE POLYATOMIC MOLECULES. EMPLOYING A LIGHT GUIDE TYPE STARK ABSORPTION CELL 90 CM LONG HAVING FRONT SURFACED MIRRORS AS PARALLEL PLATE ELECTRODES, FIELDS OF 120 KV/CM COULD BE OBTAINED WITH SAMPLE PRESSURES 1/4 MM HG. THE ELECTRODE SPACING OF 0.2 TO 0.5 MM WAS EVALUATED BY EXAMINING THE FRINGE SYSTEMS PRODUCED UPON PASSING LIGHT THROUGH THE CELL PERPENDICULAR TO ITS OPTICAL AXIS. FOR THIS PURPOSE, PARTIALLY TRANSPARENT MIRROR ELECTRODES WERE USED. AN EBERT-FASTIE SPECTROMETER OF THREE METER FOCAL LENGTH AND EQUIPPED WITH A 300 LINE/MM GRATING 200 MM LONG AFFORDED A RESOLVING POWER IN EXCESS OF 75,000 WHEN USED DOUBLE PASSED. LIQUID AIR COOLED PBS DETECTORS AND SYNCHRONOUS AMPLIFIERS WERE USED.

269 583 0050 (*ATOMIC SPECTRUM, *ELECTRIC FIELDS, *INFRARED SPECTROSCOPY, *MOLECULES.) (DIPOLE MOMENTS, POLARIZATION, QUANTUM MECHANICS, ENERGY.) (OPTICS, LIGHT TRANSMISSION, OPTICAL EQUIPMENT, MOLECULAR BEAMS.) (COATINGS OF ALUMINUM, CHROMIUM, GOLD.) (REFLECTION, DIFFRACTION GRATINGS, COLLIMATORS.) -

269 584 0052 MAIN PROPELLANT TANK PRESSURIZATION SYSTEM STUDY AND TEST PROGRAM. VOLUME III. DESIGN HANDBOOK.

269 584 0052 DESIGN INFORMATION ON LIQUID PROPELLANT TANK PRESSURIZATION SYSTEMS IS PRESENTED. THE AREAS COVERED ARE PRESSURIZATION GAS REQUIREMENTS, INCLUDING HAND CALCULATION PROCEDURES AND NOMOGRAPHS TANKAGE, INCLUDING MATERIAL PROPERTIES AND VOLUME AND WALL AREA CURVES AND COMPONENTS, INCLUDING STORED HE SYSTEM WEIGHT CURVES AND A SIMPLE BUT ACCURATE HEAT EXCHANGER DESIGN METHOD. (AUTHOR) (TISTW/DLW) OTS PRICE \$11.50 RADIATION LAB., U. OF MICHIGAN, ANN ARBOR. STUDIES IN RADAR CROSS SECTIONS - XLVI. THE CONVERGENCE OF LOW FREQUENCY EXPANSIONS IN SCALAR SCATTERING BY SPHEROIDS, BY T. B. A. SENIOR. 31 AUG 61, 143P. INCL. ILLUS. TABLES, 7 REFS. (SCIENTIFIC REPT. NO. 4 REPT. NO. 3648-4-T) 9CONTRACT AF 19(604)6655) 9AFCL-787) UNCLASSIFIED REPORT DESCRIPTORS (*RADAR ECHO AREAS, RADAR REFLECTIONS, ELECTROMAGNETIC WAVE REFLECTIONS, *ELLIPSOIDS, BODIES OF REVOLUTION, SCATTERING, DIFFRACTION, THEORY, PARTIAL DIFFERENTIAL EQUATIONS, WAVE ANALYSIS, MATHEMATICAL PREDICTION, MATHEMATICAL ANALYSIS.) FOR THE SCALAR PROBLEM OF THE DIFFRACTION OF A PLANE WAVE BY A SPHEROID THE EXACT SOLUTION IS KNOWN, AND AT LOW FREQUENCIES THE EXPRESSION FOR THE FAR FIELD AMPLITUDE CAN BE EXPANDED IN A SERIES OF INCREASING POSITIVE POWERS OF KA , WHERE K IS THE WAVE NUMBER AND $2A$ IS THE INTERFOCAL DISTANCE. THIS IS THE RAYLEIGH SERIES, AND IS CONVERGENT FOR SUFFICIENTLY SMALL VALUES OF KA . TO DETERMINE THE RANGE OF FREQUENCIES FOR WHICH THIS EXPANSION IS APPLICABLE AN ESSENTIAL FACTOR IS THE RADIUS OF CONVERGENCE, AND THE DISCUSSION IS DEVOTED ENTIRELY TO THE CALCULATION OF THIS QUANTITY. ATTENTION IS CONCENTRATED ON THE CASE IN WHICH THE PLANE WAVE IS INCIDENT NOSE-ON, AND THE RADIUS OF CONVERGENCE IS OBTAINED AS A FUNCTION OF THE LENGTH-TO-WIDTH RATIO FOR PROLATE AND OBLATE SPHEROIDS, HARD AS WELL AS SOFT. FOR OTHER ANGLES OF INCIDENCE IT CAN BE SHOWN THAT THE RADIUS IS NOT GREATER THAN THIS, AND IN MOST INSTANCES IT WOULD APPEAR TO BE THE SAME. 9AUTHOR)

269 584 0051 (LIQUID ROCKET PROPELLANTS, *PROPELLANT TANKS, PRESSURE, CONFIGURATION, GEOMETRY, VOLUME, DESIGN, MILITARY REQUIREMENTS, MATHEMATICAL ANALYSIS, HANDBOOKS.) (GAS GENERATING SYSTEMS, ROCKET FUELS, ROCKET OXIDIZERS, VAPORIZATION, COMBUSTION.) (GASES, LIQUEFIED GASES, OXYGEN, HYDROGEN, HYDRAZINES, METHYL HYDRAZINES, NITROGEN COMPOUNDS, TETROXIDES, STORAGE.) (PROPELLANT TANK LINERS, MATERIALS, METALS, PHYSICAL PROPERTIES.) HEAT EXCHANGERS. -

269 587 0053 SPACE RADIATOR ANALYSIS AND DESIGN. PART I,

269 587 0053 THE THERMAL ANALYSIS OF COMPONENT ELEMENTS OF SPACE RADIATORS IS DESCRIBED. ELEMENTS INCLUDE RECTANGULAR AND CIRCULAR PLATES OF UNIFORM THICKNESS, TRIANGULAR AND TRAPEZOIDAL FINS, AND CONSTANT TEMPERATURE-GRADIENT FINS. A COMPLETE CONDENSER AND A RADIATOR ARE ANALYZED AND ILLUSTRATIVE EXAMPLES GIVEN. THE THERMAL ANALYSES PRODUCED RELATIONSHIPS BETWEEN THE PHYSICAL PROPERTIES AND DIMENSIONS, ELEMENT AND ENVIRONMENTAL TEMPERATURES, AND RATES OF HEAT TRANSFER. THESE ARE SHOWN GRAPHICALLY FOR ALL TYPES OF ELEMENTS. THE OPTIMUM PROPORTIONS OF SPACE RADIATOR ELEMENTS HAVING THE GREATEST RATIO OF HEAT RADIATION RATE PER POUND OF WEIGHT ARE ALSO INDICATED GRAPHICALLY, AND PROCEDURES FOR THEIR CALCULATION ARE SHOWN. THE DISCUSSIONS ON CONDENSERS AND RADIATORS INCLUDE DIMENSIONAL-THERMAL RELATIONSHIPS AND WEIGHT-OPTIMIZING PROCEDURES FOR COMPLETE UNITS.

269 587 0052 (SPACESHIPS, SATELLITE VEHICLES, *RADIATORS, RADIANT HEATING PANELS, METAL PLATES, REFRIGERANT CONDENSERS, HEAT, TEMPERATURE CONTROL, HEAT TRANSFER, HEAT EXCHANGERS, CONVECTION, *THERMAL RADIATION, DESIGN, CONFIGURATION, EFFECTIVENESS, MATHEMATICAL ANALYSIS, MILITARY REQUIREMENTS.) -

269 589 0054 THE EFFECTS OF FEEDBACK AND GROUP TASK DIFFICULTY ON INDIVIDUAL AND GROUP PERFORMANCE,

269 589 0054 THIS EXPERIMENT WAS CONCERNED WITH THE EFFECTS OF FEEDBACK AND GROUP TASK DIFFICULTY ON THE PERFORMANCE OF INDIVIDUALS WORKING IN SEVEN MEN TEAMS AND ON GROUP PERFORMANCE. THE RESULTS INDICATE THAT THE PERFORMANCE OF INDIVIDUALS IMPROVE WHEN THEY WORK ON A GROUP TASK, AND THAT THE MOST PRONOUNCED IMPROVEMENT OCCURS FOR A DIFFICULT GROUP TASK WHEN INFORMATION ABOUT THE PERFORMANCE OF ALL TEAM MEMBERS AS WELL AS OF THE TEAM AS A WHOLE IS MADE AVAILABLE. WHEN INFORMATION ABOUT TEAM PERFORMANCE ALONE (CONFOUNDED FEEDBACK) IS GIVEN ONLY SLIGHT IMPROVEMENT OCCURS. GROUP TASK DIFFICULTY LED TO INCREMENTS IN INDIVIDUAL AND GROUP PERFORMANCE, ALTHOUGH THESE INCREMENTS WERE RELATIVELY WEAKER THAN THOSE DUE TO FEEDBACK. IT WAS INCIDENTALLY FOUND THAT INDIVIDUALS PERFORMING AT HIGH RATES WERE MORE SENSITIVE TO FEEDBACK THAN TO GROUP TASK DIFFICULTY, WHILE THE OPPOSITE WAS FOUND FOR GROUP MEMBERS PERFORMING AT LOW RATES.

269 589 0053 (*GROUP DYNAMICS, *JOB ANALYSIS, EFFECTIVENESS, FEEDBACK, LABOR.) SOCIOMETRICS, MATHEMATICAL ANALYSIS. -

269 593 0055 NOL RING TEST EVALUATION OF THREE HIGH MODULUS GLASS FIBERS,

269 593 0055 DATA ON THE STRENGTH PROPERTIES OF GLASS ROVING REINFORCED PLASTICS IS DISCUSSED. EXPERIMENTAL GLASS FORMULATIONS WERE USED IN THE PREPARATION OF TEST SPECIMENS WHICH WERE EVALUATED BY THE SERIES OF NOL RING TEST METHODS. RESULTS SHOW THAT MUCH PROGRESS WAS MADE IN THE DEVELOPMENT OF HIGHER MODULUS FIBERS FOR REINFORCED PLASTICS. A TENSILE MODULUS OF 13.4×10 TO THE 6TH POWER PSI WAS OBTAINED WITH YM-31-A IN A RING. CALCULATED TO A 100% GLASS BASIS, THE MODULUS OF THE GLASS WAS 17.6×10 TO THE 6TH POWER PSI, WHICH COMPARES WELL WITH 17×10 TO THE 6TH POWER PSI REPORTED IN LITERATURE.

269 593 0054 (*PLASTICS, REINFORCING MATERIALS, *GLASS TEXTILES, *CERAMIC FIBERS, FIBERS, FILAMENT WOUND CONSTRUCTION, RINGS, MECHANICAL PROPERTIES, TENSILE PROPERTIES, SHEAR STRESSES, TESTS.) (EPOXY RESINS, RESINS, MANUFACTURING METHODS, TEST METHODS.) -

269 595 0056 THERMODYNAMICS OF INTERSTITIAL SOLID SOLUTIONS.

269 595 0056 THE THERMODYNAMICS OF INTERSTITIAL SOLID SOLUTIONS IN TERMS OF THE CONTRIBUTIONS OF POSITIONAL AND VIBRATIONAL ENTROPY AND ZERO POINT ENTHALPY WAS CONSIDERED IN DETAIL FOR IDEAL AND RESTRICTED INTERSTITIAL SOLUTIONS. THE RESULTS WERE APPLIED TO CALCULATION OF PHASE EQUILIBRIA IN INTERSTITIAL IRON-CARBON ALLOYS AT ONE ATMOSPHERE AND HIGH PRESSURE. COMPARISON WITH OBSERVATIONS ON KINETICS OF THE BAINITE REACTION AND HIGH PRESSURE EQUILIBRIA ACTION YIELDS GOOD AGREEMENT. A METHOD EVOLVED FOR COMPUTING THE ENTROPY OF SOLUTIONS AND INTERMETALLIC COMPOUNDS FROM 0 K TO THE MELTING POINT WAS APPLIED TO 35

NACL TYPE COMPOUNDS (INCLUDING HIGH MELTING CARBIDES, OXIDES AND NITRIDES). THESE COMPUTATIONS COMPARE FAVORABLY WITH EXPERIMENTAL DATA. A STUDY OF THE INTERSTITIAL SOLUTIONS IN THE TITANIUM-OXYGEN SYSTEM INDICATES THAT THE HIGH TEMPERATURE STABILITY OF THE H.C.P. SOLUTION IS DUE TO THE ENTHALPY OF FORMATION.

269 595 0055 (*THERMODYNAMICS, CHEMICAL EQUILIBRIUM, *PHASE TRANSITIONS, *EUTECTICS, SOLID STATE PHYSICS.) (METALS, IRON, CARBON, *INTERMETALLIC COMPOUNDS, ALLOYS.) (CRYSTAL STRUCTURE, METALLURGY, CRYSTALS, LATTICES.) (MELTING, TEMPERATURE, TABLES.) -

269 596 0057 STRESS REDISTRIBUTION IN NOTCHED SPECIMENS UNDER CYCLIC STRESS.

269 596 0057 MOST MATERIALS EXHIBIT A CHANGE IN STRESS-STRAIN RELATIONSHIP WHEN SUBJECT TO FATIGUE STRESSES. THE EFFECT OF THIS CHANGE ON THE STRESS DISTRIBUTION ACROSS THE THROAT OF NOTCHED PLATE SPECIMENS OF MILD STEEL IS EXAMINED. THE STRAIN DISTRIBUTION ACROSS THE SPECIMENS WAS DETERMINED UNDER DYNAMIC CONDITIONS FOR VARIOUS NUMBERS OF CYCLES. TESTS OF UNNOTCHED SPECIMENS WERE USED TO OBTAIN THE CYCLIC STRESS-STRAIN PROPERTIES FOR CORRESPONDING NUMBERS OF CYCLES, AND FROM THESE DATA THE STRESS DISTRIBUTION IN THE NOTCHED SPECIMENS WAS DETERMINED. GOOD AGREEMENT WAS OBTAINED BETWEEN THE INTEGRAL OF THE STRESS DISTRIBUTION CURVE AND THE TOTAL LOAD ON THE SPECIMEN. TESTS IN WHICH THE STRAIN AMPLITUDE AT THE NOTCH ROOT WAS HELD CONSTANT REVEALED A DECREASING MAXIMUM STRESS WITH FATIGUE CYCLES. IN OTHER TESTS IN WHICH THE LOAD AMPLITUDE WAS CONSTANT, THE MAXIMUM STRESS AMPLITUDE DECREASED WITH NUMBER OF FATIGUE CYCLES, DESPITE AN INCREASING STRAIN AMPLITUDE. IN BOTH TYPES OF TEST, THE STRESS CONCENTRATION FACTOR DECREASED WITH INCREASING AVERAGE-STRESS AMPLITUDE, AND A FURTHER DECREASE OCCURS WITH INCREASING NUMBER OF FATIGUE CYCLES.

269 596 0056 (*STEEL, *FATIGUE (MECHANICS), STRESSES, DEFLECTION, TEST METHODS, METAL PLATES, CYLINDRICAL BODIES, ELASTICITY, PLASTICITY, HARDENING, DEFORMATION.) (TEST EQUIPMENT, STRAIN GAGES, LOADING, TESTS, THEORY.) -

269 600 0058 THE STUDY FOR AUTOMATIC ABSTRACTING C107-1U12.

269 600 0058 TECHNIQUES FOR THE AUTOMATIC ABSTRACTING OF TEXTUAL INFORMATION ARE PRESENTED. ONE APPROACH IS THE STUDY OF ATTRIBUTES OF CONTROLLED HUMANPRODUCED ABSTRACTS TO DEDUCE FROM SUCH STUDY A MECHANIZABLE TECHNIQUE FOR CREATING SIMILAR PRODUCTS. A PROCEDURE MAKING EFFICIENT USE OF MECHANIZED DATA HANDLING WAS IMPLEMENTED TO COLLECT, ORGANIZE, AND PRESENT LANGUAGE DATA FOR ANALYSIS. THE RESULTS OF SUCH ANALYSIS WERE FED BACK TO THE MACHINE AS THE BASIS FOR A NEW CYCLE OF EXPERIMENTS. A SECOND APPROACH IS BASED ON A SENTENCE CLASSIFICATION SCHEME FOR CONTENT REPRESENTATION AS A MEASURE FOR DETERMINING THE RELATIVE SIGNIFICANCE OF DIFFERENT PORTIONS OF AN ARTICLE. EXTRACT-TYPE ABSTRACTS WERE PRODUCED MANUALLY FOR 100 ARTICLES EACH ARTICLE WAS EXTRACTED SEPARATELY BY THREE INDIVIDUALS. EACH SENTENCE WAS CODED TO REFLECT THE NUMBER OF PERSONS SELECTING IT FOR EXTRACTION. FREQUENCY COUNTS OF THE MATERIAL IN EACH CATEGORY WERE MADE. THE FULL TEXT OF THE SAMPLE LIBRARY, TOGETHER WITH THE ABOVE INFORMATION, WAS RECORDED ON PUNCHED CARDS AND A COMPUTER PROGRAM WAS WRITTEN AND RUN. THE SECOND MAJOR APPROACH CONSISTS OF THEORETICAL INVESTIGATIONS TO CODE, AND ARTICLES.

269 600 0057 (AUTOMATIC, *ABSTRACTING, *DATA PROCESSING SYSTEMS, COM
PUTERS, CODING.) -
269 688 0059 BIOLOGICALLY ACTIVE STEROID GLYCOSIDES FROM
HOLOTHURIANS.

269 688 0059 PUBLISHED REPORTS SHOW THAT THE CRUDE HOLOTHURIN
DERIVED FROM THE CUVIERIAN TUBULES OF THE BAHAMIAN SEA-CUCUMBER
ACTINOPYGA AGASSIZI HAS A WIDE VARIETY OF BIOLOGICAL PROPERTIES,
INCLUDING AN IRREVERSIBLE BLOCKING ACTION ON NERVE, INTERFERENCE IN THE
SEQUENTIAL DEVELOPMENTAL PROCESSES OF THE SEA-URCHIN EGG, AND
INHIBITION OF CERTAIN TUMORS IN MICE. THE PUBLISHED PAPER APPENDED TO
THIS REPORT SUMMARIZES THE EFFECTS OF HOLOTHURIN ON VARIOUS BIOLOGICAL
SYSTEMS AND ALSO INCLUDES A BIBLIOGRAPHY OF THE SEVERAL PAPERS
PUBLISHED ON THIS SUBJECT.

269 688 0058 (*ECHINODERMS, *STERIODS, *GLY-COSIDES, TOXICITY, *FISH
ES, SHARKS, CHEMOTHER-APEUTIC AGENTS, NERVES, INHIBITION.) (*MARINE BIO
LOGY, BIOCHEMICAL TESTS, BIOLOGY, ECOLOGY, CHEMICAL PROPERTIES.) -
269 689 0060 NEUTRON AND X-RAY DIFFRACTION STUDIES ON THE
STRUCTURE OF WC AND A COMPARISON OF IT WITH EARLIER ELECTRON
DIFFRACTION DATA.

269 689 0060 A NEUTRON DIFFRACTION STUDY OF WC REVEALS THAT WC
CRYSTALLIZES IN A HEXAGONAL FORM WITH ONE W ATOM IN 000 AND ONE C ATOM
IN 1/3 2/3 1/2. NEUTRON DIFFRACTION STUDY IN CONTRADISTINCTION TO THE
ELECTRON AND X-RAY DIFFRACTION STUDIES CONCLUSIVELY ESTABLISHES THAT WC
DOES NOT CRYSTALLIZE IN THE NIAS TYPE STRUCTURE.

269 689 0059 (*TUNGSTEN COMPOUNDS, *CARBIDES, PHASE STUDIES, *CRYSTA
L STRUCTURE, METALLIC CRYSTALS, CRYSTALS, NEUTRON DIFFRACTION ANALY-SIS,
X-RAY DIFFRACTION ANALYSIS, ELECTRON DIF-FRACTION ANALYSIS.) METALLIC
COMPOUNDS. -

269 692 0062 EXPLORATION OF THE BIOCHEMICAL BASIS FOR DIFFERENT
ELECTROPHYSIOLOGICAL STATES OF THE NERVOUS SYSTEM.

269 692 0062 NO ABSTRACT AVAILABLE

269 692 0061 (*BRAIN, *BIOCHEMICAL TESTS, *ELECTRICAL PROPERTIES, CE
LLS (BIOLOGY).) (*NERVOUS SYSTEM, TISSUES (BIOLOGY), *METAB-OLISM, ENZYM
ES, OXIDATION, METABOLIC PROD-UCTS, ADENOSINE PHOSPHATES, BRAIN TUMOR, N
UCLEOTIDES.) INSTRUMENTATION, *MEDICAL RESEARCH. -

269 739 0063 DEVELOPMENT OF LOW TEMPERATURE BRAZING OF TUNGSTEN
FOR HIGH TEMPERATURE SERVICE.

269 739 0063 REMELT SEPARATION TEMPERATURE WAS DETERMINED FOR
SPECIMENS BRAZED WITH PT-2.15B ALLOY, WITH AND WITHOUT W POWDER
ADDITIONS. JOINT THICKNESS STUDY IS CONTINUING. ADDITIONS OF TI OR ZR
TO JOINTS MADE WITH PT-3.08 ALLOY WERE NOT EFFECTIVE IN RAISING REMELT
TEMPERATURE.

269 739 0062 (REFRACTORY MATERIALS, *TUNGSTEN, *BRAZING, SILVER SOLD
ERS, LOW TEMPERATURE RESEARCH.) (SOLDERING ALLOYS, PLATINUM ALLOYS, BOR
ON ALLOYS, ADDITIVES, POWDER ALLOYS, POWDER METALS, TUNGSTEN.) (WELDED
JOINTS, METAL JOINTS, DIFFUSION, MELTING, HEAT TREATMENT, CHEMICAL REACT
IONS, THICKNESS.) (TUNGSTEN COMPOUNDS, BORIDES, ADDITIVES, TITANIUM, ZI
RCONIUM, THIN FILMS, FOILS, TESTS.) -

269 693 0064 CONCEPTS AND OBJECTIVES FOR A THREAT
EVALUATION/ACTION SELECTION SIMULATION RESEARCH FACILITY,

269 693 0064 THE IMPORTANCE OF TIMELY THREAT EVALUATION AND
ACTION SELECTION (TEAS) IN THE POST-1970 ERA IS PARAMOUNT IN THE FACE
OF (1) ADVANCES IN WEAPONS TECHNOLOGY LEADING TO TREMENDOUS INCREASES
IN LETHALITY AND SPEED OF DELIVERY, AND (2) THE PROBABLE AND HIGHLY
UNDESIRABLE CONSEQUENCES OF SELECTING A WRONG ACTION. PRELIMINARY
CONSIDERATIONS ARE PRESENTED WHICH SHOULD AFFECT THE DESIGN OF A
FACILITY TO BE USED FOR THE SIMULATION OF A POST-1970 TEAS ACTIVITY.
EMPHASIZED ARE THE ENVIRONMENTAL AND CONCEPTUAL 9 6939N6

269 693 0063 (*MILITARY OPERATIONS, *AIR FORCE OPERATIONS, *DISPLAY
SYSTEMS, DATA PROCESSING SYSTEMS, COMMAND SYSTEMS, CONTROL SYSTEMS, WARF
ARE, SIMULATION, *TEST FACILITIES, OPERATIONS RESEARCH.)
269 697 0065 PROJECT LIGHTNING.

269 697 0065 APPLICATION OF THE PROCESSOR SYSTEM HAS BEEN
MODIFIED SOMEWHAT IN THAT THE KILOMEGACYCLE COMPUTER IS TO BE
CONSIDERED PART OF A LARGER DATAPROCESSING SYSTEM AND IS NOT INTENDED
PRIMARILY FOR ARITHMETIC PROBLEMS. THE QUESTION OF CONVENTIONAL VERSUS
UNCONVENTIONAL DESIGN IS DISCUSSED. ANOTHER BOUNDARY, THAT OF THE
EFFECT OF TUNNEL-DIODE COMPONENTS, HAS BEEN MODIFIED IN THAT THE LOW
FAN POWER OF TUNNEL DIODE CIRCUITS CONFLICTS WITH THE DESIRE FOR
COMPLEX AND SOPHISTICATED LOGIC. VARIOUS ASPECTS OF INPUT/OUTPUT ARE
ALSO DISCUSSED, AND THE CONTROL SCHEME IS PRESENTED. FINALLY, THE
CHARACTERISTICS OF THREE PROPOSED COMPUTERS (FROM LARGE TO SMALL) ARE
SET FORTH AS A FAMILY OF DESIGNS.

269 697 0064 (*DATA PROCESSING SYSTEMS, *COMPUTERS.) (ELECTRONIC CI
RCUITS, COMPUTER LOGIC, MEMORY DEVICES, DIODES.) RESEARCH PROGRAM ADMIN
ISTRATION.
269 698 0066 PROJECT LIGHTNING.

269 698 0066 NO ABSTRACT AVAILABLE

269 698 0065 (*DATA PROCESSING SYSTEMS, *COM-PUTERS.) (*ELECTRONIC
CIRCUITS, COMPUTER LOGIC, MEMORY DEVICES.) (TRANSISTORS, TRIODES, CADMI
UM COMPOUNDS, SULFIDES, THIN FILMS, SEMI-CONDUCTOR FILMS, CRYSTALS.) (D
IODES, GERMA-NIUM, GALLIUM COMPOUNDS, ARSENIDES.) (TRANS-MISSION LINES,
ELECTRICAL CONNECTORS.) OSCILLOSCOPES.
269 699 0067 A DUAL DECOMPOSITION PRINCIPLE,

269 699 0067 A DECOMPOSITION PRINCIPLE FOR LINEAR PROGRAMMING IS
PRESENTED. THE TECHNIQUE MAY BE VIEWED AS A DUAL OF THE DANTZIG -
WOLFE DECOMPOSITION PRINCIPLE FOR LINEAR PROGRAMS. THE PROGRAM MATRIX
IN WHAT WE MAY CALL THE BASIC PROBLEM IS CONSIDERED AS HAVING MANY (AN
INFINITE NUMBER OF) COLUMNS. ONE VISUALIZES A BASIC PROBLEM, IN PRIMAL
FORM, WHERE, THE SET OF PERMISSIBLE COLUMNS IS NOT FINITE, AS IN THE
USUAL PRIMAL FORM, BUT IS A GIVEN CONVEX POLYHEDRON. THE BASIC PROBLEM
IS SOLVED BY THE MODIFIED SIMPLEX METHOD, BUT AT EACH ITERATION THE
COLUMN TO ENTER THE CURRENT BASIS EMERGES AS THE SOLUTION TO AN
AUXILIARY LINEAR PROGRAM AND IS, IN FACT, AN EXTREME POINT OF THE GIVEN
CONVEX POLYHEDRON.

269 699 0066 (*SCHEDULING, *LINEAR PROGRAM-MING, DIGITAL COMPUTERS, MANAGEMENT ENGINEERING, PRODUCTION, ECONOMICS, RELIABILITY.) OPERATIONS RESEARCH. -

269 709 0068 DEVELOPMENT OF ELECTRONIC VERNEUIL FURNACE.

269 709 0068 RESEARCH IS CONCERNED WITH THE DEVELOPMENT OF TECHNIQUES FOR THE GROWTH OF REFRACTORY SINGLE CRYSTALS BY A MODIFIED VERNEUIL TECHNIQUE. AN INVESTIGATION WAS MADE OF METHODS OF ATTAINING HIGH TEMPERATURES BY EXTRACTING ENERGY FROM ELECTRICAL PLASMA TORCHES RATHER THAN BY GASEOUS COMBUSTION WHICH IS THE ESTABLISHED TECHNIQUE. THE THEORETICAL CONSIDERATIONS AND PRACTICAL EFFORTS RELATING TO THE DEVELOPMENT OF A FUNCTIONING PLASMA TORCH ARE DESCRIBED.

269 709 0067 (LABORATORY FURNACES, *PLASMA JETS, PLASMA PHYSICS, *HIGH TEMPERATURE RE-SEARCH, SINGLE CRYSTALS, *REFRACTORY MATERIALS, ELECTRIC DISCHARGES, GAS DISCHARGES, RADIO-FREQUENCY POWER, RADIOFREQUENCY GENERATORS, ALTERNATING CURRENT, THEORY, DESIGN.) (CRYSTAL STRUCTURE, CRYSTALS, GROWTH.) -

269 713 0069 THE EFFECT OF SURFACE TEMPERATURE VARIATIONS ON THE POLAR NIGHT JET,

269 713 0069 THE POSSIBILITY OF DIFFERENTIAL HEATING IN THE OZONE LAYER DUE TO DIFFERENCES IN GROUND AND LOWER TROPOSPHERE TEMPERATURES AS A MECHANISM FOR PRODUCING THE OBSERVED STATIONARY PERTURBATIONS OF THE POLAR NIGHT JET WAS EXAMINED. IT IS FOUND THAT THIS MECHANISM IS NOT LIKELY TO BE THE CAUSE OF THE DISTURBANCES.

269 713 0068 (STRATOSPHERE, *JET STREAMS, OZONE, HEATING.) (ATMOSPHERE MODELS, PERTURBATION THEORY, PARTIAL DIFFERENTIAL EQUATIONS, INTEGRAL TRANSFORMS.) -

269 714 0070 THE SUCCESSION PROBLEM AND THE TRANSITION TO COMMUNISM,

269 714 0070 NO ABSTRACT AVAILABLE

269 714 0069 (*USSR, *COMMUNISM, *POLITICAL SCIENCE.) -

269 721 0071 DEVELOPMENT OF REFRACTORY CERAMICS THAT CAN BE PROCESSED AT TEMPERATURES CONSIDERABLY LOWER THAN THEIR MAXIMUM USE TEMPERATURE.

269 721 0071 AN EVALUATION OF THE STRENGTH, ELECTRICAL PROPERTIES, AND REFRACTORINESS OF BODIES FABRICATED CONTAINING 94% AL₂O₃ UTILIZING DIFFERENT FORMS OF THE MGO ADDITIVE IS PRESENTED. ALUMINA BODIES IN THE ALUMINA-CHROMIA-TITANIA, ALUMINA-CHROMIA, AND ALUMINA-CHROMIA-SILICA SYSTEMS WERE FABRICATED. INTRODUCTION OF THE DEVITRIFIABLE GLASS, LEAD ALUMINOSILICATE, INTO AN ALUMINA MATRIX WAS INVESTIGATED. THE EFFECT OF LONGER SOAKING PERIOD UPON DENSITY WAS ALSO STUDIED.

269 721 0070 (*RADOMES, MATERIALS, PROCESSING, TEMPERATURE.) (*REFRACTORY MATERIALS, *CERAMIC MATERIALS, ALUMINUM COMPOUNDS, MAGNESIUM COMPOUNDS, CHROMIUM COMPOUNDS, TITANIUM COMPOUNDS, SILICON COMPOUNDS, OXIDES, MIXTURES, GLASS, SILICATES, LEAD COMPOUNDS, CRYSTAL STRUCTURE.) (ALUMINUM COMPOUNDS, OXIDES, OXYCHLORIDES.) (PREPARATION, PROCESSING, SINTERING.) (PHYSICAL PROPERTIES, DENSITY, POROSITY, ELECTRICAL PROPERTIES, DIELECTRIC PROPERTIES.) -

269 725 0072 ORBITS WITH FIXED LOW THRUST,

269 725 0072 THE METHOD OF KRYLOV-BOGOLIUBOFF IS USED TO ANALYZE ORBITS WITH AN ADDITIONAL LOW THRUST IN A FIXED DIRECTION IN THE ORBIT PLANE. ALGEBRAIC FORMULAS FOR ORBITAL ELEMENTS ARE OBTAINED. IT IS SHOWN THAT EVENTUALLY THE ORBITAL ECCENTRICITY INCREASES TO 1 WITH THE ORBIT APPROACHING A STRAIGHT LINE THROUGH THE CENTER OF THE EARTH. HOWEVER, IN A PRACTICAL CASE, IT IS LIKELY THAT COLLISION WOULD OCCUR BEFORE ESCAPE.

269 725 0071 (SATELLITE VEHICLES, SATELLITE VEHICLE TRAJECTORIES, *ORBITAL FLIGHT PATHS, THRUST, MATHEMATICAL ANALYSIS.) -

269 039 0073 STUDIES PERTAINING TO BAMBI. SPACE-TIME SAMPLING AND FILTERING.

269 039 0073 METHODS WERE DEVELOPED WHICH ARE APPLICABLE TO THE PROBLEM OF MANIPULATING VISUAL DATA AVAILABLE TO A SATELLITE SO AS TO ENHANCE THE DETECTION OF A GIVEN TARGET. STUDY WAS ORIENTED TOWARD THE DETECTION OF A MISSILE IN THE POWERED PHASE. CONSIDERING THE INTENSITY DISTRIBUTION ON AN OPTICAL IMAGE PLANE AS THE INPUT, FOUR DIFFERENT TYPES OF SPATIAL FILTERS ARE DEVELOPED. THE STATISTICAL DESCRIPTION OF THE BACKGROUND, WHICH MUST BE KNOWN PRIOR TO APPLYING THE THEORY, VARIES FROM THE AUTOCORRELATION FUNCTION FOR A LINEAR FILTER TO A COMPLETE STATISTICAL DESCRIPTION FOR THE GENERAL STATISTICAL AND DECISION THEORY FILTERS.

269 039 0072 (*ANTIAIRCRAFT DEFENSE SYSTEMS, *SATELLITE VEHICLES, OPTICAL SYSTEMS, INFRARED OPTICAL SYSTEMS, *OPTICAL FILTERS, *INFRARED FILTERS, OPTICAL IMAGES, INFRARED IMAGES, SAMPLING, SIGNAL-TO-NOISE RATIO, STATISTICAL FUNCTIONS.) (GUIDED MISSILES, SURFACE TO SURFACE, LAUNCHING, DETECTION, DETECTORS.) -

269 316 0074 INSTRUMENTATION FOR USE IN THE STUDY OF EXTRATERRESTRIAL PARTICLES.

269 316 0074 RESEARCH WAS DIRECTED TOWARD THE DETERMINATION OF THE PROPERTIES OF EXTRA-TERRESTRIAL PARTICLES ENTERING THE EARTH'S ATMOSPHERE. INSTRUMENTATION AND TECHNIQUES WERE DEVELOPED WITH WHICH TO MEASURE THE INFLUX RATE, SIZE, MASS, AND VELOCITY OF MICROMETEORITES. ADDITIONAL INSTRUMENTATION WAS DEVELOPED TO STUDY AND CALIBRATE MICROMETEORITE DETECTORS IN THE LABORATORY AND TO INVESTIGATE NEW DETECTION TECHNIQUES. INSTRUMENTS WERE INSTALLED IN BALLOONS, ROCKETS, AND OTHER SPACE VEHICLES AND THE DATA OBTAINED FROM THE FLIGHTS OF THESE VEHICLES WAS ANALYZED IN THE LABORATORY.

269 316 0073 (*METEORITES, PARTICLES, *INSTRUMENTATION, MEASUREMENT .) (METEORITES, SIMULATION OF DETECTION.) (CALIBRATION OF METEORITES, PARTICLES, DETECTORS.) (VACUUM SYSTEMS FOR ACCELERATION OF PARTICLES.) (HYPERVELOCITY GUNS FOR ACCELERATION OF PARTICLES.) (INSTRUMENTATION FOR ANALYSIS OF *INTERSTELLAR MATTER.) -

269 383 0075 DURATION OF THE SLOW NO DECOMPOSITION REGIME BEHIND SHOCK WAVES AROUND 3000 DEGREE K AND ITS RELATION TO THE RATE COEFFICIENT OF THE EXCHANGE PATH NO 0 YIELDS N 02.

269 383 0075 AN ANALYSIS OF THE CHEMICAL MECHANISMS GOVERNING THE FIRST AND SLOW NO DECOMPOSITION REGIME BEHIND SHOCK WAVES AROUND 3000 K IS PROVIDED. THE DURATION OF THIS REGIME IS ESSENTIALLY INVERSELY PROPORTIONAL TO THE RATE COEFFICIENT k_6 WHICH GOVERNS THE EXCHANGE PATH $\text{NO} + \text{O} \rightarrow \text{N} + \text{O}_2$ AND IS RATHER INSENSITIVE TO CHANGES OF ADDITIONAL RATE COEFFICIENTS ENTERING THE EXPRESSION. COMPARISON OF CALCULATED VALUES FOR THE TIME DURATION BASED UPON A VALUE k_6 EQUALS 2.03×10 TO THE 10TH POWER $1/T^2 \times \exp(-38100/RT)$ CC/MOLE/SEC WITH EXPERIMENTAL SHOCK TUBE RESULTS SHOWS AGREEMENT WITHIN 50% FOR TEMPERATURES BETWEEN 2250 AND 3450 K. THIS RESULT IMPLIES THE VALIDITY OF THE PRE-EXPONENTIAL TEMPERATURE DEPENDENCY FACTOR $1/T^2$ AS DERIVED FROM COLLISION THEORY FOR THE HIGH TEMPERATURE EXTRAPOLATION OF THE VALUE OF k_6 DETERMINED BY PREVIOUS INVESTIGATIONS AROUND 500 K.

269 383 0074 (SHOCK TUBES, SHOCK WAVES, DECOMPOSITION, REACTION KINETICS, EXCHANGE REACTIONS, *NITROGEN COMPOUNDS, *OXIDES AND OXYGEN, HIGH TEMPERATURE RESEARCH, DENSITY, KINETIC THEORY, MATHEMATICAL ANALYSIS.)

269 413 0076 STABILITY OF CUSHIONED LUNAR LANDING.

269 413 0076 STABILITY AGAINST OVERTURNING IS ANALYZED FOR A LANDING VEHICLE HAVING A CRUSHABLE PAD FIXED TO ITS BASE AS THE LANDING DEVICE. THE PAD MATERIAL IS ASSUMED IDEALLY RIGID-PLASTIC AND ITS UNCRUSHED SHAPE IS THAT OF A PRISM WITH ANNULAR CROSS SECTION. THE ANALYSIS IS CONFINED TO PLANAR MOTION OF LANDINGS MADE ON A SLOPING SURFACE. BOUNDARIES DEFINING THE REGIONS OF INITIAL TRANSLATORY VELOCITIES THAT RESULT IN STABLE LANDINGS ARE GIVEN FOR A CLASS OF EXAMPLES OF PRACTICAL INTEREST IN WHICH THE VEHICLE IS HORIZONTAL AND NONROTATING AT INITIAL CONTACT. SEVERAL SETS OF VEHICLE AND SURFACE PARAMETERS ARE STUDIED, CENTERED ABOUT A VEHICLE WITH SATISFACTORY CHARACTERISTICS FOR A SOFT LUNAR LANDING ON A 15-DEGREE SLOPE. IT IS FOUND THAT DUE TO AN INITIAL ANGLE BETWEEN THE PAD AND LANDING SURFACE, A STRIP OF INSTABILITY TENDS TO APPEAR CENTERED ABOUT A CRITICAL INITIAL VELOCITY NORMAL TO THE SURFACE. THIS SITUATION IS AGGRAVATED BY INCREASING EITHER THE SLOPE, THE VEHICLE MASS RADIUS OF GYRATION, THE CENTER-OF-GRAVITY HEIGHT, OR THE PAD-CRUSHING STRESS. DROP TESTS AND THE NUMERICAL RESULTS OF THIS STUDY INDICATE THAT, EVEN FOR REALISTIC CRUSHABLE MATERIALS, AN ANALYSIS BASED ON RIGID-PLASTIC MATERIAL BEHAVIOR GIVES A GOOD INDICATION OF STABILITY CHARACTERISTICS. (AUTHOR) AD-269 4139N6

269 413 0075 (*LUNAR PROBES, MOON, LANDING, STABILITY, DYNAMICS, MATHEMATICAL ANALYSIS.) (SHOCK, ABSORPTION, IMPACT SHOCK, VIBRATION ISOLATORS, MATERIALS, DESIGN.)

269 513 0077 INVESTIGATION FOR THE DEVELOPMENT OF CERAMIC BODIES FOR ELECTRON TUBES,

269 513 0077 EFFORTS TO PRODUCE A NONABSORBENT MICROCRYSTALLINE QUARTZ BODY BY HIGH-TEMPERATURE FIRING OF Ca -DOPED SiO_2 THAT HAD BEEN PRECALCINED TO DEVELOP THE QUARTZ PHASE FAILED. COMPOSITIONS WERE FORMULATED IN WHICH Ca_2SiO_4 WAS THE PRINCIPAL PHASE. MEANS OF DOPING THE COMPOSITIONS TO PREVENT BODY DISINTEGRATION, CAUSED BY THE BETA TO GAMMA INVERSION ON COOLING, WERE STUDIED. THE PRESENCE OF SUFFICIENT MgO PREVENTED THE TEST DISCS FROM DUSTING AND SEEMED TO PRESERVE BETA- Ca_2SiO_4 TO ROOM TEMPERATURE. SIMILAR STABILIZATION WAS OBTAINED BY THE INTRODUCTION OF APPROXIMATELY 1 WT-% B_2O_3 , OR BY THE FORMATION

OF A SOLID SOLUTION HAVING A MOLE RATIO OF 1 $\text{Ca}_3(\text{PO}_4)_2$ 15 Ca_2SiO_4 . THE 1 Ba_2SiO_4 15 Ca_2SiO_4 COMPOSITION WAS NOT STABILIZED, BUT THE 1 Ba_2SiO_4 7 Ca_2SiO_4 SAMPLE WAS VERY HARD AND DID NOT DISINTEGRATE UNTIL BOMBARDED BY X RAYS. THE 1 Mg_2SiO_4 7 Ca_2SiO_4 MIXTURE PRODUCED A BODY THAT DUSTED ON COOLING AND GAVE DEFINITE X-RAY EVIDENCE THAT MERWINITE ($\text{Ca}_3\text{MgSi}_2\text{O}_8$) FORMED. EXPERIMENTS WERE MADE TO DETERMINE THE SUITABILITY OF AlPO_4 AS A MAJOR PHASE IN A CERAMIC BODY.

269 513 0076 (*ELECTRON TUBES, *CERAMIC MATERIALS, ALKALINE EARTH COMPOUNDS, SILICATES, SYNTHESIS, QUARTZ CRYSTALS, PHASE TRANSITIONS, STABILIZATION, THERMAL EXPANSION.) (SILICON COMPOUNDS, TETROXIDES, CALCIUM COMPOUNDS, BARIUM COMPOUNDS, CHEMICAL IMPURITIES, MAGNESIUM COMPOUNDS, BORON COMPOUNDS, OXIDES.) (ALUMINUM COMPOUNDS, PHOSPHATES.) -

269 520 0078 INTEGRATION OF PERSONAL EQUIPMENT.

269 520 0078 THIS REPORT DESCRIBES THE VARIOUS EFFORTS, METHODS OF APPROACH AND SOLUTIONS TO SOME PROBLEMS OF INTEGRATING ITEMS OF AIR CREW PERSONAL EQUIPMENT. THE MAJOR PROBLEMS OF INTEGRATION IS THE COMBINING OF THE VARIOUS INDIVIDUAL ITEMS, WHICH HAVE SPECIFIC FUNCTIONS WITH EACH OTHER, WITHOUT COMPLICATING THESE COMBINATIONS BEYOND THEIR EFFECTIVENESS LIMITS. PRACTICAL SOLUTIONS WERE ACHIEVED IN SOME AREAS BUT ADDITIONAL WORK IS REQUIRED IN OTHERS.

269 520 0077 (*PNEUMATIC LIFE RAFTS, *PROTECTIVE CLOTHING, *SURVIVAL, AVIATION PERSONNEL, EFFECTIVENESS, FEASIBILITY STUDIES, SEA RESCUE EQUIPMENT.) SURVIVAL KITS, CLOTHING, HELMETS, PRESSURE SUITS. -

269 539 0079 STRONG INTERACTION WITH SLIP BOUNDARY CONDITIONS.

269 539 0079 A SOLUTION TO THE PROBLEM OF STRONG INTERACTION BETWEEN THE SHOCK WAVE AND THE BOUNDARY LAYER HAS BEEN OBTAINED FOR THE CASE WHERE VELOCITY SLIP AND TEMPERATURE JUMP BOUNDARY CONDITIONS ARE CONSISTENT AT THE WALL. IT IS SHOWN THAT THE ADDITION OF SLIP BOUNDARY CONDITIONS YIELDS A CORRECTION OF ORDER (BOUNDARY LAYER THICKNESS/X) TO THE NO SLIP SOLUTION. ESTIMATES ARE MADE OF THE EFFECT OF SLIP ON INDUCED PRESSURES AND SKIN FRICTION FOR THE CASE OF THE ADIABATIC WALL. IN ADDITION, IT IS SHOWN THAT THE INCLUSION OF SLIP BOUNDARY CONDITIONS DOES NOT CHANGE THE ENERGY TRANSFER TO THE WALL FROM THE NO SLIP VALUES.

269 539 0078 (*AIRFOILS, AERODYNAMICS, *HYPERSONICS, SHOCK WAVES, *BOUNDARY LAYER, INTERFERENCE, PRESSURE, DRAG, HEAT TRANSFER, MATHEMATICAL ANALYSIS.) -

269 553 0080 MAIN PROPELLANT TANK PRESSURIZATION SYSTEM STUDY AND TEST PROGRAM. VOLUME IV. COMPUTER PROGRAM.

269 553 0080 A COMPUTER PROGRAM WHICH CAN BE USED TO DETERMINE THE PRESSURIZING GAS REQUIREMENTS FOR A MISSILE PROPELLANT TANK PRESSURIZATION SYSTEM IS DESCRIBED. THE PROGRAM IS APPLICABLE TO BOTH CRYOGENIC AND STORABLE PROPELLANTS WHEN PRESSURIZED WITH STORED GAS, EVAPORATED PROPELLANT, AND MAIN TANK INJECTION METHODS OF PRESSURIZATION. (AUTHOR) AD-269 5539N6

269 553 0079 (GUIDED MISSILES, FUEL TANKS, *PROPELLANT TANKS, *HEAT TRANSFER, AERODYNAMIC HEATING.) (THERMODYNAMICS, EQUATIONS, DIGITAL COMPUTERS, *PROGRAMMING.) (PRESSURE TANKS, GASES, HEAT TRANSFER.) -

269 556 0081 SPACE ENVIRONMENTAL EFFECTS ON GEARS AND BEARINGS.
AN ANNOTATED BIBLIOGRAPHY.

269 556 0081 AN ANNOTATED BIBLIOGRAPHY ON GEARS AND BEARINGS,
RESULTING FROM A GENERAL LITERATURE SEARCH AS AN AID TO THE
CONSIDERATION OF DESIGN FACTORS, TEMPERATURE, SPEED EFFECTS AND WEAR
PROBLEMS ON MATERIALS THAT COULD GIVE SATISFACTORY SERVICE IN
SPACECRAFT APPLICATIONS IS PRESENTED.

269 556 0080 (*BIBLIOGRAPHY, *SPACE ENVIRON-MENTAL CONDITIONS, MATER
IALS, SPACESHIPS, *BEARINGS, *GEARS, LUBRICATION.) -

269 572 0082 INVESTIGATION OF MICROWAVE NON-LINEAR EFFECTS
UTILIZING FERROMAGNETIC MATERIALS.

269 572 0082 ELIMINATION OF VOLTAGE BREAKDOWN WITHIN THE HARMONIC
GENERATION CIRCUIT IS DISCUSSED WITH THE RESULTING EFFECTS UPON APPLIED
POWER NOTED. ALSO DESCRIBED IS A 70 GC POWER DIVIDER, A NEW DEVICE
USED AS A VARIABLE, HIGH-POWER ATTENUATOR IN DOUBLING EXPERIMENTS.
DATA RESULTING FROM 8 TO 4 MM DOUBLING IS PRESENTED AS A BASIS FOR
EXTENDING PRESENT METHODS TO KLYSTRON OPERATION. THE SIGNAL AND IDLER
RESONANCES, OF THE FERRITE AMPLIFIER ARE DESCRIBED AS MAGNETO-DYNAMIC
MODES. EXPERIMENTAL VERIFICATION OF THIS DESCRIPTION IS PRESENTED.
EXPRESSIONS ARE DERIVED WHICH RELATE AMPLIFIER NOISE FIGURE TO THE
INPUT VSWR WITH NO PUMP APPLIED. OPERATION OF THE AMPLIFIER AS A LOWER
SIDE BAND UP CONVERTER IS REPORTED. CONSTRUCTION OF A NEW AMPLIFIER
CONFIGURATION IS DESCRIBED.

269 572 0081 (*FERROMAGNETIC MATERIALS, FERRITES, YTTRIUM, IRON, *GA
RNET, SINGLE CRYSTALS, NONLINEAR SYSTEMS, MICROWAVE EQUIP-MENT, ELECTROM
AGNETIC PROPERTIES, MEASUREMENT.) (*MICROWAVE AMPLIFIERS, *PARAMETRIC AM
PLIFIERS, *FREQUENCY MULTIPLIERS, KLYSTRONS, RADIOFRE-QUENCY GENERATORS,
EXTREMELY HIGH FREQUENCY, DESIGN, TESTS.) -

269 573 0083 INVESTIGATIONS IN COMPUTER-AIDED DESIGN.

269 573 0083 THE APPLICATION OF THE CONCEPTS AND TECHNIQUES OF
MODERN DATA PROCESSING TO THE DESIGN OF MECHANICAL PARTS, AND THE
FURTHER DEVELOPMENT OF AUTOMATIC PROGRAMMING SYSTEMS FOR NUMERICALLY
CONTROLLED MACHINE TOOLS ARE STUDIED. TOPICS COVERED INCLUDE (1) A
DESCRIPTION OF INITIAL WORK ON A BOOTSTRAP COMPILER FOR PROGRAMMING
WITH 'PLEX' STRUCTURES, INCLUDING THE HANDLING OF FREE STORAGE AND
SYMBOL TABLES (2) MODIFICATIONS TO THE NEW CALCULATING PROGRAM
(ARELEM) FOR THE APT SYSTEM (3) INITIAL EXPERIMENTS WITH GRAPHICAL
LANGUAGES (4) SOME PROPOSALS FOR IMPROVED COMPUTER DESIGN FOR
MANIPULATING PLEX STRUCTURES (5) SUMMARIES OF THESES ON GRAPHICAL
LANGUAGES, STRESS ANALYSIS AND SELECTION OF STANDARD PARTS AND (6)
MATHEMATICAL TECHNIQUES USEFUL IN DESIGN.

269 573 0082 (*DIGITAL COMPUTERS, *PROGRAM-MING, MATHEMATICAL LOGIC,
MECHANICAL ENGINEER-ING, MACHINE TOOLS.) (MEMORY DEVICES, DESIGN, *DAT
A PROCESSING SYSTEMS, DATA STORAGE SYS-TEMS.) (STATISTICAL ANALYSIS, RE
LIABILITY, TOPOLOGY.) (MATHEMATICAL ANALYSIS, STRESSES, QUALITY CONTROL
.) -

269 576 0084 STUDY OF THE EFFECTS OF BETA-RADIATION ON THE INTERMEDIARY METABOLISM OF MAMMALIAN SKIN.

269 576 0084 NO ABSTRACT AVAILABLE

269 576 0083 (*RADIATION EFFECTS, *MAMMALS, LABORATORY ANIMALS, SODIUM COMPOUNDS, PHOS-PHATES, SKIN, *METABOLISM.) BIOSYNTHESIS, TRACER STUDIES. -

269 608 0086 C-BAND, WIDEBAND SOLID STATE AMPLIFIER.

269 608 0086 RESEARCH IS CONCERNED WITH THE DEVELOPMENT OF A STRAIGHT THROUGH LOW NOISE AMPLIFIER, ELECTRONICALLY TUNABLE FROM 4000 TO 6000 KMC. PERTINENT LITERATURE IS REVIEWED AND A THEORETICAL FOUNDATION FOR SUBSEQUENT EXPERIMENTAL AND THEORETICAL WORK ESTABLISHED. UPPER BOUNDS FOR PRACTICALLY REALIZABLE SIGNAL, IDLER, AND PUMP BANDWIDTHS ARE DETERMINED. IT IS SHOWN THAT EVEN WITH AN INFINITE NUMBER OF TUNED SECTIONS, THE BANDWIDTH OF EACH CIRCUIT IS ULTIMATELY LIMITED BY THE ELECTRICAL CHARACTERISTICS AND PARASITIC ELEMENTS OF THE VARACTOR DIODE. NOISE FIGURE LIMITATIONS WITH PRESENTLY AVAILABLE DIODES ARE REVIEWED AND THE PROPER PUMP FREQUENCY IS APPROXIMATELY DETERMINED.

269 608 0085 (*PARAMETRIC AMPLIFIERS, MICRO-WAVE AMPLIFIERS, C BAND, BROADBAND, SOLID STATE PHYSICS, DIODES, TUNING CIRCUITS, ELECTRONIC CIRCUITS, THEORY, DESIGN, NOISE (RADAR), MEASUREMENT.) AMPLIFIERS. -

269 632 0087 ELECTRICAL FIELD OF A MOVING DROPLET,

269 632 0087 THE THEORY OF THE ELECTROKINETIC DIFFUSION EFFECT OF A DROPLET ARISING DURING MOTION OF ITS SURFACE IS GIVEN. FROM CALCULATIONS MADE ON NOT EXCESSIVELY LARGE DROPLETS, THE FALL OF WHICH IS CHARACTERIZED BY REYNOLDS NUMBERS LESS THAN UNITY, IT HAS BEEN SHOWN THAT THIS EFFECT MAY LEAD TO ELECTRICAL FIELDS OF AN INTENSITY OF 100 V/CM. THE ABOVE EFFECT MUST BE TAKEN INTO ACCOUNT WHEN DEALING WITH ORDINARY FRACTIONS OF ELECTRICALLY NEUTRAL OR CLOSE TO ELECTRICALLY NEUTRAL DROPLETS. THE ELECTROKINETIC DIFFUSION EFFECT PRESENTS A UNIQUE POSSIBILITY FOR THE STUDY OF EXTREMELY WEAK ADSORPTION.

269 632 0086 (*DROPS, *ELECTRIC FIELDS, ELECTRICAL PROPERTIES, SURFACE PROPERTIES, BOUNDARY LAYER, DIFFUSION, REYNOLDS NUMBER, KINETIC THEORY, MATHEMATICAL ANALYSIS.) USSR. -

269 639 0088 ENTHALPY AND HEAT CAPACITY OF MOLYBDENUM IN THE 1200-2500 DEGREE K TEMPERATURE RANGE,

269 639 0088 AN EXPERIMENTAL DETERMINATION OF THE ENTHALPY OF MO IN THE 1164-2540 K RANGE WITH AN ERROR OF LESS THAN 1% WAS MADE. MEASUREMENTS WERE BASED ON THE METHOD OF COALESCENCE IN A HIGH-TEMPERATURE VACUUM DEVICE.

269 639 0087 (*MOLYBDENUM, HIGH TEMPERATURE RESEARCH, *ENTHALPY, *SPECIFIC HEAT, TEST METHODS, THERMOCHEMISTRY, THERMODYNAMICS.) USSR. -

269 642 0089 NATURE (SELECTED ARTICLES).

269 642 0089 NO ABSTRACT AVAILABLE

269 642 0088 (*USSR, *SCIENTIFIC RESEARCH, *SPACE PROBES, *SPACE FLIGHT.) -

269 833 0090 STUDY LEADING TO THE DEVELOPMENT OF HIGH TEMPERATURE RESISTANT ADHESIVES.

269 833 0090 CHEMICAL MODIFICATIONS WERE ATTEMPTED ON POLY-2,6-XYLENOLS AND CONDENSATION TRIAZINE TYPE POLYMERS WHICH HAD BEEN FOUND TO BE SUITABLE BASE MATERIAL FOR HIGH TEMPERATURE ADHESIVES FOR STAINLESS STEEL. POLY-2,6XYLENOL WAS PREPARED. HIGH MOLECULAR WEIGHT POLYXYLENOLS HAD GOOD ADHESION (2000-3000 PSI) AT ROOM TEMPERATURE, BUT LOST STRENGTH TO 10% OF THE ORIGINAL AFTER HEATING AT 550 F. FOR 30 MIN. THE LOW MOLECULAR WEIGHT MATERIAL MAY FLOW BETTER AND THEREFORE IMPART BETTER WETTING. SEVERAL LOW MOLECULAR WEIGHT POLYXYLENOLS WERE PREPARED. 2-METHYL-6ALLYL-4-BROMOPHENOL WAS PREPARED AND A POLYMER WAS PREPARED FROM IT BY THE PRICE METHOD OF OXIDATIVE COUPLING. NITRATION OF 2,4,6-TRIPHENYLS-TRIAZINE YIELDS 2,4-(DI-(M-NITROPHENYL))-6PHENYL-S-TRIAZINE. REDUCTION OF THIS DERIVATIVE GIVES THE DIAMINO COMPOUND. (AUTHOR) AD-269 8339N6

269 833 0089 (*ADHESIVES, HIGH TEMPERATURE RESEARCH, *HEAT RESISTANT POLYMERS, POLYMERS, PHENOLS, METHYL RADICALS, *TRIAZINES, SYN-THESIS, MOLECULAR WEIGHT, NITRATION, REDUCTION, POLYMERIZATION, ADHESION.) (AMINE S, BENZOYL RADICALS, GUANIDINES.) (ADHESIVES FOR STAIN-LESS STEEL.) -
269 866 0091 NO TITLE AVAILABLE

269 866 0091 AD-269 8669N6 NO ABSTRACT AVAILABLE

269 866 0090 (*GYROSCOPES, INERTIAL NAVIGATION, SPHERES, BERYLLIUM.) (PHYSICS, *VACUUM SYSTEMS, PLASMA PHYSICS, ELECTRONS, MOLECULES, HELIUM.) (*SECONDARY EMISSION, GOLD, MOLYBDENUM.) (*NUCLEAR RESONANCE, FLUORESCENCE, COPPER.) (*ELECTRONS, DIFFRACTION, CRYSTALS, GERMANIUM.) (*ANALOG COMPUTERS, DIGITAL COMPUTERS, TRANSISTORS, COMPUTER LOGIC, PROGRAMMING.) (*PLASMA PHYSICS, *DELAY LINES.) -
269 887 0092 HIGH TEMPERATURE THERMOELECTRIC GENERATOR.

269 887 0092 APPLIED RESEARCH AND DEVELOPMENT IS REPORTED ON A LABORATORY THERMOELECTRIC GENERATOR OPERATING AT A HOT JUNCTION TEMPERATURE OF 1200 C AND A COLD JUNCTION OF 500-700 C IN A VACUUM OF 1/100,000 MM HG. APPARATUS NEEDED TO FABRICATE AND TEST CANDIDATE JUNCTION MATERIALS AND MODULES FOR USE WITH A NEW PROPRIETARY THERMOELECTRIC MATERIAL, MCC 50, ARE DESCRIBED. TESTS TO BE CONDUCTED INCLUDE MECHANICAL STRENGTH, SUBLIMATION LOSS, ELECTRICAL PROPERTIES, THERMAL SHOCK AND RESISTANCE TO SOLID-STATE DIFFUSION. PRELIMINARY EFFORTS TO PRODUCE MODULES OF MCC 50 IN COMBINATION WITH TANTALUM, TITANIUM, MOLYBDENUM AND TUNGSTEN BY HOT PRESS, RESISTANCE WELDING AND BRAZING WERE ONLY PARTIALLY SUCCESSFUL. HOWEVER, A GRAPHITE-MCC 50-GRAPHITE MODULE WAS PRODUCED WHICH EXHIBITED JUNCTIONS OF PROMISING MECHANICAL STRENGTH AND PRELIMINARY MEASUREMENTS OF ITS ELECTRICAL PROPERTIES WERE MADE.

269 887 0091 (*THERMOELECTRICITY, *GENERATORS, ELECTRIC POWER PRODUCTION, POWER SUPPLIES, DESIGN.) (THERMOCOUPLES OF TANTALUM, TITANIUM, MOLYBDENUM, TUNGSTEN, GRAPHITE, MANUFACTURING METHODS, TESTS.) -

269 892 0093 DIRECT ENERGY CONVERSION LITERATURE ABSTRACTS.

269 892 0093 NO ABSTRACT AVAILABLE

269 892 0092 *BIBLIOGRAPHY, *ENERGY, CON-VERSION RATIO, *THERMOELECTRICITY, THERMIONIC EMISSION, PHOTOEMISSION, PHOTOELECTRIC CELLS, *MAGNETOHYDRODYNAMICS, ELECTROCHEMISTRY, FUEL CELLS, PRIMARY BATTERIES, STORAGE BATTERIES, NUCLEAR ENERGY, SOLAR ENERGY, *POWER SUPPLIES, *SOLAR CELLS.

269 896 0094 EFFECT OF FINITE OXYGEN RECOMBINATION RATE ON THE FLOW CONDITIONS IN HYPERSONIC NOZZLES,

269 896 0094 THE EFFECT IS ESTIMATED USING FOR AIR A SIMPLIFIED MODEL GAS CONSISTING ONLY OF O, O₂, AND N₂. FOR THE RANGE OF SUPPLY CONDITIONS CONSIDERED, THE GAS COMPOSITION FREEZES DURING EXPANSION WITH THE OXYGEN ATOM CONCENTRATION DEPENDING STRONGLY ON SUPPLY CONDITIONS, LESS SIGNIFICANTLY ON THE NOZZLE GEOMETRY. THE FRACTIONAL DEPARTURE OF THE FLOW PARAMETERS FROM EQUILIBRIUM VALUES THEN DEPENDS ON A GOOD APPROXIMATION ONLY ON THE OXYGEN ATOM CONCENTRATION.

269 896 0093 (OXYGEN, DISSOCIATION, RECOMBINATION REACTIONS, HYPERSONIC NOZZLES, ROCKET MOTOR NOZZLES.) (*GAS FLOW, HYPERSONICS, AERODYNAMICS, TEMPERATURE, PRESSURE, VELOCITY, DENSITY, THERMODYNAMICS, ENTHALPY, MATHEMATICAL ANALYSIS, TABLES.) -

269 509 0095 CLASSICAL STATISTICAL THEORY OF DIELECTRIC FLUIDS,

269 509 0095 A FORMAL CLUSTER EXPANSION THEORY OF THE DIELECTRIC CONSTANTS AND THE SUSCEPTIBILITIES OF NON-POLAR FLUIDS IS DEVELOPED AND THE DEVIATION OF THE CLAUSIUS-MOSSOTTI EQUATION FROM EXPERIMENTS IS DISCUSSED. MANY BODY POLARIZATION EFFECTS ARE CONSIDERED IN TERMS OF DIAGRAMS. A CHAIN DIAGRAM APPROXIMATION GIVES THE SUSCEPTIBILITIES IN TERMS OF THE FOURIER TRANSFORMS OF THE MAYER F-FUNCTION AND OF THE EFFECTIVE DIPOLE INTERACTION TENSOR.

269 509 0094 (*STATISTICAL ANALYSIS, FLUIDS, GASES, *DIELECTRICS, POLARIZATION, ELECTRIC FIELDS, MOLECULES, DIPOLE MOMENTS, CHEMICAL BONDS.) (TENSOR ANALYSIS, FOURIER ANALYSIS, SERIES, INTEGRAL TRANSFORMS.) -

269 623 0096 STRUCTURE FORMATION DURING SOLIDIFICATION OF TURBINE BLADES CAST IN INVESTMENT PATTERNS,

269 623 0096 AN ATTEMPT WAS MADE TO STUDY THE PECULIARITIES OF STRUCTURE FORMATION OF HEAT RESISTANT ALLOYS CAST UNDER CONDITIONS CLOSE TO THOSE OF SOLIDIFICATION OF CAST TURBINE BLADES. WHEN SMELTING ALLOYS SUCH AS NI-CR-C AND NI-CR-W-C, THE METALS W, MO, CO AND AL WERE INTRODUCED IN A QUANTITY AMOUNTING TO 5% TI WAS ADDED IN A QUANTITY AMOUNTING TO 2%. DURING SMELTING THE ALLOYS WERE HEATED TO 1450 OR 1700 DEGREES AND THEN POURED INTO HOT CERAMIC MOLDS HEATED TO 950 DEGREES. HEAT TREATMENT INVOLVED HEATING TO 1200 DEGREES. DEPENDING ON SOLIDIFICATION CONDITIONS, THE TENDENCY TO MACROSTRUCTURAL CHANGES DEPENDED GREATLY UPON THE ALLOY COMPOSITION. COMMON NICHROMES, AND THOSE ALLOYED WITH MO, CO AND AL WERE EXTREMELY SENSITIVE TO OVERHEAT NICHROME WITH AN ADDITION OF TI WAS ONLY SLIGHTLY SENSITIVE TO SOLIDIFICATION RATE AND OVERHEAT.

269 623 0095 (*TURBINE BLADES, *HEAT RESISTANT ALLOYS, *NICKEL ALLOYS, *CHROMIUM ALLOYS, IRON ALLOYS, TUNGSTEN ALLOYS, CASTING, HARDENING, PROCESSING, GRAINS (METALLURGY), LATTICES, MICROSTRUCTURE, PHASE STUDIES, MECHANICAL PROPERTIES.) USSR. -

269 630 0097 BREAKTHROUGH INTO SPACE,

269 630 0097 THE MATERIALS FOR THE BODY OF THE SPACESHIP SHOULD PROTECT THE CREW FROM THE COSMIC VACUUM, WITHSTAND EROSION WHEN THE SKIN IS BOMBARDED BY COSMIC DUST, AND WITHSTAND THE IMPACTS OF SMALL METEORITES. A GROUP OF VERY REFRACTORY METALS WHICH MUST BE HEATED TO 3000 DEGREES AND HIGHER TO BE MELTED INCLUDE BE, NB, MO, TA, AND W. THE PROPERTIES OF THESE METALS ARE DISCUSSED.

269 630 0096 (*GUIDED MISSILE NOSES, RE-ENTRY VEHICLES, RE-ENTRY AERODYNAMICS, *REFRACTORY MATERIALS, METALS, BERYLLIUM, NIOBIUM, MOLYBDENUM, TANTALUM, TUNGSTEN.) (COOLING BY SUBLIMATION, THERMAL RADIATION AND MAGNETIC FIELDS.) USSR. -

269 638 0098 A POWERFUL AC-DC CONVERTER,

269 638 0098 THE DIFFICULTIES IN CREATING POWERFUL RECTIFIERS ARE MAINLY DUE TO THE FACT THAT HIGH VOLTAGE ACCUMULATES IN THE DISCHARGE GAPS WHICH UNDERGO PRELIMINARY IONIZATION THIS DECREASES THEIR ELECTRICAL AND RECTIFYING STRENGTH. IN THE EXAMINED CONVERTER THE AIR GAPS (AT A PRESSURE OF 5-10 ABS ATM) ARE NOT IONIZED, SINCE WITH AIR PRESSURE GREATER THAN 3 ABS ATM AND VOLTAGES LESS THAN DISCHARGE VOLTAGES, THERE IS NO CORONA DISCHARGE. THE CONVERTER CONSISTS OF A TRANSFORMER UNIT WHICH CREATES A MULTIPHASE CLOSED WINDING, A SWITCHING DEVICE, AND RECTIFIERS.

269 638 0097 (*RECTIFIERS, SWITCHING CIRCUITS, PHASE TRANSFORMERS, ELECTRODES, USSR, DESIGN.) -

269 644 0099 DETERMINATION OF THE PARAMETERS OF PARTICLE-SIZE DISTRIBUTION,

269 644 0099 A MATHEMATICAL DEVICE IS DEVELOPED THAT YIELDS NOMOGRAMS AND WHICH PERMITS US TO DETERMINE THE PARTICLE-SIZE DISTRIBUTION OF SUSPENSIONS, FOGS, CLOUDS, ETC., FROM THREE MEASUREMENTS OF THE RELATIVE INTENSITY OF LIGHT SCATTERED AT SMALL ANGLES.

269 644 0098 (*STATISTICAL FUNCTIONS, DISTRIBUTION THEORY, STATISTICAL DISTRIBUTION.) (*PARTICLES, ANALYSIS, COLLOIDS, *CLOUDS, FOG.) (LIGHT, SCATTERING, INTENSITY.) (NOMOGRAMS, BESSEL FUNCTIONS.) USSR. -

269 648 0100 OUR NEAREST COSMIC NEIGHBOR,

269 648 0100 THE MOON IS BEING STUDIED BY SCIENTISTS AND ENGINEERS IN MANY SCIENTIFIC AND TECHNICAL FIELDS. A NEW PERIOD HAS BEGUN IN THE BIOGRAPHY OF THE MOON. ON 14 SEPTEMBER 1959 THE SECOND SOVIET COSMIC ROCKET REACHED ITS SURFACE. THE THIRD SOVIET COSMIC ROCKET WAS LAUNCHED ON THE MORNING OF 4 OCTOBER 1959. USING A PHOTOGRAPHIC TELEVISION APPARATUS IT PHOTOGRAPHED THE FAR SIDE OF THE MOON AND TRANSMITTED THE IMAGE TO EARTH. FURTHER STEPS IN THE STUDY OF THE MOON WILL BE THE DEVELOPMENT OF ARTIFICIAL LUNAR SATELLITES WHICH WILL BE ABLE TO MAINTAIN RADIO AND TV CONTACT WITH THE EARTH THE MAKING OF A SOFT (NON-IMPACT) LANDING ON THE MOON'S SURFACE WITH

ROCKETS CARRYING VARIOUS SCIENTIFIC-RESEARCH APPARATUS A ROUND-TRIP
ROCKET FLIGHT TO THE MOON AND FINALLY THE ORGANIZATION OF COSMIC SHIP
FLIGHTS TO THE MOON WITH RESEARCHERS ON BOARD.

269 648 0099 (MOON, LANDING, *LUNAR PROBES, USSR.) -
269 649 0101 MEASUREMENT OF THE CORRELATION BETWEEN THE AMPLITUDE
AND FREQUENCY FLUCTUATIONS IN A REFLEX KLYSTRON,

269 649 0101 THE INTERFERENCE METHOD, USED TO MEASURE THE
AMPLITUDE AND FREQUENCY FLUCTUATIONS IN RADIOFREQUENCY OSCILLATORS, IS
USED TO STUDY THE CORRELATION DEPENDENCE BETWEEN THE AMPLITUDE AND
FREQUENCY FLUCTUATIONS IN A REFLEX KLYSTRON WITH A THREE-CENTIMETER
RANGE. EXPERIMENTAL GRAPHS ARE GIVEN FOR THE CORRELATION FUNCTION AT
SEVERAL DIFFERENT VOLTAGE VALUES ON THE REFLECTOR PLATE OF THE
KLYSTRON THESE CORRESPOND TO THE GENERATION REGION WITH THE MAXIMUM
GENERATING POWER.

269 649 0100 (INTERFERENCE, AMPLITUDE MODULATION, *RADIOFREQUENCY OS
CILLATORS.) (*KLYSTRONS, POWER, VOLTAGE.) USSR. -
269 667 0102 VARIANCE IN THE RATE OF SPEAKING BY PILOTS AND
CONTROLLERS IN COMMUNICATING TO U. S. AND FOREIGN LISTENERS,

269 667 0102 RECORDINGS OF AIR TRAFFIC MESSAGES AT FOREIGN AND
DOMESTIC INTERNATIONAL AIRPORTS WERE EXAMINED TO DETERMINE IF PILOTS
AND CONTROLLERS ADJUST THEIR RATE OF SPEAKING IN TERMS OF PERCEIVED
LISTENER NEEDS. IT WAS FOUND THAT PILOTS AND CONTROLLERS USE A SLOWER
RATE WHEN SPEAKING IN ENGLISH TO LISTENERS WHOSE NATIVE LANGUAGE IS
NOT ENGLISH. IN GENERAL, THAT DATA SUPPORTS A CONCLUSION THAT PILOTS
AND CONTROLLERS ADJUST RATE OF SPEAKING TO MATCH PERCEIVED LISTENER
NEEDS.

269 667 0101 (*VOICE COMMUNICATION SYSTEMS, *SPEECH, *SPEECH TRANSM
ISSION, INTELLIGIBILITY, LANGUAGE, PILOTS, AIR TRAFFIC CONTROLLERS.)
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269 701 0103 HIGH TEMPERATURE MICROWAVE TUBE DESIGN AND
PROCESSING.

269 701 0103 INVESTIGATIONS OF FACTORS WHICH WOULD PERMIT
LONG-LIFE OPERATION OF MICROWAVE TUBES AT AN AMBIENT TEMPERATURE OF 350
C WERE CARRIED OUT. THE RK6249, A MAGNETRON IN HIGH USAGE AND
CONSIDERED OF TYPICAL CONSTRUCTION, WAS SELECTED AS THE TEST VEHICLE.
CERAMIC-TO-METAL SEAL ASSEMBLIES WERE DESIGNED TO REPLACE THE GLASS
BUSHINGS AND THE GLASS OUTPUT WINDOW. A WINDOW ASSEMBLY TO VIEW
CATHODE OPERATING TEMPERATURE WAS DESIGNED. WORK WAS CONDUCTED TO
PROVIDE FOR HIGH TEMPERATURE OXIDATION PROTECTION OF THE TUBE AT HIGH
AMBIENT TEMPERATURE IN AIR. THE TEST VEHICLES CONSTRUCTED WERE LIFE
TESTED AT 250 AND 400 C FOR SEVERAL HUNDRED HOURS. SCRAP ANALYSIS WAS
PERFORMED TO DETERMINE THE CAUSE OF TUBE FAILURE AND THE EFFECT OF HIGH
TEMPERATURE OPERATION ON TUBE COMPONENTS. MATERIALS AND PROCESSING
INVESTIGATIONS WERE CARRIED OUT DURING A PARALLEL EFFORT IN WHICH A
SUITABLE REPLACEMENT FOR COPPER WAS FOUND. THE REMOVAL OF CARBON
MONOXIDE FROM STAINLESS STEEL, KOVAR AND NICKEL WAS STUDIED.

269 701 0102 (*ELECTRON TUBES, *MICROWAVE EQUIPMENT, HIGH TEMPERATUR
E RESEARCH, DESIGN, MANUFACTURING METHODS.) (*MAGNETRONS, WAVE-GUIDE WI
NDOWS, REFRACTORY MATERIALS, PROCESS-ING, LIFE EXPECTANCY, TESTS.) -

269 710 0104 COMPILATION OF UNPUBLISHED MATERIALS INFORMATION.

269 710 0104 MECHANICAL PROPERTY DATA, NOT HERETOFORE PUBLISHED, ARE PRESENTED FOR 16 MATERIALS. THESE DATA WERE OBTAINED FROM MATERIALS PROGRAMS CONDUCTED DURING THE PAST 5 YRS. THE FOLLOWING MATERIALS ARE CONTAINED IN THE DATA COMPILATION AL ALLOYS - 2014, X2020, 7075, 7079 MG ALLOYS - HK31 TI ALLOYS - TI-4AL-4MN, TI-5AL-2.5SN LOW ALLOY STEEL (90% FE, OR GREATER) - SAE 4340 HIGH ALLOY STEELS (LESS THAN 90% FE) - W-545, AISI 431, AM-350, PH15, MO NI ALLOYS - M-252, U-500 SANDWICH MATERIAL - KRAFT PAPER HONEYCOMB AND BEARINGS - STAKING OF BEARINGS WITH PLASTICS.

269 710 0103 (*MATERIALS, *ALLOYS, *METALS, *SANDWICH CONSTRUCTION, PAPER, HONEYCOMB CORES, PLASTICS, BEARINGS.) (MECHANICAL PROPERTIES, TENSILE PROPERTIES, DEFORMATION, STRESSES, SHEAR STRESSES, FATIGUE (MECHANICS), FAILURE. -

269 712 0105 AN ADIABATIC-ISOTHERMAL NOZZLE,

269 712 0105 A METHOD IS PRESENTED FOR THE NOZZLE CALCULATION FOR A CHEMICALLY ACTIVE FLOW AT A CONSTANT STATIC TEMPERATURE.

269 712 0104 (*NOZZLES, DESIGN, *ADIABATIC GAS FLOW, MATHEMATICAL ANALYSIS, NUMERICAL METHODS AND PROCEDURES, EQUATIONS OF STATE, THERMODYNAMICS.) (*ADIABATIC GAS FLOW, *COMPRESSIBLE FLOW, THERMAL EXPANSION, HEAT OF REACTION, EQUATIONS OF STATE.) AERO-DYNAMICS, USSR. -

269 727 0106 THE STABILITY OF THIN CONICAL FRUSTUMS SUBJECTED TO AXIAL COMPRESSION AND INTERNAL OR EXTERNAL UNIFORM HYDROSTATIC PRESSURE,

269 727 0106 CALCULATIONS ARE PRESENTED FOR THE PROBLEMS OF THE STABILITY OF CONICAL SHELLS SUBJECTED TO (1) COMBINED EXTERNAL UNIFORM HYDROSTATIC PRESSURE AND AXIAL TENSION OR COMPRESSION, AND (2) COMBINED INTERNAL UNIFORM HYDROSTATIC PRESSURE AND AXIAL COMPRESSION. THE INTERACTION CURVES FOR THE FIRST PROBLEM ARE FOUND TO DEPEND ON THE RATIO OF THE END RADII OF THE CONE AND ARE BOUNDED BY THE LIMITING CURVES FOR A CYLINDER AND FOR A COMPLETE CONE. THE CHANGE OF SHAPE OF THE CURVES WITH VARYING END RADIUS RATIO IS SMALL, HOWEVER. FOR THE SECOND PROBLEM THE CRITICAL AXIAL LOAD OF A PRESSURIZED CONE IS FOUND TO BE GREATER THAN THE SUM OF THE CRITICAL AXIAL LOAD OF AN UNPRESSURIZED CONE AND THE PRESSURE LOAD ON THE SMALL CROSS SECTION. THE DIFFERENCE IS A FUNCTION OF THE INTERNAL PRESSURE AND OF THE CONE GEOMETRY.

269 727 0105 (*STRUCTURAL SHELLS, CONICAL BODIES, STABILITY, HYDROSTATIC PRESSURE.) (*LOAD DISTRIBUTION, DEFORMATION, BUCKLING, MECHANICAL PROPERTIES.) (EQUATIONS, EXPERIMENTAL DATA, TABLES.) -

269 729 0107 BERYLLIUM OXIDE. A LITERATURE SURVEY,

269 729 0107 THIS BIBLIOGRAPHY CONSISTING OF 283 ENTRIES COVERS THE PERIOD FROM 1955 TO 1961. THE EMPHASIS IS ON BEO, ITS PHYSICAL, CHEMICAL AND MECHANICAL PROPERTIES, PREPARATION AND FABRICATION METHODS. SOME INFORMATION IS GIVEN ON INTERMETALLIC COMPOUNDS OF BE AND ITS ALLOYS. THE THIRD PART INCLUDES THE TOXICITY OF BE AND BEO AND SAFETY MEASURES. IN PREPARATION OF THIS BIBLIOGRAPHY THE OPEN LITERATURE SOURCES, PERTINENT INDEXES, ABSTRACTING JOURNALS, UNCLASSIFIED REPORTS, AND ASTIA HOLDINGS WERE CONSULTED.

269 729 0106 (*BERYLLIUM COMPOUNDS, OXIDES, CERAMIC MATERIALS, BERYLLIUM, INTERMETALLIC COMPOUNDS, *BERYLLIUM ALLOYS, *REFRACTORY MATERIALS, *BIBLIOGRAPHY.) TOXICITY, CRYSTAL STRUCTURE, PHYSICAL PROPERTIES, MECHANICAL PROPERTIES, MANUFACTURING METHODS. -

269 732 0108 LOW RATE SENSING CAPABILITIES OF SINGLE-DEGREE-OF-FREEDOM GYROS.

269 732 0108 A SURVEY OF THE LOW RATE SENSING CAPABILITIES OF IN-PRODUCTION AND DEVELOPMENTAL MECHANICAL INSTRUMENTS IS DESCRIBED. MECHANICAL RATE INSTRUMENTS INCLUDE PRIMARILY THE SINGLE DEGREE-OF-FREEDOM GYRO, SPRING RESTRAINED AND UNHEATED, AND ELECTRICALLY RESTRAINED, HEATED AND UNHEATED. ALSO DISCUSSED ARE TWO CLASSES OF VIBRATORY GYROS AND THE USE OF ANGULAR ACCELEROMETERS. TWO APPENDICES ANALYZE THE EFFECT OF RATE SENSOR DEAD-BAND ON GAS CONSUMPTION, AND THE USE OF A LOW RATE SENSOR TO DETECT SATELLITE YAW MOTION. IT IS CONCLUDED THAT (1) THE ELECTRICALLY RESTRAINED, HEATED GYRO HAS THE BEST OVER-ALL LOW RATE SENSING CAPABILITIES (2) THE SPRING RESTRAINED GYRO HAS OVER-ALL PERFORMANCE QUALITIES WHICH SHOULD BE ADEQUATE FOR MANY MISSIONS (3) INTEGRATING THE OUTPUT OF AN ANGULAR ACCELEROMETER APPEARS TO BE A VERY PROMISING PROSPECT AND (4) VIBRATORY GYROS ARE IN THE EARLY STAGES OF DEVELOPMENT AND LITTLE IS KNOWN ABOUT THEIR ACTUAL PERFORMANCE.

269 732 0107 (*GYROSCOPES, OPERATION.) (INSTRUMENTATION FOR STABILIZATION OF *CONTROL SYSTEMS DURING SPACE FLIGHT.) -

269 733 0109 SYNTHETIC MICA CRYSTAL GROWTH PROGRAM.

269 733 0109 VARIOUS CRYSTAL GROWING TECHNIQUES WERE INVESTIGATED AS POSSIBLE MEANS OF PRODUCING LARGE SIZE SINGLE CRYSTALS OF SYNTHETIC MICA (FLUORPHLOGOPITE TYPE) ON A COMMERCIALY FEASIBLE BASIS. METHODS INCLUDED CRYSTAL PULLING, ZONE MELTING, AND GROWTH FROM SOLUTION. MOST FAVORABLE RESULTS WERE OBTAINED FROM A PROGRESSIVE INTERNAL RESISTANCE MELTING USING ZONE MELTING PRINCIPLES, HOWEVER, NO METHOD WAS FOUND FOR DELAMINATION OF THE CRYSTAL BOOKS. CRYSTAL PULLING TECHNIQUES WERE UNSATISFACTORY. ZONE MELTING, USING INDUCTIVE HEATING, PRODUCED CRYSTALS WITH GOOD ORIENTATION, BUT CRYSTAL SIZE WAS SMALL. PROGRESSIVE MELTING, USING THE INTERNAL RESISTANCE METHOD OF HEATING PRODUCED THE LARGEST CRYSTALS. RELATIVELY LARGE PERCENTAGES OF SUCH CRYSTALS WERE OBTAINED WITHIN A MELT. THESE CRYSTALS WERE LARGER THAN THOSE PRODUCED BY STANDARD PRODUCTION TECHNIQUES. CRYSTALS OF SYNTHETIC MICA CAN BE GROWN FROM A SOLUTION USING GLASS AS A SOLVENT.

269 733 0108 (*MICA, SINGLE CRYSTALS, GROWTH, MANUFACTURING METHODS, *MICA CAPACITORS, *CAPACITORS, ZONE MELTING, CRYSTALLIZATION FROM SOLUTIONS, GLASS, SOLVENT ACTION, HEAT TREATMENT, DIELECTRIC PROPERTIES.) (CRYSTALS, THICKNESS, ULTRASONICS, SHOCK TUBES.) -

269 735 0110 PRODUCTION FUNCTIONS WITH CONSTANT ELASTICITIES OF SUBSTITUTION,

269 735 0110 THE CLASS OF PRODUCTION FUNCTIONS FOR WHICH ELASTICITIES OF SUBSTITUTION ARE ALL CONSTANT REGARDLESS OF FACTOR PRICES IS DISCUSSED. LET $F(X_1, X_2)$ BE A PRODUCTION FUNCTION WHERE X_1 AND X_2 RESPECTIVELY REPRESENT THE AMOUNTS OF FACTORS 1 AND 2 EMPLOYED. PRODUCTION IS ASSUMED TO BE SUBJECT TO CONSTANT RETURNS TO SCALE AND TO DIMINISHING MARGINAL RATES OF SUBSTITUTION.

269 735 0109 (*PRODUCTION, *ECONOMICS, *FACTOR ANALYSIS, FUNCTIONS,
PARTIAL DIFFERENTIAL EQUATIONS, ELASTICITY, SUBSTITUTES, COSTS, SCHEDULI
NG, WAGES.) -

269 738 0111 FAILURE MECHANISMS IN SILICON SEMICONDUCTORS.

269 738 0111 THIS REPORT INCLUDES STACKING FAULTS IN EPITAXIAL
SILICON, BY H. J. QUEISSER, R. H. FINCH AND J. WASHBURN. 1961, (IN
COOPERATION WITH LAWRENCE RADIATION LAB., U. OF CALIFORNIA, BERKELEY)
DIFFUSION STUDIES ON SMALL ANGLE GRAIN BOUNDARIES IN SI WERE PERFORMED
WITH THE DOPANTS GA, IN, AND AL TO INVESTIGATE THE INFLUENCE OF
DISLOCATIONS ON THE BEHAVIOR OF DIFFUSED SI DEVICES. A MATHEMATICAL
TREATMENT OF DIFFUSION ALONG ISOLATED DISLOCATIONS IS BEING EXPLORED.
THE ELECTRICAL BEHAVIOR OF DEVICES WITH A SMALL ANGLE BOUNDARY WAS
STUDIED. TWIN BOUNDARIES WERE INVESTIGATED AN ADVERSE EFFECT UPON
DIODE REVERSE CHARACTERISTICS WAS FOUND ONLY FOR INCOHERENT TWIN
BOUNDARIES. DEFECTS IN EPITAXIAL LAYERS WERE STUDIED EXTENSIVELY.
SLICES OF LESS THAN 1 MICRON THICKNESS WERE FABRICATED THE
TRANSPARENCY OF THESE SLICES ALLOWS DIRECT OBSERVATION OF DEFECTS WITH
OPTICAL AND ELECTRON TRANSMISSION MICROSCOPY. STACKING FAULTS WERE
DETECTED FOR THE FIRST TIME IN SI.

269 738 0110 (*SILICON, *SEMICONDUCTORS, DIODES, SINGLE CRYSTALS, C
RYSTALS, CRYSTAL STRUCTURE, GROWTH, PREPARATION, DIFFUSION, CHEMICAL IMP
URITIES, GALLIUM, INDIUM, ALUMINUM, FAILURE (MECHANICS), ELECTRICAL PRO
PERTIES.) (MICROSCOPY, ELECTRON MICROSCOPES.) -

269 741 0112 RADIATION FROM SHOCK-HEATED AIR. PART I.
EQUILIBRIUM RADIATION,

269 741 0112 A COMPUTATIONAL PROCEDURE GIVING EQUILIBRIUM
RADIATIVE HEAT TRANSFER RATES TO THE SURFACE OF A SHOCK ENGULFED
VEHICLE IS PRESENTED. THE LOCAL TRANSFER RATES ARE OBTAINED IN TERMS
OF THE LOCAL TEMPERATURE AND DENSITY AT THE OUTER EDGE OF THE BOUNDARY
LAYER AND AN EFFECTIVE THERMAL LAYER. THE COMPUTED RADIATIVE TRANSFER
RATES AROUND A TYPICAL ENTRY VEHICLE ARE PRESENTED. A COMPUTATIONAL
PROCEDURE FOR THE NON-EQUILIBRIUM RADIATION IS PRESENTED IN PART II.

269 741 0111 (RE-ENTRY VEHICLES, SHOCK TUBES, *SHOCK WAVES, BOUNDARY
LAYER, RE-ENTRY AERO-DYNAMICS, AERODYNAMIC HEATING, *THERMAL RADIATION
, *HEAT TRANSFER, NUMERICAL ANALYSIS, TEMPERATURE, DENSITY, MATHEMATICAL
PREDICTION.) -

269 757 0113 LIQUID-GAS INTERFACE IN ZERO-G.

269 757 0113 IN THE INVESTIGATION OF THE BEHAVIOR OF A LIQUID-GAS
MIXTURE IN A ZERO-G FIELD, AN EXPERIMENT UNIT WAS INSTALLED IN AN ATLAS
REENTRY NOSECONE TEST VEHICLE. THE EXPERIMENT UNIT HOUSES A MOVIE
CAMERA, PLACED SO AS TO OBSERVE AND RECORD THE INTERACTION OF GAS AND
WATER CONTAINED IN A PLASTIC CUBE DURING THE 25-MINUTE NEAR-ZERO-G
CONDITIONS PRESENT ON AN ICBM FLIGHT. TEMPERATURE AND PRESSURE
CHANGES ARE ALSO RECORDED.

269 757 0112 (*LIQUIDS, FLUIDS, SURFACES WITH *GASES, DYNAMICS, GRAV
ITY, ACCELERATION, WEIGHTLESSNESS, TEMPERATURE, PRESSURE, THEORY, TEST
EQUIPMENT, TEST METHODS.) -

269 762 0114 GRAPHS FOR PREDICTING THE IDEAL HIGH-SPEED RESISTANCE OF PLANING CATAMARANS,

269 762 0114 GRAPHS ARE PRESENTED BY MEANS OF WHICH THE HIGHSPEED RESISTANCE AND TRIM OF CATAMARAN PLANING HULLS OF A WIDE RANGE OF SIZES AND PROPORTIONS CAN BE DETERMINED. GRAPHS WHICH GIVE GUIDANCE IN SELECTING PARAMETERS WHICH WILL RESULT IN OPTIMUM PLANING PERFORMANCE ARE ALSO PRESENTED. VALUES FOR THE GRAPHS WERE OBTAINED FROM EQUATIONS FOR THE LIFT, CENTER OF PRESSURE, AND RESISTANCE OF PRISMATIC PLANING BOTTOMS WHICH WERE PREVIOUSLY DEVELOPED BY THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AND THE DAVID TAYLOR MODEL BASIN.

269 762 0113 (*CATAMARANS, *TESTS, DESIGN, HYDRODYNAMICS, BOUNDARY LAYER, TURBULENCE, *RESISTANCE, PHYSICAL PROPERTIES.) (*MATHEMATICAL PREDICTION, PROBABILITY, SAMPLING.) -

269 763 0115 DEVELOPMENT AND PRODUCTION OF IMPROVED MOLYBDENUM SHEET BY POWDER METALLURGY TECHNIQUES.

269 763 0115 MO-TI AND MO-TI-C SHEETS ROLLED FROM SLABS SINTERED AT 2150 C WERE EVALUATED FOR COMPOSITION, RECRYSTALLIZATION TEMPERATURE, TENSILE PROPERTIES AT ROOM-TEMPERATURE AND 1200 C, 1200 C STRESS-RUPTURE PROPERTIES AND DUCTILE-BRITTLE TRANSITION TEMPERATURE. THE RESULTS WERE EXAMINED ALONG WITH RESULTS FROM PREVIOUS SHEET EVALUATIONS. THE DEPENDENCY OF SHEET PROPERTIES ON VARIATIONS IN ALLOY FORM AND CONCENTRATION AND SINTERING CONDITIONS WAS DETERMINED. THE SINTERING TEMPERATURE OF THE SLABS HAD THE GREATEST EFFECT ON SHEET PROPERTIES. THE TEST RESULTS VERIFIED THAT HIGH-TEMPERATURE PROPERTIES OF POWDER-METALLURGY SHEET PRODUCED FROM A MIXTURE OF MO WITH 0.5% TI AND 0.1% C SINTERED AT 2150 C ARE SUPERIOR TO THOSE OF THE COMPOSITIONAL COUNTERPART SINTERED AT 1800 C AND TO THOSE OF COMMERCIAL ARC-CAST MO-0.5TI-C SHEET.

269 763 0114 (*SHEETS, *MOLYBDENUM, *MOLYB-DENUM ALLOYS, TITANIUM ALLOYS, CARBON ALLOYS, PRODUCTION, ROLLING MILLS.) (PHYSICAL PROPERTIES, POWDER METALLURGY, CONTROLLED ATMOSPHERES, SINTERING, ADDITIVES, TEMPERATURE, TENSILE PROPERTIES, STRESSES, RUPTURE, BRITTLE MATERIALS, TRANSITION TEMPERATURE, PHASE TRANSITIONS, HEAT OF FUSION, CRYSTAL STRUCTURE, DENSITY, GRAINS (METALLURGY).) (HEAT RESISTANT ALLOYS, PROCESSING, SINTERING VS MELTING, ELECTRIC ARCS, CASTING.) -

269 764 0116 INFLUENCE OF ENVIRONMENTAL ALTERATIONS ON THE PERIPHERAL TRANSPORT AND METABOLISM OF THYROID HORMONE.

269 764 0116 STUDIES PERFORMED DURING THE COMPLETED TENURE OF THIS CONTRACT HAVE BEEN PRINCIPALLY DIRECTED TOWARD THE FOLLOWING OBJECTIVES IDENTIFICATION, PURIFICATION AND CHARACTERIZATION OF THE THYROXINE-BINDING PROTEINS OF THE PLASMA AND ELUCIDATION OF THEIR PHYSIOLOGICAL ROLE AND ABERRATIONS IN DISEASE STATES INVESTIGATION OF THE INTRACELLULAR MECHANISM FOR THE DEGRADATION OF THE THYROID HORMONES AND OF THE RELATIONSHIP BETWEEN HORMONAL DEGRADATION AND ACTION INVESTIGATION OF THE MECHANISM OF THYROID HORMONE BIOSYNTHESIS AND ITS REGULATION BY INTERMEDIARY METABOLISM OF THE THYROID. SPECIFIC FINDINGS IN THESE STUDIES HAVE BEEN DESCRIBED.

269 764 0115 (*THYROID HORMONES, *BIOSYNTHESIS, *METABOLISM, *THYROXINE, DETECTION, PURIFICATION, BLOOD CIRCULATION, BLOOD PROTEINS, DETOXICATION.) IODINE. -

269 765 0117 EXPERIMENTS ON ROTATIONAL IMPACT,

269 765 0117 THE RESULTS OF AN EXPERIMENTAL INVESTIGATION TO DETERMINE THE PRESSURES PRODUCED ON THE BOTTOM OF A SLAMMING SHIP WHEN IMPACT WITH THE SMOOTH WATER SURFACE RESULTS FROM SIMPLE ROTATION IN THE PLANE OF SYMMETRY ARE PRESENTED. THE EFFECT OF FORWARD SPEED OF ADVANCE IS NOT INCLUDED. GRAPHS ARE INCLUDED WHICH SHOW PRESSURE DEPENDENCE ON TIME AND ON SHAPE FOR A PARTICULAR TRANSVERSE SECTION. A COMPARISON OF EXPERIMENTAL AND THEORETICAL AVERAGE PRESSURES FOR THIS STATION SHOWS GOOD AGREEMENT IN MAGNITUDES FOR THE THEORETICAL COMPUTATIONS AVAILABLE. IT IS NECESSARY TO CONSIDER ONLY THOSE PRESSURES WHICH OCCUR A SHORT TIME AFTER THE KEEL CONTACTS THE WATER SURFACE. THUS THE PROPER APPLICATION OF THE THEORY REQUIRES THAT THE IMMERSION BE SMALL, BUT GREATER THAN ZERO. WITH THIS RESTRICTION AN EXAMINATION OF MAXIMUM PRESSURES OVER THE FORWARD 22.5 PERCENT OF THE SHIP'S LENGTH SHOWS THAT THE REGION EXPERIENCING THE HIGHEST PRESSURES IS LOCATED APPROXIMATELY AT 9 PERCENT OF THE SHIP'S LENGTH AFT OF THE FORWARD PERPENDICULAR.

269 765 0116 (*MODEL TESTS, IMPACT SHOCK, PRESSURE, SHIPS, *SHIP HULLS, WATER, SURFACE PROPERTIES, ROTATION, STABILITY (LONGITUDINAL).) (TEST EQUIPMENT, EXPERIMENTAL DATA, TABLES, PHOTOGRAPHIC ANALYSIS.) -

269 770 0118 THE DESIGN OF FUNDAMENTAL MODE MILITARY QUARTZ RESONATORS FOR THE HC-18/U HOLDER 3 TO 12 MC.

269 770 0118 GENERAL DESIGN AND PRODUCTION DATA ARE PRESENTED FOR FUNDAMENTAL MODE RESONATORS IN THE 3 TO 12 MC RANGE WHICH ARE TO BE MOUNTED IN THE HC-18/U TYPE HOLDER. TWO PLATE CONFIGURATIONS WERE INVESTIGATED PLANE-PARALLEL, AND PLANO-CONVEX. SATISFACTORY RESULTS WERE OBTAINED WITH PLANE-PARALLEL PLATES AT FREQUENCIES DOWN TO 9 MC, AND WITH PLANO-CONVEX PLATES DOWN TO 3.5 MC. BELOW 3.5 MC, THE RESULTS WITH PLANO-CONVEX PLATES WERE MARGINAL.

269 770 0117 (*QUARTZ RESONATORS, QUARTZ CRYSTALS, HIGH FREQUENCY, CRYSTAL HOLDERS, CRYSTALS, PRODUCTION, DESIGN, TESTS.) -

269 771 0119 LOW FREQUENCY RADIATION FROM AN ELECTRIC DIPOLE IN A COLD ANISOTROPIC PLASMA,

269 771 0119 EXPRESSIONS FOR THE ELECTROMAGNETIC RADIATION FROM AN ELECTRIC DIPOLE IN AN INFINITE COLD ANISOTROPIC PLASMA ARE PRESENTED UNDER THE CONDITION THAT THE OPERATING FREQUENCY IS MUCH LESS THAN THE ION GYRO FREQUENCY. IT IS FOUND THAT THE MAJOR PORTION OF THE RADIATION IS CONCENTRATED ALONG THE DIRECTION OF THE MAGNETOSTATIC FIELD.

269 771 0118 (*LOW FREQUENCY, *ELECTROMAGNETIC WAVES, ELECTRIC FIELDS, DIELECTRICS, DIPOLE MOMENTS.) (*PLASMA PHYSICS, ELECTRONS, IONS, HIGH FREQUENCY, PLASMA OSCILLATIONS.) -

269 772 0120 CAMOUFLAGE CLOTHING FOR RECONNAISSANCE PERSONNEL.

269 772 0120 THE PROTOTYPE RECONNAISSANCE JACKETS M-2, WERE TESTED BY THE 2D FORCE RECONNAISSANCE COMPANY DURING EXTENSIVE AMPHIBIOUS OPERATIONS AT ST. THOMAS, VIRGIN ISLANDS DURING THE PERIOD 6 OCTOBER - 10 NOVEMBER 1961. RESULTS INDICATE THAT THE MODIFICATIONS INCORPORATED INTO THE M-2 JACKET AS A RESULT OF THE INITIAL TESTS HAVE NOW RENDERED THE JACKET A USEFUL ITEM THAT IS A SUBSTANTIAL IMPROVEMENT OVER THE CAMOUFLAGE UTILITIES NOW IN USE.

269 772 0119 (*CAMOUFLAGE CLOTHING, NAVAL PERSONNEL, DESIGN, TESTS.)

269 007 0121 CARRIER CHARACTERISTICS IN COPPER-DOPED WO₃ FROM CONDUCTIVITY, HALL VOLTAGE, AND THERMAL E.M.F. STUDIES,

269 007 0121 SINGLE CRYSTALS OF CUO.076WO₃, CUO.094WO₃, AND CUO.95WO₃ DELTA WERE PREPARED BY THERMAL DECOMPOSITION OF CUWO₄ AND WO₃. POTENTIAL-PROBE RESISTIVITY MEASUREMENTS IN THE RANGE 120 TO 770 K INDICATE COMPLEX SEMICONDUCTING BEHAVIOR. CUO.076WO₃ AND CUO.094WO₃, WHICH ARE ORTHORHOMBIC, SHOW 3 LINEAR SEGMENTS IN THE LOG ρ VS. $1/T$ DEPENDENCE, THE APPARENT ACTIVATION ENERGIES BEING 0.05 EV BELOW 170 K, 0.4 EV BETWEEN 170 AND 220 K, AND 0.45 EV ABOVE 500 K. BETWEEN 220 AND 500 K, BEHAVIOR IS METALLIC. CUO.95WO₃ DELTA, WHICH IS TRICLINIC, SHOWS NO METALLIC REGION BUT HAS 2 LINEAR SEGMENTS WITH ACTIVATION ENERGY 0.10 EV BELOW 700 K AND 0.15 EV ABOVE. MEASUREMENTS OF THE HALL VOLTAGE AND OF THE THERMOELECTRIC POWER INDICATE THAT CARRIERS ARE ELECTRONS. AT 300 K, CARRIER DENSITIES ARE 4.9×10 TO THE 18TH POWER, AND 0.90×10 TO THE 18TH POWER ELECTRONS/CC WITH MOBILITIES 5.9, 10, AND 0.37 SQ CM/VOLT-SEC. FOR CUO.076WO₃, CUO.094WO₃, AND CUO.95WO₃ DELTA, RESPECTIVELY. THERMAL EMF'S FALL IN THE RANGE -220 TO -300 MICROVOLTS/DEGREE C.

269 007 0120 (*SEMICONDUCTORS, *TUNGSTEN COM-POUNDS, OXIDES WITH COPPER, CHEMICAL IMPURITIES, METALLIC COMPOUNDS, SINGLE CRYSTALS, PREPARATION, ELECTROLYSIS AND TEMPERATURE, DECOMPOSITION, SYNTHESIS.) (CRYSTAL STRUCTURE, LATTICES, RESISTANCE, HALL EFFECT, THERMO-ELECTRICITY, CONDUCTIVITY, ELECTRIC POTENTIAL, MEASUREMENT.) (ELECTRON TRANSITIONS, EXCITATION, FERROELECTRICITY, THEORY, DENSITY.)

269 015 0122 APPROXIMATE TRANSFER FUNCTIONS FOR FLEXIBLEBOOSTER-AND AUTOPILOT ANALYSIS,

269 015 0122 INFORMATION IS PRESENTED TO ENABLE AN ENGINEER TO UNDERSTAND AND ANALYZE THE PHENOMENA ASSOCIATED WITH A FLEXIBLE-BOOSTER-AND-AUTOPILOT ANALYSIS. SIMPLIFICATIONS AND APPROXIMATIONS ARE GIVEN FOR ALL PHASES OF SYNTHESIS AND ANALYSIS, AND THE LIMITATIONS OF THE SIMPLIFIED SOLUTIONS ARE DISCUSSED. THE DEVELOPMENT OF METHODS FOR SYNTHESIS AND ANALYSIS OF FLEXIBLE BOOSTERS IS PRESENTED IN SEVERAL STAGES--FROM SIMPLE LINEAR TECHNIQUES USEFUL FOR PREDESIGN OR PRELIMINARY DESIGN ANALYSIS, UP TO THE COMPLEX FORMS REQUIRING COMPUTER SOLUTIONS, WHICH MAY BE USED TO VERIFY THE ADEQUACY OF THE FINAL FLEXIBLE-BOOSTER-AND-AUTOPILOT CONFIGURATION. THE METHODS OF SYNTHESIS AND ANALYSIS ARE PRESENTED WITH 3 LIMITATIONS (1) A LINEAR AIRFRAME IS ASSUMED (2) THE AERODYNAMIC SURFACES (WINGS) ARE ASSUMED TO BE SMALL AND RELATIVELY RIGID AND (3) THE AERODYNAMICS ARE REPRESENTED BY A SIMPLE QUASI-STEADY MODEL. RESULTS INDICATE THAT ACCURATE SOLUTIONS FOR MOST NONWINGED FLEXIBLE BOOSTERS CAN BE ACHIEVED BY SIMPLE ROOT-LOCUS TECHNIQUES INVOLVING LINEARIZED EQUATIONS.

269 015 0121 (GUIDED MISSILES, SURFACE TO SURFACE, HYPERVELOCITY VEHICLES, LIQUID ROCKET PROPELLANTS, MOTION, BOOSTER ROCKETS, ELASTICITY, *DYNAMICS, MOMENTS, STABILITY, STABILITY (LATERAL), STABILITY (LONGITUDINAL), AUTO-MATIC, STABILIZATION SYSTEMS, SERVO SYSTEMS, *CONTROL SYSTEMS, AUTOMATIC PILOTS, MATHEMATICAL ANALYSIS, NUMERICAL ANALYSIS, FUNCTIONS, MATHEMATICAL PREDICTION, EQUATIONS.)

269 046 0123 HANDBOOK OF OPERATIONS AND SERVICE INSTRUCTIONS FOR TEST SET, ELECTRONIC CIRCUIT, PLUG-IN UNIT QRC-133A(T).

269 046 0123 INSTRUCTIONS ARE GIVEN FOR THE OPERATION AND MAINTENANCE OF TEST SET ELECTRONIC CIRCUIT, PLUG-IN UNIT QRC-133A(T). THIS UNIT IS DESIGNED TO TEST THE FOLLOWING MODULES OF BARRAGE JAMMER QRC-133A(T) (1) POWER SUPPLY (2) VOLTAGE REGULATOR (3) MODULATOR-POWER SUPPLY AND (4) INTERFERENCE GENERATOR. THE OUTPUTS OF THESE MODULES ARE DISPLAYED ON VARIOUS METERS AND INDICATORS CONTAINED IN THIS TEST SET. THE DISPLAYED OUTPUTS ARE EVALUATED TO DETERMINE THE PERFORMANCE OF THE MODULE UNDER TEST. TO OBTAIN SIGNIFICANT TEST RESULTS AND READINGS WHEN TESTING THE 4 MODULES OF THE QRC-133A(T) SYSTEM, IT IS NECESSARY TO MAINTAIN THE SAME CONDITIONS UNDER WHICH THE MODULES UNDER TEST NORMALLY OPERATE. DURING NORMAL OPERATION IN THE QRC-133A(T) SYSTEM, EACH OF THE 4 MODULES INTERACTS IN SOME WAY WITH AT LEAST ONE OTHER MODULE. THE OUTPUT OF EACH MODULE IS AFFECTED BY INHERENT LOADS IN THE ASSOCIATED MODULES.

269 046 0122 (HANDBOOKS, *INSTRUCTION MANUALS, *TEST SETS, *RADAR JAMMING, *RADAR EQUIPMENT.) (TEST EQUIPMENT, ELECTRONIC CIRCUITS, MAINTENANCE, OPERATION.) -

269 060 0124 SELF-ADAPTIVE CONTROL SYSTEMS. PART II. BLOCK DIAGRAM MODELS FOR THE AIRFRAME, AND SOME APPROACHES TO ACTIVE COMPENSATION,

269 060 0124 THE SECOND PHASE IS REPORTED OF A LONG-RANGE PROJECT TO STUDY SELF-ADAPTIVE CONTROL PRINCIPLES AND APPLY THEM TO THE CONTROL OF AIRCRAFT. THE PRIMARY PURPOSE OF THIS PHASE IS TO DEVELOP A SUITABLE MATHEMATICAL MODEL FOR THE STUDY OF AIRCRAFT DYNAMICS INCLUDING ALL DEGREES OF FREEDOM, AND THE SECONDARY PURPOSE IS TO TEST THE FEASIBILITY OF USING ACTIVE COMPENSATORS IN THE AUTOPILOT AS A BASIS FOR SELF-ADAPTIVE SCHEMES OF CONTROL. THE MODEL IS RESTRICTED TO THAT OF A RIGID AIRFRAME, AND IS TREATED AS A BLOCK DIAGRAM BECAUSE OF WELL ESTABLISHED CORRELATIONS BETWEEN THE BLOCK DIAGRAM AND A DETERMINANTAL ARRAY ON ONE HAND, AND BETWEEN THE BLOCK DIAGRAM AND ANALOG SIMULATION ON THE OTHER HAND. THE INITIAL MODEL IS HELD TO A LINEAR FORM SINCE IT IS NECESSARY THAT THE MODEL BE REDUCIBLE TO SIMPLER, WELL-KNOWN LINEAR BLOCK DIAGRAM MODELS WHEN THE PROPER RESTRICTIONS ARE IMPOSED. ANALYSIS OF A LINEAR MODEL IS ALSO READILY OBTAINED AND PROVIDES A BASIS FOR ESTIMATING THE IMPORTANCE OF NONLINEAR EFFECTS WHICH CAN BE INTRODUCED BY THE INJECTION OF PROPERLY DERIVED SIGNALS. THIS MODIFICATION OF THE MODEL CAN LEAD TO SIMULATION STUDIES WHERE AN ANALYTIC TREATMENT IS IMPOSSIBLE.

269 060 0123 (JET PLANES, AIRPLANES, AIR-CRAFT, *CONTROL SYSTEMS, *SERVO SYSTEMS, *AUTOMATIC PILOTS, MATHEMATICAL ANALYSIS, OPERATIONAL CALCULUS, DETERMINANTS, DESIGN.) (AIRFRAMES, DYNAMICS, STABILITY, YAW, PITCH, ROLL, MATHEMATICAL ANALYSIS.) -

269 065 0125 HELIX COUPLERS FOR LINEAR-BEAM DEVICES,

269 065 0125 THE INTERACTION BETWEEN ELECTRON BEAMS AND COUPLED HELICES IS STUDIED AND GENERALIZED TO INCLUDE THE EFFECTS OF (1) SPACE CHARGE, QC (2) FINITE CIRCUIT LOSS, D (3) FINITE VALUES OF GAIN PARAMETER, C (4) AN UNRESTRICTED COUPLING PARAMETER, K AND (5) THE EFFECT OF HAVING A LARGE POSITIVE VALUE OF THE VELOCITY PARAMETER, B, SUCH THAT THE PROPAGATION CONSTANTS ARE PURELY IMAGINARY. A GENERAL DETERMINANTAL EQUATION INCLUDING ALL THESE FACTORS IS DERIVED FROM THE

COUPLED-CIRCUIT EQUATIONS AND THE STREAM EQUATION. CURVES OF THE PROPAGATION CONSTANTS FOR A VARIETY OF OPERATING PARAMETERS ARE SHOWN.

ATTENTION IS CALLED TO THE FACT THAT A REGION OF GROWING WAVE IS FOUND FOR LARGE POSITIVE B FOR EXTREMELY TIGHT COUPLING. THE EXTENT TO WHICH THE GROWING-WAVE ISLAND IS AFFECTED BY THE VARIOUS OPERATING PARAMETERS IS ILLUSTRATED. EQUATIONS FOR THE OUTER AND INNER HELIX RF VOLTAGES ARE DERIVED FROM WHICH CURVES OF THE PROPAGATING RF POWERS ALONG THE HELICES ARE COMPUTED AND PLOTTED.

269 065 0124 (*TRAVELING WAVE TUBES, *MICRO-WAVE AMPLIFIERS, *COUPLING CIRCUITS, ELECTRONIC CIRCUITS, HELIXES.) (ELECTRON BEAMS, SPACE CHARGES, RADIOFREQUENCY POWDER, THEORY, MATHEMATICAL ANALYSIS.) -

269 073 0126 SOME USEFUL INFORMATION FOR THE DESIGN OF AIRCORE SOLENOIDS, PART I. RELATIONSHIPS BETWEEN MAGNETIC FIELD, POWER, AMPERE-TURNS AND CURRENT DENSITY. PART II. HOMOGENEOUS MAGNETIC FIELDS,

269 073 0126 RELATIONSHIPS RELATING POWER, MAGNETIC FIELD, CURRENT DENSITY, AND AMPERE-TURNS IN TERMS OF CERTAIN DIMENSIONLESS FACTORS ARE SUMMARIZED FOR MANY TYPES OF COIL GEOMETRIES AND CURRENT DISTRIBUTIONS. A NUMBER OF PLOTS OF THESE FACTORS ARE PRESENTED. THE FIELD HOMOGENEITY IN MAGNET STRUCTURES IS PRESENTED IN TERMS OF A SERIES EXPANSION ABOUT THE ORIGIN UTILIZING LEGENDRE POLYNOMIALS. A NUMBER OF TABLES TO FACILITATE DESIGN OF HOMOGENEOUS FIELDS ARE PRESENTED. A METHOD OF ACHIEVING HOMOGENEITY IN LONG SOLENOID STRUCTURES BY THE USE OF DETERMINANTS IS DISCUSSED. EXPRESSIONS FOR THE AXIAL FIELD FROM UNIFORM AND RADIALY VARYING CURRENT DENSITY COILS ARE GIVEN.

269 073 0125 (*COILS, GEOMETRY, AIR, MAGNETIC CORES, *SOLENOIDS, DESIGN.) (POWER, MAGNETIC FIELDS, ELECTRIC CURRENTS, DENSITY.) (TAYLOR S SERIES, POLYNOMIALS, MATRIX ALGEBRA, ALGEBRA, INTEGRALS.) TABLES. -

269 074 0127 SOME USEFUL INFORMATION FOR THE DESIGN OF IRON MAGNETS. PART I. THE CALCULATION OF GAP FIELDS BY MEANS OF EQUIVALENT SURFACE POLES. PART II. THE CALCULATION OF GAP FIELDS BY MEANS OF DISTRIBUTED VOLUME DIPOLES. PART III. ANALYSIS OF EXISTING MAGNETS,

269 074 0127 THE CALCULATION OF GAP FIELDS IN IRON MAGNETS BY MEANS OF EQUIVALENT SURFACE POLES HAS BEEN EXPLORED BY SEVERAL AUTHORS. THIS WORK IS ENLARGED AND THE RESULTS COMPARED WITH THE PERFORMANCE OF A WIDE RANGE OF COMMERCIAL MAGNETS. MAGNET CIRCUITS CAN ALSO BE ANALYZED BY A VOLUME INTEGRAL OF DIPOLES. THIS REMOVES THE RESTRICTION OF UNIFORM MAGNETIZATION AND ALLOWS THE OPTIMUM DIRECTION OF MAGNETIZATION TO BE EXPLORED. GENERAL RESULTS ARE GIVEN FOR IRON CYLINDERS, AND A NUMBER OF SPECIFIC TAPERED POLES ARE ANALYZED. THE HOMOGENEITY OF FIELDS IN THE GAPS OF MAGNETS IS PRESENTED IN THE FORM OF A TAYLOR SERIES OF ERROR COEFFICIENTS.

269 074 0126 (*IRON, *MAGNETS, DESIGN.) (*MAGNETIC FIELDS, MEASUREMENT, MAGNET COILS, SEPARATION, MATHEMATICAL ANALYSIS, TAYLOR S SERIES, INTEGRALS.) ANALYSIS. -

269 106 0128 THE SOVIET OIL OFFENSIVE AND INTER-BLOC ECONOMIC COMPETITION,

269 106 0128 DATA ARE PRESENTED ON SOVIET OIL PRODUCTION AND EXPORTS, AND ARE RELATED TO THE BROADER EAST-WEST ECONOMIC STRUGGLE. THE SOVIET OIL EXPORT DRIVE ILLUSTRATES THREE ASPECTS OF INTER-BLOC RIVALRY COMPETITION IN ECONOMIC AND TECHNOLOGICAL ACHIEVEMENT, COMPETITION FOR INFLUENCE, AND COMPETITION FOR MARKETS. IN EACH THE SOVIET OIL OFFENSIVE HAS ACHIEVED CONSIDERABLE SUCCESS. THE STUDY ASSESSES THE EFFECTS OF SOVIET OIL EXPORTS ON THE WEST AS BOTH CONSUMER AND PRODUCER OF OIL. AS CONSUMER, THE WEST CAN GAIN FROM LOWER PRICES BUT RUNS THE RISK OF A LESS RELIABLE OIL SUPPLY. MEASURES ARE DISCUSSED FOR REDUCING THIS RISK BY ENSURING THE AVAILABILITY OF ALTERNATIVE SUPPLIES.

269 106 0127 (*USSR, *ECONOMIC CONDITIONS, *MINERAL OILS, FOREIGN POLICY.) -

269 132 0129 COATINGS FOR REFRACTORY METALS, FORMED BY ANODIC TREATMENT AND BY VAPOR DEPOSITION.

269 132 0129 PREPARATION OF ANODIC COATINGS ON NB, TA, MO, AND W WAS INVESTIGATED. THE OBJECT WAS TO MODIFY SUCH COATINGS BY ANODICALLY INCORPORATING ELEMENTS KNOWN TO FORM OXIDATION PROTECTIVE ALLOYS WITH THESE REFRACTORY BASIS METALS, AND TO CONVERT THE MIXED COATINGS TO A HIGH-TEMPERATURE OXIDATION PROTECTIVE FILM BY SUBSEQUENT REDUCTION AND SINTERING. ANODIZING WAS CARRIED OUT IN BOTH AQUEOUS SOLUTIONS AND IN MOLTEN SALTS. SUCCESSFUL COATINGS WERE NOT OBTAINED. ATTEMPTS TO FORM ALUMINIDE COATINGS BY DIFFUSION OF ELECTRODEPOSITED AL, FOLLOWED BY ANODIZING, WERE ALSO UNSUCCESSFUL. EFFORTS WERE TURNED TO THE PREPARATION OF COATINGS BY COMBINING ELECTRODEPOSITION AND VAPOR DEPOSITION. CHROMIUM SILICIDE COATINGS, FORMED BY VAPOR PHASE SILICIDING OF ELECTRODEPOSITED CR, WERE INVESTIGATED. SOUND COATINGS WERE NOT OBTAINED FROM HYDROGEN REDUCTION OF SiCl_4 DUE TO CHEMICAL DISPLACEMENT REACTION WITH THE BASIS CR. SILICIDING WITH MONOMETHYL AND TETRAMETHYL SILANE AVOIDED THE DISPLACEMENT REACTION AND YIELDED SOUND SILICON CARBIDE COATINGS. HOWEVER, THESE COATINGS FAILED TO PROVIDE GOOD OXIDATION PROTECTION AT 1100 C IN AIR, DUE TO SPALLING. THE DIFFERENTIAL THERMAL COEFFICIENT OF EXPANSION WITH RESPECT TO THE BASIS METAL WAS THE PROBABLE CAUSE OF FAILURE.

269 132 0128 (*COATINGS, *OXIDATION INHIBITORS, *REFRACTORY MATERIALS, NIOBIUM, TANTALUM, MOLYBDENUM, TUNGSTEN, ELECTRODEPOSITION, VAPOR PLATING, ANODES (ELECTROLYTIC CELL).) (OXIDES, ALUMINUM, SILICIDES, CHROMIUM PLATING.) HIGH TEMPERATURE RESEARCH. -

269 137 0130 ION EXCHANGE-PHOTOMETRIC DETERMINATION OF TANTALUM IN VANADIUM ALLOYS.

269 137 0130 A METHOD WAS DEVELOPED FOR THE DETERMINATION OF TANTALUM IN VANADIUM ALLOYS. TANTALUM IS DETERMINED PHOTOMETRICALLY WITH PYROGALLIC ACID FOLLOWING A SEPARATION BY ION EXCHANGE. A DETAILED PROCEDURE IS GIVEN.

269 137 0129 (*VANADIUM ALLOYS, *TANTALUM, CHEMICAL ANALYSIS, ION EXCHANGE, SOLVENT EXTRACTION, SEPARATION, PHOTOMETERS.) (RE-AGENTS, NITRIC ACID, HYDROGEN COMPOUNDS, FLUORIDES, HYDROXIDES, BENZENES.) -

269 138 0131 PREPARATION OF THE FLUOROSULFONATES $KI(SO_3F)_4$, $KBR(SO_3F)_4$, $SNCL(SO_3F)_3$, AND $CR_2(SO_3F)_2$,

269 138 0131 PEROXYDISULFURYL DIFLUORIDE, $S_2O_6F_2$, REACTS WITH SOME CHLORIDES TO REPLACE CL BY THE FLUOROSULFONATE GROUP. THIS TYPE OF REACTION WAS USED TO PREPARE $SNCL(SO_3F)_3$ FROM $SNCL_4$ AND $CR_2(SO_3F)_2$ FROM CR_2CL_2 . $S_2O_6F_2$ FAILS TO REPLACE THE HALOGEN IN KBR OR KI WHEN REACTING AT ABOUT ROOM TEMPERATURE. INSTEAD, THE COMPLEX SALTS, $KBR(SO_3F)_4$ AND $KI(SO_3F)_4$, ARE FORMED.

269 138 0130 (*FLUORIDES, *SULFONATES OF POTASSIUM COMPOUNDS, IODATE S OF BROMINE COMPOUNDS OR DIOXIDES, CHROMIUM COMPOUNDS OR CHLORIDES, TI N COMPOUNDS, COMPLEX COMPOUNDS, SYNTHESIS.) -

269 141 0132 INVESTIGATION OF A VARIATIONAL PRINCIPLE FOR OPEN SYSTEMS,

269 141 0132 AN ATTEMPT TO OBTAIN INFORMATION ABOUT THE STATIONARY NONEQUILIBRIUM STATE OF A FLUID THROUGH WHICH HEAT IS FLOWING IS DESCRIBED. THE FLUID IS IN CONTACT WITH SEVERAL HEAT RESERVOIRS AT DIFFERENT TEMPERATURES AND IS ASSUMED TO BE DESCRIBED BY AN ENSEMBLE DENSITY WHICH SATISFIES A GENERALIZED LIOUVILLE EQUATION. OUR METHOD CONSISTS OF MINIMIZING A POSITIVE FUNCTIONAL WHICH VANISHES ONLY WHEN THE CORRECT STATIONARY SPACE DISTRIBUTION IS ASSUMED.

269 141 0131 (*FLUID FLOW, *HEAT TRANSFER, HYDRODYNAMICS, THERMODYNAMICS, ENERGY, CHEMICAL EQUILIBRIUM, ENTROPY, THERMAL CONDUCTIVITY, PARTICLES, TRANSPORT PROPERTIES.) (*CALCULUS OF VARIATIONS, PARTIAL DIFFERENTIAL EQUATIONS, TENSOR ANALYSIS.) -

269 142 0133 FINAL REPORT 1 OCTOBER 1959 - 1 OCTOBER 1961,

269 142 0133 THIS WORK IS IN THE FIELD OF STATISTICAL MECHANICS. THE GOAL OF STATISTICAL MECHANICS IS TO PREDICT THE OBSERVED PROPERTIES OF MACROSCOPIC OBJECTS FROM THE PROPERTIES OF THE ATOMS MAKING UP THESE OBJECTS. THIS INCLUDES SUCH DIVERSE PROBLEMS AS CHANGE OF PRESSURE WITH TEMPERATURE, THE AMOUNT OF HEAT TRANSPORTED BY A METAL BAR WHOSE ENDS ARE KEPT AT DIFFERENT TEMPERATURES, AND THE RATE AT WHICH A LIQUID WILL FLOW THROUGH A CHANNEL.

269 142 0132 (*QUANTUM STATISTICS, *FLUIDS, *FLUID MECHANICS, THERMODYNAMICS, *GASES, *MOLECULES, *PARTICLES, KINETIC THEORY.) (TEMPERATURE, TRANSPORT PROPERTIES, METALS, SHEETS.) (DISTRIBUTION THEORY, STATISTICAL FUNCTIONS, STATISTICAL DISTRIBUTIONS, PARTIAL DIFFERENTIAL EQUATIONS, INTEGRATION, VECTOR ANALYSIS, TAYLOR S SERIES, MATRIX ALGEBRA, PROBABILITY.) -

269 785 0134 HIGHLY CHLORINATED MATERIALS FOR OXIDATION AND HEAT-RESISTANT PLASTICS.

269 785 0134 THE TEXT OF THE ARTICLE WHICH CONTAINS A BRIEF OUTLINE OF METHODS FOR OBTAINING HEXACHLOROCYCLOPENTADIENE, IS DOCUMENTED BY MORE THAN 60 REFERENCES, MANY OF WHICH ARE SOVIET. THE WORK BY L. M. KOGAN AND OTHERS CITED DATES FROM 1958 THROUGH 1961. THE PART OF THE ARTICLE DEALING WITH HEXACHLOROCYCLOPENTADIENE IS REPRESENTATIVE OF SOVIET INTEREST IN HIGHLY CHLORINATED POLYMERS BECAUSE OF THEIR HEAT AND OXIDATION RESISTANCE. AN IMPROVEMENT IN THE TECHNOLOGY OF ANOTHER HIGHLY CHLORINATED MONOMER, CHLORENDIC ANHYDRIDE, WAS REPORTED PREVIOUSLY. (NOTE THIS ABSTRACT VIRTUALLY COMPRISES THE ENTIRE REPORT).

269 785 0133 (*HEAT RESISTANT POLYMERS, MATERIALS, *CYCLOPENTENES, CHLORIDES, POLYMERS, SYNTHESIS, CHLORINATION, USSR.) -

269 795 0135 TRACKING OF MISSILES AND SPACE VEHICLES. REVIEW OF SOVIET LITERATURE.

269 795 NO ABSTRACT AVAILABLE

269 795 0134 (*PLASMA PHYSICS, ELECTRO-MAGNETIC PROPERTIES, *IONOSPHERIC DISTURBANCES, IONS, METEORS, ELECTRONS, DENSITY, IONOSPHERE, UPPER ATMOSPHERE, MOLECULES, *RADIO ASTRONOMY, EXTRATERRESTRIAL RADIO WAVES, SCIENTIFIC RESEARCH.) (SATELLITE VEHICLES, GUIDED MISSILES, SURFACE TO SURFACE, RADAR TRACKING, RADIO INTERFEROMETERS, TRACKING.) USSR. -

269 796 0136 THEORETICAL PERFORMANCE BOUNDS FOR VARIABLE DATA RATE TRANSMISSIONS ON FADING CIRCUITS,

269 796 0136 VARIABLE DATA RATE TRANSMISSIONS ARE CONSIDERED AS A MEANS OF COUNTERACTING ADVERSE EFFECTS OF FADING. THEORETICAL BOUNDS ON ATTAINABLE IMPROVEMENTS ARE DERIVED AS A GUIDELINE TO MORE EXHAUSTIVE STUDIES. IT IS SHOWN THAT RELATIVELY SIMPLE SUBOPTIMUM SYSTEMS OFFER VIRTUALLY AS GOOD PERFORMANCE AS THE MOST ELABORATE SYSTEM.

269 796 0135 (*DATA TRANSMISSION SYSTEMS, *COMMUNICATIONS THEORY, TESTS, ANALYSIS, ERRORS, PROBABILITY, FREQUENCY SHIFT, FREQUENCY SHIFT KEYERS, BAND-PASS FILTERS, CIRCUITS.) -

269 854 0137 NOTE ON THE AXISYMMETRY OF AN ELECTRODELESS DISCHARGE,

269 854 0137 THE VACUUM ELECTRIC FIELD IN A CONFIGURATION IS STRONGLY NON-AXISYMMETRIC, BUT THE POLARIZATION OF THE GAS INSIDE THE COIL COMPLETELY COMPENSATES THE NON-AXISYMMETRIC COMPONENT, LEAVING AN AXISYMMETRIC FIELD.

269 854 0136 (*ELECTRIC DISCHARGES, *MAGNETIC FIELDS, *CONFIGURATION, VACUUM SYSTEMS, *ELECTRIC FIELDS, *COILS.) (GAS IONIZATION, POLARIZATION, ELECTRONS, DENSITY, IONS, VORTICES, VECTOR ANALYSIS.) -

269 867 0138 RESEARCH AND DEVELOPMENT OF A PROTON SPECTROMETER.

269 867 0138 A PROTON SPECTROMETER SYSTEM HAS BEEN DEVELOPED TO MEASURE THE FLUX AND ENERGY SPECTRUM OF PROTONS ABOVE 1 MEV IN THE VAN ALLEN RADIATION BELTS AND INTERPLANETARY SPACE. THE INSTRUMENT WILL BE FLOWN ON THE ADVENT SATELLITE AND OTHER AIR FORCE VEHICLES TO OBTAIN INFORMATION PERTINENT TO RELIABILITY OF SATELLITE COMPONENTS IN THE SPACE ENVIRONMENT.

269 867 0137 (DESIGN OF *SPECTROPHOTOMETERS FOR SPECTROGRAPHIC ANALYSIS OF ENERGY, *PROTONS, VAN ALLEN RADIATION BELT.) (SATELLITE VEHICLES, INSTRUMENTATION.) (*SCINTILLATION COUNTERS, CRYSTALS, PHOTO-MULTIPLIERS.) (CESIUM COMPOUNDS, IODIDES, PULSE HEIGHT ANALYZERS.) -

269 834 0139 TOTAL SYSTEM CONCEPT FOR A NAVY STOCK POINT,

269 834 0139 THIS REPORT PRESENTS A NEW DATA-PROCESSING CONCEPT FOR NAVY STOCK POINTS. THE REPORT IS BASED ON THE FOLLOWING PRECEPTS (1) THE OBJECTIVE OF THE TOTAL SYSTEM IS RAPID, PREDICTABLE ISSUES TO CUSTOMERS, WITH THE LATTER OF PREDOMINANT IMPORTANCE SINCE PREDICTABLE LEAD TIME WILL ENABLE CUSTOMERS TO ADJUST THEIR OPERATIONS TO SUPPLY

CAPABILITIES IN AN OPTIMUM MANNER. (2) THE ACHIEVEMENT OF THE TOTAL SYSTEMS OBJECTIVE REQUIRE THAT THE ENTIRE ISSUE PROCESSING CYCLE AT A STOCK POINT I.E., THE TOTAL SYSTEM BE CONSIDERED AS A UNIT. THE DATA-PROCESSING REQUIREMENTS OF ALL OF THE FUNCTIONAL AREAS MUST BE CONSIDERED, AND THESE REQUIREMENTS MUST BE DEFINITELY ALIGNED WITH AND EXPEDITE THE MATERIAL-PROCESSING SYSTEM AND SHIPPING REQUIREMENTS. (3) THE NEW CONCEPT APPLIES TO ALL MAJOR STOCK POINTS, REGARDLESS OF TYPE OR MISSION.

269 834 0138 (*DATA PROCESSING SYSTEMS, *NAVAL LOGISTICS, RECORDS, NAVAL SUPPLIES.) MANAGEMENT ENGINEERING. -
269 811 0140 ANTENNA - AT-601(XE-3)/TRN.

269 811 0140 THE DEVELOPMENT AND FINAL DESIGN EFFORTS ARE DISCUSSED OF A PROTOTYPE MODEL OF THE AT-601 (XE-3)/TRN ANTENNA FOR THE RADIO BEACON SYSTEM AN/TRN-9. DETAILED CONSIDERATION IS GIVEN TO (1) THE ELECTRICAL DESIGN OF THE RADIATION AND FEED CIRCUITS FOR THE ANTENNA CONE AND FAN ARRAYS, (2) MATCHING TECHNIQUE FOR OBTAINING 1.2 VSWR, (3) EVALUATION OF THE NECESSITY OF A GROUND PLANE AND THE FINAL CHOICE OF GROUND PLANE MATERIAL, (4) MECHANICAL REDESIGN TO OBTAIN A RUGGED, PORTABLE, AND EASILY ASSEMBLED UNIT, (5) THE CHOICE OF THE RADIATION ELEMENT MATERIAL AND THE MEANS FOR RADIATION ELEMENT QUICK DISCONNECT, (6) RADIATION PATTERN MEASUREMENTS, (7) FLIGHT TEST MEASUREMENT ON THE ANTENNA, AND (8) ENVIRONMENTAL TESTING.

269 811 0139 (*RADIO BEACONS, *ANTENNAS, ANTENNA HARDWARE, ANTENNA MASTS, MOBILE, TRANSMISSION LINES, GLASS TEXTILES, DESIGN, ANTENNA RADIATION PATTERNS, STANDING WAVE RATIOS, TESTS, RADIO NAVIGATION.) -
269 829 0141 AIRCRAFT LANDING SYSTEM COMPATIBILITY STUDY. U-3A. AN/GSN-5.

269 829 0141 THE LANDING CONTROL, CENTRAL, AN/GSN-5 IS A GROUND-BASED, FINAL APPROACH NAVIGATION SYSTEM PROVIDING THREE BASIC APPROACH AND LANDING TECHNIQUES, NAMELY, COMPLETELY AUTOMATIC CONTROL, CROSS-POINTER GUIDED APPROACH, AND TALKDOWN. THESE TECHNIQUES MAY BE USED SINGULARLY OR IN COMBINATION. IN ALL CASES, HOWEVER, AIRCRAFT SURVEILLANCE AND GUIDANCE INFORMATION ARE MAINTAINED TO TOUCHDOWN. THE STUDY OF THE COMPATIBILITY OF THE U-3A AIRCRAFT, THE L-2 AUTOPILOT, AND THE LANDING CONTROL, CENTRAL, AN/GSN-5 INDICATES THAT, WITH THE AIRBORNE AND GROUND UNITS CONFORMING TO THE PERFORMANCE REQUIREMENTS STATED HEREIN, THE AIRCRAFT AND THE AN/GSN-5 SYSTEM ARE COMPATIBLE, AND THAT SATISFACTORY ALL WEATHER AUTOMATIC FINAL APPROACHES AND LANDINGS CAN BE MADE. THE AIRCRAFT IS ALSO COMPATIBLE WITH THE AN/GSN-5 SYSTEM FOR CROSS-POINTER OR TALKDOWN GUIDED APPROACHES.

269 829 0140 (*LIAISON PLANES, INSTRUMENT LANDINGS, ALL-WEATHER AVIATION, *GROUND CONTROLLED APPROACH RADAR, SERVO SYSTEMS, CONTROL SYSTEMS, RADAR TRACKING, RADAR EQUIPMENT, AUTO-MATIC PILOTS, NAVIGATION COMPUTERS, STABILITY, ERRORS, DESIGN, SIMULATION BY ANALOG COMPUTERS, DIGITAL COMPUTERS.) RADAR ECHO AREAS. -

269 832 0142 TABLES OF CYLINDRICAL BLAST FUNCTIONS FOR GAMMA
EQUALS 5/3 AND GAMMA EQUALS 7/5,

269 832 0142 TABLES OF SIMILARITY FUNCTIONS DEFINING THE FLOW
FIELD BEHIND EXPANDING CYLINDRICAL SHOCK WAVES ARE PRESENTED HERE FOR
VALUES OF 5/3 AND VALUES OF 7/5. A BRIEF DISCUSSION INCLUDES THE
DIFFERENTIAL EQUATIONS AND BOUNDARY CONDITIONS FOR THESE FUNCTIONS
TOGETHER WITH AN ANALYTICAL SOLUTION FOR THEM.

269 832 0141 (SHOCK WAVES, *BLAST, CYLIN-DRICAL BODIES, GAS FLOW, *F
UNCTIONS, *TABLES.) (NUMERICAL ANALYSIS, DIFFERENTIAL EQUATIONS.) (WIRE,
DETONATION, SHOCK WAVES, BLAST.) SPECIFIC HEAT. -

269 889 0143 STUDIES IN DETERRENCE. IV. THE PROSPECTS FOR FUTURE
ARMS-CONTROL NEGOTIATIONS,

269 889 0143 WHILE GENERAL SPECULATIONS ON THE FUTURE POLICY OF
THE SOVIET UNION ENCOUNTER MANY DIFFICULTIES, THE FACT THAT THE SOVIET
NEGOTIATORS HAVE FOLLOWED A DISTINCT PATTERN IN THE ARMS-CONTROL AREA
PERMITS AN EXTRAPOLATION OF TRENDS INTO LIKELY ALTERNATIVES WITHIN
BROAD LIMITS. THREE OF THESE ARE CONSIDERED IN DETAIL, TOGETHER WITH
LIKELY U. S. RESPONSES. THESE INCLUDE (A) SOVIET PROPOSALS FOR GENERAL
AND COMPLETE DISARMAMENT, (B) SOVIET PROPOSALS FOR LIMITED
ARMS-CONTROL MEASURES, AND (C) SOVIET PROPOSALS BASED ON U. S. IDEAS
DEVELOPED DURING THE LAST FEW YEARS. EACH IS EXPLORED IN SOME DETAIL
TOGETHER WITH POSSIBLE U. S. RESPONSES.

269 889 0142 (*FOREIGN POLICY, *POLITICAL SCIENCE, *USSR, CONTROL OF
WAR POTENTIAL.) -

269 853 0144 RADOME MODEL 128B10005.

269 853 0144 THIS REPORT INCLUDES BRUNSWICK CORP., MARION, VA.
GRUMMAN DESIGN 128. MONTHLY PROGRESS REPT. 1-31 AUG 61, BY
H. L. HUFF. (BC REPT. NO. 1260-EE) (SUBCONTRACT TO GRUMMAN AIRCRAFT
ENGINEERING CORP., BETHPAGE, N. Y., CONTRACT NOA(S) 58-524-C)
BRUNSWICK CORP., MARION, VA. GRUMMAN DESIGN 128. MONTHLY PROGRESS
REPT., 1 SEP-31 OCT 61, BY H. L. HUFF. (BC REPT. NO. 1260-FF)
9SUBCONTRACT TO GRUMMAN AIRCRAFT ENGINEERING CORP., BETHPAGE, N. Y.,
CONTRACT NOA(S) 58-524-C)

269 853 0143 (*RADOMES OF EPOXY RESINS, PLASTICS, DESIGN, PROCESSIN
G.) -

269 844 0145 ANALYSIS OF AN INTEGRATED BISTABLE MULTIVIBRATOR.

269 844 0145 A TYPICAL REALIZATION OF AN INTEGRATED BISTABLE
MULTIVIBRATOR IS PROPOSED AND ANALYZED. IT IS FOUND THAT THE
INTEGRATED REALIZATION IS SLOWER THAN ITS LUMPED COUNTERPART. THIS
DECREASED SPEED OF OPERATION RESULTS (A) FROM EXCESS MINORITY CARRIER
STORAGE IN THE BULK SEMICONDUCTOR MATERIAL WHICH FORMS THE TRANSISTOR
COLLECTOR REGIONS AND CIRCUIT RESISTANCES, AND (B) FROM THE VOLTAGE
DEPENDENCE OF THE LARGE AREA P-N JUNCTIONS WHICH FORM THE CROSS
COUPLING NETWORKS.

269 844 0144 (*VIBRATORS, *CIRCUITS, SEMICONDUCTORS, CAPACITORS, TR
ANSISTORS, DESIGN.) -

269 874 0146 SOLID STATE LOGARITHMIC PULSE AMPLIFIER,

269 874 0146 THE USE OF A ZENER DIODE AS THE LOGARITHMIC ELEMENT IN PULSE LOGARITHMIC AMPLIFICATION IS DESCRIBED. A SPECIFIC THREE DECADE PULSE LOGARITHMIC AMPLIFIER USING THE ZENER DIODE AND TRANSISTORIZED CIRCUIT IS PRESENTED.

269 874 0145 (*TRANSISTOR AMPLIFIERS, *PULSE AMPLIFIERS WITH DIODES.) (*PHOTOMULTIPLIERS, CIRCUITS.) -

269 807 0147 NO TITLE AVAILABLE

269 807 0147 NO ABSTRACT AVAILABLE

269 807 0146 (TESTS WITH LEAST SQUARES METHOD.) (INSTRUMENTATION FOR MEASUREMENT OF *GUIDED MISSILE TRAJECTORIES.) (TEST EQUIPMENT FOR MODEL TESTS OF BACTERIAL AEROSOLS.) (CALIBRATION OF DETECTORS OF PARTICLES IN *AEROSOLS.) (*AREA BOMBING, EFFECTIVENESS.) (SAFETY OF ARMIES FROM GUIDED MISSILES.) (DATA PROCESSING SYSTEMS, ANALYSIS.) (TESTS.) -

269 873 0148

269 873 0148 THE ROOM TEMPERATURE DEFORMATION BEHAVIOR OF FE-AL ALLOYS NEAR THE COMPOSITION FE3AL WAS STUDIED AS A FUNCTION OF QUENCHING TEMPERATURE (DEGREE OF ORDER). A SLIP TRACE STUDY SHOWED (110) TO BE THE DOMINANT SLIP PLANE WITH (211) AND (321) ALSO PARTICIPATING. THE RELATIVE SLIP PLANE PREFERENCE WAS INDEPENDENT OF THE QUENCHING TEMPERATURE. THE YIELD STRESS OF POLYCRYSTALLINE SPECIMENS AND THE CRITICAL RESOLVED SHEAR STRESS OF SINGLE CRYSTALS WAS DETERMINED AS A FUNCTION OF QUENCHING TEMPERATURE. A SECOND STRENGTH MAXIMUM WAS ALSO OBSERVED IN THE 700 TO 750 C QUENCHING TEMPERATURE RANGE. X-RAY RESULTS SHOWED COMPLETE SUPPRESSION OF FE3AL TYPE ORDER, AND NO VARIATION IN THE DEGREE OF RETAINED FEAL TYPE ORDER. A THIRD STRENGTH VS QUENCHING TEMPERATURE RISE WAS OBSERVED AT ABOUT 900 C, WHICH IT IS SUGGESTED MAY BE DUE TO VACANCY STRENGTHENING. YOUNG'S MODULUS EXHIBITED ANOMALOUS BEHAVIOR, INCREASING WITH INCREASING QUENCHING TEMPERATURE. THE YOUNG'S MODULUS BEHAVIOR DID NOT CORRELATE WITH THE DISORDERING OF THE FE3AL SUPERLATTICE.

269 873 0147 (*PHASE STUDIES, PHASE TRANSITIONS, *MOLECULAR ASSOCIATION OF IRON IN *IRON ALLOYS, *ALUMINUM ALLOYS, DEFORMATION, TEMPERATURE, HEAT TREATMENT.) (POLYMERS, CRYSTALS, SINGLE CRYSTALS, LATTICES, CRYSTAL STRUCTURE, SHEAR STRESSES, TENSILE PROPERTIES, STRAIN GAGES, X-RAY DIFFRACTION ANALYSIS.) -

269 804 0149 RELIABILITY STUDY FOR HIGH POWER TRANSISTORS.

269 804 0149 NO ABSTRACT AVAILABLE

269 804 0148 (*TRANSISTORS, *RELIABILITY, LIFE EXPECTANCY, TESTS, TEST METHODS, TEST EQUIPMENT.) -

269 883 0150 TRANSIENT HEAT AND MOISTURE TRANSFER TO SKIN THROUGH THERMALLY IRRADIATED CLOTH,

269 883 0150 A STUDY WAS MADE OF THE ACTION OF CLOTH IN PROTECTING SKIN FROM THERMAL INJURY RESULTING FROM EXPOSURE TO HIGH-INTENSITY THERMAL RADIATION. METHODS WERE DEVELOPED TO OBTAIN TEMPERATURE-TIME-DEPTH DATA FOR A SYSTEM SIMULATING SKIN COVERED BY A LAYER OF DRY OR MOIST CLOTH. EXPERIMENTALLY THIS WAS ACCOMPLISHED BY THE USE OF A COPPER-AIR SIMULANT WHICH ACCEPTS HEAT AT THE SAME RATE AS

HUMAN SKIN BUT DEVELOPS A PROPORTIONALLY STRETCHED TEMPERATURE PROFILE. THE METHOD FACILITATES THE INSPECTION OF THE INFLUENCES ON TEMPERATURE DISTRIBUTION IN THE SKIN OF VARIOUS SYSTEM PROPERTIES AND THE SURROUNDING CONDITIONS. THE SKIN ENTHALPY RISE ABOVE A CRITICAL TEMPERATURE LEVEL, A FEASIBLE BASIS FOR CORRELATING BURN DATA, WAS FOUND TO BE VERY SENSITIVE TO SLIGHT VARIATIONS IN THE TEMPERATURE RESPONSE AND DESERVES FURTHER TESTING.

269 883 0149 (*SKIN, BURNS, INHIBITION, SIM-ULATION.) (PROTECTIVE COVERINGS, *PROTECTIVE CLOTHING, FIRE PROTECTIVE CLOTHING, MATERIALS, TEXTILES, COTTON TEXTILES, *HEAT TRANSFER, THERMAL CONDUCTIVITY, COLORS, MOISTURE, MATHEMATICAL ANALYSIS.) (THERMAL RADIATION, THERMAL INSULATION, TEST METHODS, TEST EQUIPMENT.) -

269 872 0151 VELOCITY REQUIREMENTS FOR TRANSFER BETWEEN CO-PLANAR, CO-AXIAL ORBITS,

269 872 0151 THE TOTAL VELOCITY REQUIREMENTS FOR COPLANAR, COTANGENTIAL TRANSFER BETWEEN ORBITS WITH A COMMON MAJOR DIAMETER ARE EXAMINED. THE RESULTS ARE VALID FOR ASCENDING, DESCENDING, INTERSECTING, AND NON-INTERSECTING ORBITS. COMPUTATIONAL RESULTS OBTAINED USING THE AFIT IBM 1620 COMPUTER ARE PRESENTED FOR ELLIPTIC, PARABOLIC, AND HYPERBOLIC OUTER ORBITS AS A FUNCTION OF THE TRANSFER AND OUTER ORBIT GEOMETRIES. FOR THE PARABOLIC OUTER ORBIT, THE MAXIMUM VELOCITY REQUIREMENT IS 18% GREATER THAN THE ESCAPE VELOCITY AT THE PERIAPSIS OF THE TRANSFER ORBIT WHEN THE TRANSFER ORBIT HAS AN ECCENTRICITY OF 0.73. FOR HYPERBOLIC ORBITS, MAXIMUM VELOCITY REQUIREMENTS OCCUR AT PARTICULAR ELLIPTICAL TRANSFER ORBITS WHERE THE VELOCITIES AT INFINITY (I.E., THE HYPERBOLIC EXCESS), ARE LESS THAN ONE THIRD THE REFERENCE ESCAPE VELOCITY.

269 872 0150 (CELESTIAL MECHANICS, *ORBITAL FLIGHT PATHS, SATELLITES, SATELLITE VEHICLES, THRUST, SATELLITE VEHICLE TRAJECTORIES, VELOCITY, MILITARY REQUIREMENTS, SPACE FLIGHT, MATHEMATICAL ANALYSIS, NAVIGATION COMPUTERS.) -

269 422 0158 DEFLECTIONS AND STRESSES OF HEATED TRUSS TYPE STRUCTURES BY A DIRECT STIFFNESS METHOD.

269 422 0158 THE TESTING AND STRESS ANALYSIS OF PIN-JOINTED TRUSS TYPE STRUCTURES SUBJECTED TO AERODYNAMIC HEATING AND LOADING ARE CONSIDERED. FORCE-DEFLECTION RELATIONSHIPS AND CORRESPONDING MEMBER STRESSES WERE FOUND BY USE OF A DIRECT STIFFNESS METHOD. GEOMETRICAL NON-LINEARITIES AND THE VARIATION WITH TEMPERATURE OF THE MODULUS OF ELASTICITY AND THE COEFFICIENT OF LINEAR EXPANSION WERE ACCOUNTED FOR. SOLUTIONS OBTAINED ON A DIGITAL COMPUTER SHOW LITTLE EFFECT OF GEOMETRIC NON-LINEARITIES ON DISPLACEMENTS. THERE IS A MORE PRONOUNCED EFFECT ON MEMBER STRESSES BUT THIS WAS ALSO SMALL FOR THE TRUSSES EXAMINED. THIS METHOD IS A VALUABLE TOOL FOR STRESS ANALYSIS AND THE FORCE-DEFLECTION RELATIONSHIPS OBTAINED MAY BE USED TO INDICATE INCIPIENT FAILURE OF A STRUCTURE DURING TESTING.

269 422 0157 (*AIRFRAMES, STRUCTURES, AERO-DYNAMIC HEATING, LOAD DISTRIBUTION, DEFLECTION, DEFORMATION, STRESSES, TEST METHODS, MATHEMATICAL ANALYSIS, MATHEMATICAL PREDICTION.) *THESES. -

269 510 0159 EFFECT OF SLIP ON THE LAMINAR BOUNDARY LAYER NEAR THE LEADING EDGE OF A FLAT PLATE IN HYPERSONIC RAREFIED GAS FLOW,

269 510 0159 NEAR THE LEADING EDGE OF A SHARP FLAT PLATE IN HIGH SPEED, LOW DENSITY FLOW OF HIGH TEMPERATURE GASES THE INDUCED SHOCK WAVE IS ALMOST STRAIGHT AND THE PRESSURE AND VELOCITY DOWNSTREAM ARE THEREFORE APPROXIMATELY CONSTANT. ASSUMING THAT THE OUTER EDGE OF THE VISCOUS LAYER COINCIDES WITH THE SHOCK WAVE IN THIS REGION OF THE FLOW, IT IS POSSIBLE TO INTEGRATE THE BOUNDARY LAYER EQUATIONS WITH FIRST ORDER SLIP IN THE BOUNDARY CONDITIONS AT THE PLATE USING A GORTLER-TYPE SERIES IN FRACTIONAL POWERS OF X, THE LONGITUDINAL DISTANCE ALONG THE PLATE. THE FIRST TWO TERMS IN THIS SERIES HAVE BEEN FOUND IN CLOSED, ANALYTICAL FORM. TO TERMS IN X TO THE FIRST POWER THE RESULT LEADS TO A CONSTANT VALUE OF THE SKIN FRICTION COEFFICIENT AND HEAT TRANSFER COEFFICIENT. AS AN EXAMPLE THE RESULT IS APPLIED TO A FLAT PLATE FLYING AT MACH NUMBER 20 AT 295,000 FEET ALTITUDE, WHERE THE EFFECTS OF SLIP ARE SIGNIFICANT FOR A CONSIDERABLE DISTANCE DOWNSTREAM OF THE LEADING EDGE.

269 510 0158 (SHEETS, GAS FLOW, AERODYNAMICS, *HYPERSONICS, *SUPERAE RODYNAMICS, SHOCK WAVES, BOUNDARY LAYER, *LAMINAR BOUNDARY LAYER, FRICTION, DRAG, HEAT TRANSFER, MATHEMATICAL ANALYSIS, DIFFERENTIAL EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS, INTEGRAL EQUATIONS, SERIES.) -

269 731 0160 HEAT DISSIPATION THROUGH DIODE LEAD WIRES UNDER STEADY-STATE CONDITIONS,

269 731 0160 RESULTS OF AN INVESTIGATION OF THE CAPABILITIES OF WIRE LEADS TO FUNCTION AS HEAT DISSIPATING MEDIA ARE PRESENTED. EXPERIMENTAL WORK RELATED TO THIS PROJECT HAS CONFIRMED THAT LEADS MAY SERVE AS HEAT SINKS TO AN EXTENT GREATER THAN HAS GENERALLY BEEN RECOGNIZED, AND HAS ALSO SERVED AS A BASIS FOR DERIVATION OF THE THEORETICAL RELATIONSHIPS WHICH DEFINE THE SIGNIFICANT PARAMETERS INVOLVED. THE EXPERIMENTS WERE CONDUCTED TO GENERALLY DETERMINE THE EFFECTS OF VARYING WIRE LEAD MATERIALS, LENGTHS, AND DIAMETERS UNDER BOTH RADIATIVE AND CONVECTIVE AMBIENT CONDITIONS. THE MATHEMATICAL RELATIONSHIPS WHICH HAVE BEEN OBTAINED PROVIDE QUANTITATIVE METHODS FOR PREDICTING THE EFFECT AND BEHAVIOR OF COMPONENT GENERATED HEAT ON PERFORMANCE, AND WILL PERMIT BETTER CORRELATION BETWEEN COMPONENT WATTAGE RATINGS AS STATED BY THE MANUFACTURER AND NOTED BY THE USER. (AUTHOR) AD-269 7319N6

269 731 0159 (*HEAT TRANSFER, DIODES, WIRE, *CONDUCTORS, NICKEL, COPPER, THERMAL CONDUCTIVITY, ELECTRIC CONNECTORS, TESTS, THERMODYNAMICS.) (EXPERIMENTAL DATA, TABLES, FUNCTIONS, EQUATIONS.) -

269 823 0161 METABOLISM OF RUTHENIUM IN THE RAT,

269 823 0161 SEVENTEEN SPRAGUE-DAWLEY RATS WERE INJECTED INTRAMUSCULARLY AND INTRAPERITONEALLY WITH RUTHENIUM-106. THE AMOUNT OF THIS ISOTOPE WAS DETERMINED DAILY FOR 5 WEEKS IN THE URINE AND FECES. ANIMALS WERE SACRIFICED AT INTERVALS AND THE VARIOUS ORGANS WERE ANALYZED FOR RUTHENIUM. IT WAS NOTED FROM THIS EXPERIMENT THAT THE PATHWAYS OF ABSORPTION, METABOLISM, AND EXCRETION ARE DEPENDENT ON THE ROUTE OF ADMINISTRATION OF RUTHENIUM.

269 823 0160 (*METABOLISM, *RUTHENIUM, *FISSION PRODUCTS, EXPERIMENTAL DATA.) (BIO-CHEMICAL TESTS, MEASUREMENT, ISOTOPES, ABSORPTION, EXCRETION, OMENTUM, AUTORADIOGRAPHY.) *RADIOBIOLOGY. -

269 856 0162 INVESTIGATION OF MOLYBDENUM-AND TUNGSTEN-BASE ALLOY SHEET MATERIALS.

269 856 0162 OF THE 28 EXTRUSION BLANKS PREPARED FROM THE SIX VACUUM-ARC-CASE, MOLYBDENUM - AND TUNGSTEN-BASE ALLOY INGOTS, 24 WERE SUCCESSFULLY EXTRUDED AND 4 STUCK IN THE DIE DURING EXTRUSION. TWO SHEET BARS FROM EACH OF THE FIVE COMPOSITIONS HAVE BEEN ROLLED TO 50-MIL-GAGE SHEET STOCK. PROCESSING HISTORY, RECOVERIES, AND RECRYSTALLIZATION DATA ARE PRESENTED.

269 856 0161 (SHEETS, *MOLYBDENUM ALLOYS, *TUNGSTEN ALLOYS, EXTRUSION, PROCESSING, ELECTRIC ARCS, VACUUM FURNACES, CASTING, HEAT TREATMENT, CRYSTALLIZATION.) -

269 814 0163 PROTOTYPE DEVELOPMENT MODEL 385 AIR REFUELING STORE.

269 814 0163 DEVELOPMENT OF THE BEECH MODEL AIR REFUELING HOSE HAS CONTINUED WITH SATISFACTORY PROGRESS IN ALL AREAS EXCEPT CORRECTION OF PREVIOUSLY REPORTED CLUTCH DEFICIENCIES DURING THIS INTERIM PERIOD. THE FIRST PROTOTYPE IS COMPLETE TO THE EXTENT POSSIBLE WITHOUT SATISFACTORY CLUTCHES. THE SECOND UNIT IS READY FOR STATIC TEST AND THE THIRD UNIT IS PROGRESSING SATISFACTORILY. THE FIRST UNIT IS NOW THIRTEEN DAYS BEHIND SCHEDULE DUE TO THE CURRENT CLUTCH PROBLEMS. NO OTHER MAJOR PROBLEMS HAVE BEEN ENCOUNTERED.

269 814 0162 (FUEL SYSTEMS, *FUEL HOSE, TOWED BODIES FOR *REFUELING IN FLIGHT, DESIGN.) -

269 850 0164 EXPERIMENTAL DETERMINATION OF THE SLOW NO DECOMPOSITION REGIME AROUND 3000 DEGREES K BEHIND SHOCK WAVES,

269 850 0164 THE DECOMPOSITION OF NITRIC OXIDE BETWEEN 2250 AND 3450 K HAS BEEN STUDIED IN SHOCK TUBE EXPERIMENTS. THE EMITTED INFRARED RADIATION OF THE FUNDAMENTAL BAND SYSTEM OF NO HAS BEEN USED TO DETERMINE THE TIME DURATION OF THE SLOW DECOMPOSITION REGIME OF NO BEHIND SHOCK WAVES IN PURE NO. IT IS FOUND THAT THE TEMPERATURE DEPENDENCY OF THE DURATION IS IN GOOD AGREEMENT WITH THE THEORETICAL MODEL WE HAVE DESCRIBED PREVIOUSLY.

269 850 0163 (*SHOCK WAVES, *NITROGEN COM-POUNDS, *OXIDES, *INFRARED RADIATION, VELOCITY, MEASUREMENT, TEMPERATURE, DENSITY, OPTICAL SYSTEMS .) (HEAT TRANSFER, GAGES, LOAD DISTRIBUTION, MACH NUMBER, VACUUM SYSTEMS, PHOTO-GRAPHIC ANALYSIS.) (ELECTRONIC EQUIPMENT, *SHOCK TUBES, OSCILLOGRAMS, OSCILLOSCOPES, MINIATURE ELECTRONIC EQUIPMENT, PIEZOELECTRIC GAGES.) -

269 722 0165 COMPILATION OF UNPUBLISHED MATERIALS INFORMATION.

269 722 NO ABSTRACT AVAILABLE

269 722 0164 (*MATERIALS, *REFRACTORY MATERIALS, *CERAMIC MATERIALS, COATINGS.) (*PLASTICS, EXPANDED PLASTICS.) (*BEARINGS, LUBRICATION.) (*PLASMA JETS, GAS DISCHARGES.) (FLUIDS, SEALS, SEALING COMPOUNDS.) (*METALS, OXIDES.) (*ALLOYS, ALUMINUM ALLOYS, TITANIUM ALLOYS, NICKEL ALLOYS, MAGNESIUM ALLOYS, MOLYBDENUM ALLOYS.) (CORROSION, FATIGUE (MECHANICS), FRACTURE (MECHANICS), STRESSES.) (WELDING, WELDED JOINTS.) -

269 734 0166 A TWO-SECTOR EXTENSION OF SWAN'S MODEL OF ECONOMIC GROWTH THE CASE OF NO TECHNICAL CHANGE,

269 734 0166 THE PURPOSE OF THE PRESENT ANALYSIS IS TO EXTEND THE SWAN ONE-SECTOR ONE-GOOD MODEL (THE ECONOMIC RECORD, XXXII334-361, 1956) INTO A TWO-SECTOR TWO-GOOD ECONOMY FOR THE CASE OF NO TECHNICAL CHANGE. IN THIS CASE A SIMPLE DIAGRAMMATIC REPRESENTATION OF COMPETITIVE GROWTH IS POSSIBLE AND THE EXPOSITION IS SIMPLE AS WELL AS INDICATIVE OF THE PROPERTIES OF TWO SECTOR MODELS. THE COMPOSITION OF THE CAPITAL STOCK AND THE LABOR IS ANALYZED AND THE ALLOCATION OF THESE FACTORS BETWEEN THE TWO SECTORS IS DETERMINED. OUR TWO-SECTOR MODEL IS THE NATURAL SET-UP FOR THE ANALYSIS OF THE RELATIVE PRICE OF CAPITAL TO CONSUMER GOODS. (AUTHOR) AD-269 73416N6

269 734 0165 (*ECONOMICS, *ECONOMIC CONDI-TIONS, COSTS, COMMERCE, MONEY, WAGES, PRODUCTION.) -

269 846 0167 TUNNEL DIODE CIRCUITS AT MICROWAVE FREQUENCIES,

269 846 0167 RESULTS ARE PRESENTED OF RECENT STUDIES IN TUNNEL DIODE MICROWAVE CIRCUITS AT THE ELECTRONIC DEFENSE LABORATORIES. DESCRIPTIONS ARE ALSO OFFERED OF AN S-BAND LOW-NOISE AMPLIFIER WITH A VOLTAGE GAIN BANDWIDTH PRODUCT OF 6000 MC AND OF DESIGNS OF MECHANICALLY TUNABLE DOWN CONVERTERS. THE PRIME FEATURES OF THE TUNNEL DIODE, ITS SMALL SIZE AND LOW DC POWER REQUIREMENTS, ARE TAKEN ADVANTAGE OF IN THE CIRCUIT DESIGNS.

269 846 0166 (*ELECTRONIC CIRCUITS, *DIODES, *MICROWAVE AMPLIFIERS, MINIATURE ELECTRONIC EQUIPMENT, BROADBAND, *MICROWAVE OSCILLATORS, CRYSTAL MIXERS, FREQUENCY STABILIZERS, TRANSMISSION LINES, TUNING CIRCUITS, AMPLIFIERS, VERY HIGH FREQUENCY, L BAND, C BAND, S BAND, DESIGN, NOISE (RADIO), EFFECTIVENESS, TESTS.) -

269 865 0168 RESULTS IN GEODETIC PHOTOGRAMMETRY
III. PHOTOGRAMMETRIC DETERMINATION OF AZIMUTH OF HIRAN LINES,

269 865 0168 AN ITERATIVE SOLUTION IS DEVELOPED FOR THE DETERMINATION OF THE AZIMUTH OF HIRAN LINES FOR PHOTOGRAMMETRIC OBSERVATIONS OF THE LINE CROSSING TRACE OF AN AIRBORNE FLASHING LIGHT RECORDED AGAINST THE STELLAR BACKGROUND. RESULTS OF A TEST OF THE METHOD ARE REPORTED AND RECOMMENDATIONS ARE MADE FOR IMPROVEMENT OF OPERATIONAL PROCEDURES. (AUTHOR) AD-269 8659N6

269 865 0167 (*GEODESICS, GEODETIC DATA, *FLASH LAMPS, REFLECTORS, AZIMUTH, SIGHTS, CAMERAS.) (LEAST SQUARES METHOD, CURVE FITTING, TIME, POLYNOMIALS.) -

269 864 0169 DESIGN CONSIDERATIONS OF A PHOTODIODE FOR THE DETECTION OF LIGHT FLASHES,

269 864 0169 THE THEORY AND DESIGN OF A PHOTODIODE TO BE USED FOR THE ACCURATE TIMING OF A MISSILE OR AIRCRAFT-BORNE STROBOSCOPIC LIGHT ARE PRESENTED. THE PRECISE DETERMINATION OF THE FLASH TIMES OF THE STROBE IS NECESSARY FOR CERTAIN APPLICATIONS IN GEODESY AND TRAJECTORY DETERMINATION. CERTAIN ASPECTS OF PHOTOMETRY AND ATMOSPHERIC PHENOMENON ARE REVIEWED TO ESTABLISH A SOLID FRAMEWORK UPON WHICH TO BASE THE DESIGN. THE PROPERTIES OF THE STROBE LIGHT AND BACKGROUND RADIATION ARE DISCUSSED AND A BASIC DESIGN IS DEVELOPED.

269 864 0168 (LIGHT, LIGHT TRANSMISSION.) (*OPTICAL EQUIPMENT, *PHOTOMETERS, RADIOMETERS, STROBOSCOPES, FLASH LAMPS.) (DETECTION, *DESIGN, THEORY, GEODESICS.) (ELECTRO-MAGNETIC WAVES, WAVE TRANSMISSION, SCATTERING, ABSORPTION, ATTENUATION.) (INSTRUMENTATION, OPTICAL SYSTEMS, PHOTOMULTIPLIERS.) -

269 875 0170 EFFECT OF ORDER-DISORDER PHENOMENA ON THE STRENGTH OF HIGH TEMPERATURE ALLOYS.

269 875 0170 A SUMMARY RESEARCH IS PRESENTED INCLUDING (1) DEVELOPMENT OF A PHASE DIAGRAM IN THE FE RICH REGION OF THE FE-AL SYSTEM (2) X-RAY DIFFRACTION STUDIES OF LONG RANGE ORDER IN SOME ALLOYS OF FE₃AL COMPOSITION (3) FEAL-FE₃AL TRANSFORMATION STUDIES (4) ELECTRON BAND THEORY APPLIED TO THE EXISTENCE OF ORDER IN FE RICH FE-AL ALLOYS (5) GENERAL CALCULATIONS FOR ORDERING MECHANISMS AND (6) THE EFFECT OF QUENCHING TEMPERATURE ON ROOM TEMPERATURE DEFORMATION BEHAVIOR OF ALLOYS NEAR THE COMPOSITION FE₃AL.

269 875 0169 (*HEAT RESISTANT ALLOYS, *ALUMINUM ALLOYS, *IRON ALLOYS, PHASE STUDIES, PHASE TRANSITIONS, CRYSTAL STRUCTURE, X-RAY DIFFRACTION ANALYSIS, HEAT TREATMENT, DEFORMATION, MECHANICAL PROPERTIES.) -

269 818 0171 RESEARCH STUDY TO DETERMINE PROPULSION REQUIREMENTS AND SYSTEMS FOR SPACE MISSIONS. VOLUME III. MISSION STUDIES.

269 818 0171 PROPULSION REQUIREMENTS AND CRITERIA, SELECTION AND EVALUATION OF ALTERNATE PROPULSION SYSTEMS, AND SPECIFICATIONS OF INTEGRATED CONCEPTUAL SYSTEM DESIGNS ARE REPORTED FOR EACH OF THE SEVERAL SPACE MISSIONS SPECIFIED FOR FURTHER STUDY BY NASA AT THE COMPLETION OF PHASE I (AD268 631 AND AD-268 362) OF THE STUDY. PARTICULAR ATTENTION IS GIVEN TO LUNAR MISSIONS AND 24-HR SATELLITE MISSIONS.

269 818 0170 (*SPACE PROBES, *LUNAR PROBES, *SPACE FLIGHT, SPACESHIPS, SATELLITE VEHICLES, MANNED, BOOSTER ROCKETS, ROCKET MOTORS, CONTROL SYSTEMS, FLIGHT PATHS, ROCKET PROPULSION, ROCKET PROPELLANTS, STORAGE, SPECIFIC IMPULSE, THRUST, MILITARY REQUIREMENTS, THEORY, MATHEMATICAL ANALYSIS, MATHEMATICAL PREDICTION.) -

269 816 0172 CONVECTIVE HEAT TRANSFER WITH CHEMICAL REACTION, I. THEORETICAL DEVELOPMENT OF CORRELATION FORMULAE FOR THE PREDICTION OF HEAT FLUXES IN HIGH PERFORMANCE ROCKET MOTORS AND RELATED SYSTEMS.

269 816 0172 ENERGY TRANSFER IN CHEMICALLY REACTING BOUNDARY LAYER FLOWS IS DISCUSSED FROM THE POINT OF VIEW OF THE INVESTIGATOR, WHO IS SEEKING TO EXTEND EXISTING CORRELATION FORMULAE TO CASES IN WHICH THERMOCHEMICAL EFFECTS INFLUENCE HEAT TRANSFER RATES. EMPHASIS IS PLACED ON THE PREDICTION OF CONVECTIVE HEAT FLUXES IN HIGH PERFORMANCE ROCKET MOTORS HOWEVER, EXAMPLES ARE ALSO TAKEN FROM THE FIELD OF HYPERSONIC GAS DYNAMICS, AS FOLLOWS THE APPROPRIATE DRIVING FORCE FOR HEAT TRANSFER WITH CHEMICAL REACTION, EFFECTS OF THE ENHANCED EFFICIENCY OF ENERGY TRANSPORT BY DIFFUSION AS COMPARED TO ORDINARY CONDUCTION, CALCULATION OF THE TURBULENT FILM CONDUCTANCE IN AXISYMMETRIC NOZZLES, THERMODYNAMIC CALCULATION OF ENTHALPY/MIXTURE-RATIO CHARTS FOR COMBUSTION GAS MIXTURES, EFFECTS OF CHEMICAL NON-EQUILIBRIUM IN THE GAS PHASE, EFFECTS OF SURFACE CATALYZED EXOTHERMIC RECOMBINATION REACTIONS, ESTIMATION OF TRANSPORT PROPERTIES IN PARTIALLY DISSOCIATED GAS MIXTURES WITH EMPHASIS ON THE BINARY DIFFUSION COEFFICIENTS PERTAINING TO MOLECULAR FRAGMENTS.

269 816 0171 (*HEAT TRANSFER, *CONVECTION, BOUNDARY LAYER, GAS FLOW, CHEMICAL REACTIONS, THERMOCHEMISTRY, THERMODYNAMICS, ROCKET MOTORS.) (TRANSPORT PROPERTIES, RECOMBINATION REACTIONS, BOUNDARY LAYER, GAS FLOW, HYPER-SONIC FLOW, HYPERSONIC NOZZLES.) (DISSOCIATION, COMBUSTION, HYDROGEN, OXYGEN, DIFFUSION.) (EXPERIMENTAL DATA, TABLES.) -

269 813 0173 ON SEQUENTIAL LANGUAGES,

269 813 0173 NO ABSTRACT AVAILABLE

269 813 0172 (*SEQUENTIAL ANALYSIS, STATISTICAL ANALYSIS, PROBABILITY, MATHEMATICAL LOGIC.) (*LANGUAGE, PROGRAMMING, CODING, AUTOMATION, THEORY.) -

269 802 0174 XM104 SUSPENSION STUDY,

269 802 0174 THE RESULTS OF A COMPARATIVE STUDY OF TWO SUSPENSION SYSTEMS CONSIDERED FOR USE IN THE XM104 TRACKED VEHICLE ARE PRESENTED IN COMPLETE DETAIL. SIMULATION TESTS WERE CONDUCTED OVER A MODIFIED SINE WAVE AT SPEEDS OF 5, 10, 15, 20 AND 30 MILES PER HOUR.

269 802 0173 (*TRACKED VEHICLES, *TANKS, SUSPENSION BANDS, SPRINGS, STABILITY, ANALYSIS, DYNAMICS, SIMULATION, TESTS.) (SHOCK WAVES, ABSORPTION, VELOCITY, PITCH, ACCELERATION, DAMPING, MOMENT, GRAVITY.) (TEST EQUIPMENT, ANALOG COMPUTERS, DIGITAL COMPUTERS, ANALOG TO DIGITAL CONNECTORS.) DIFFERENTIAL EQUATIONS. -

269 820 0175 RELIABILITY PREDICTION AND ASSURANCE IN NAVAL ORDNANCE WEAPONS SYSTEMS.

269 820 0175 A SUMMARY IS GIVEN CONCERNING THE DEVELOPMENT OF A PROPOSED MILITARY STANDARD ON RELIABILITY PREDICTION FOR NAVAL WEAPONS SYSTEMS, AND ACCOMPANYING REPORTING PROCEDURES. THE FOLLOWING 3-PHASE PROGRAM WAS FORMULATED TO ATTAIN THE OBJECTIVE (1) PREVIOUSLY DEVELOPED RELIABILITY PREDICTION PROCEDURES WERE APPLIED TO SELECTED BUREAU OF NAVAL WEAPONS SYSTEMS, AND THE RESULTS WERE ASSESSED BY A COMPARISON WITH PREVIOUSLY MEASURED RELIABILITIES. (2) THE PREDICTION PROCEDURES USED IN PHASE 1 WERE REFINED IN ACCORDANCE WITH THE RESULTS OBTAINED THEREFROM, AND THESE REFINED PREDICTION PROCEDURES WERE ARRANGED IN A MILITARY STANDARD FORMAT. (3) AN EDUCATIONAL AND INDOCTRINATIONAL PROGRAM ON THE APPLICATION OF THE PROPOSED MILITARY STANDARD WAS PREPARED.

269 820 0174 (*RELIABILITY, MATHEMATICAL PREDICTION, STANDARDS, SHIPBORNE, FIRE CONTROL, *RADAR EQUIPMENT, FIRE CONTROL COMPUTERS, AIR-BORNE, SEARCH RADAR.) (SHIPBORNE, ELECTRONIC EQUIPMENT, FAILURE (MECHANICS).) NAVAL ORDNANCE. -

269 824 0176 COCKPIT RETENTION AND PARACHUTE SUSPENSION GARMET.

269 824 0176 COCKPIT RETENTION AND PARACHUTE SUSPENSION FLIGHT CLOTHING WHICH CAN DISTRIBUTE HIGH ACCELERATION FORCES OVER LARGE AREAS OF THE BODY WAS STUDIED TO REDUCE INJURIES OCCURRING IN PRESENT DAY HIGH PERFORMANCE AIRCRAFT. IT WAS FOUND THAT A FLEXIBLE, INELASTIC NYLON-NETTING GARMET COULD BE UTILIZED IN DISTRIBUTING ACCELERATION LOADS OVER THE BODY TORSO. BY CROSSING THE FIBERS OF A MATERIAL OVER EACH OTHER AND BIASING THEM AT 45 DEGREES TO THE EXTERNAL LOAD, A CHINESE FINGER GRIP CONTAINMENT ACTION CAN BE DEVELOPED. THIS CONTAINMENT ACTION (AXIAL COMPRESSION LOAD) IS APPLIED WHEN ACCELERATION FORCES ARE APPLIED TO THE COCKPIT SEAT OR THE RISERS.

SEVERAL RESTRAINT GARMETS WERE CONSTRUCTED FOR EVALUATION. HIP AND SHOULDER RESTRAINT STRAPS WERE INTEGRATED INTO THE NETTING PATTERN FOR ATTACHMENT TO THE RISERS AND COCKPIT SEAT. THE FINAL GARMET HAD A COVER AND LINER FOR ADDITIONAL COMFORT AND EASE OF DONNING AND DOFFING.

269 824 0175 (*FLIGHT CLOTHING, PARACHUTE FABRICS, SAFETY HARNESS, ELASTIC WEBBING, NYLON, NETS FOR LOAD DISTRIBUTION OF ACCELERATION, STRESSES ON PILOTS, AVIATION PERSONNEL, AVIATION SAFETY, TESTS, DESIGN.)

269 839 0177 ON A SUCCESSIVE APPROXIMATION TECHNIQUE IN SOLVING SOME CONTROL SYSTEM OPTIMIZATION PROBLEMS,

269 839 0177 A WAY OF CONSTRUCTING MINIMIZING SEQUENCES FOR FUNCTIONALS IN OPTIMIZATION PROBLEMS HAS BEEN GIVEN AND THE PROCEDURE IS PROVED TO CONVERGE. THE PROCEDURE IS SHOWN TO BE THAT OF THE NEWTON'S METHOD IN BANACH SPACES.

269 839 0176 (*CONTROL SYSTEMS, *PROGRAMMING.) (FUNCTIONAL ANALYSIS, ALGEBRA, SEQUENCES, NONLINEAR SYSTEMS, NONLINEAR DIFFERENTIAL EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS, DIFFERENTIAL EQUATIONS, EQUATIONS, FUNCTIONS.)

269 880 0178 RESEARCH AND INVESTIGATION ON PHOSPHOR SCREENS FOR HIGH RESOLUTION DISPLAY DEVICES.

269 880 0178 RESEARCH AND INVESTIGATION ON PHOSPHOR SCREENS TO IMPROVE THEIR INFORMATION TRANSFER CAPACITY CONTINUED. IMPROVEMENTS IN PHOSPHOR SCREEN FORMATION BY THE ELECTRODEPOSITION TECHNIQUE WERE STUDIED. PRELIMINARY RESULTS ON THE MEASUREMENT OF THE DYNAMIC RANGE OF PHOSPHOR SCREEN PERFORMANCE ARE INDICATED.

269 880 0177 (*DISPLAY SYSTEMS, *CATHODE RAY TUBE SCREENS, *FLUORESCENT SCREENS, *PHOSPHORS, PREPARATION, MEASUREMENT.) (ELECTRODEPOSITION, COATINGS, TIN COMPOUNDS, OXIDES, BISMUTH COMPOUNDS, GOLD COMPOUNDS, TIN ALLOYS, ZINC ALLOYS, GLASS.)

269 884 0179 APPLICATION OF WEATHER RADAR TO FALLOUT PREDICTION.

269 884 0179 SPECIAL EMPHASIS WAS PLACED ON THE OBSERVATIONAL PROGRAM, THE PRIMARY AIMS BEING TO TEST THE ABILITY OF THE 10 CM RADAR TO DETECT HAIL AND TO OBTAIN DATA SUITABLE FOR STUDYING THE VARIATIONS IN THE VERTICAL STRUCTURE OF CONVECTIVE STORMS DURING THEIR LIFETIMES. BOTH OBJECTIVES WERE ACCOMPLISHED. THE COOPERATION OF METEOROLOGISTS ASSOCIATED WITH ONE OF THE LOCAL BROADCASTING STATIONS PROVIDED HUNDREDS OF REPORTS OF HAIL OCCURRENCES. THE AGREEMENT BETWEEN THE LOCATIONS AT WHICH HAIL WAS REPORTED AND THE TRACKS OF HIGH-INTENSITY CONTOURS WAS EXCELLENT.

269 884 0178 (WEATHER FORECASTING, *METEOROLOGICAL RADAR, *STORMS, PRECIPITATION, HAIL, ATMOSPHERE, TURBULENCE.) (*RADIOACTIVE FALL-OUT FROM NUCLEAR EXPLOSIONS, DISTRIBUTION BY STORMS.)

269 855 0180 THEORETICAL STUDY OF THE ANOMALOUS ROTATIONAL STRUCTURE OF LEVEL 0311 IN THE ROTATION-VIBRATION SPECTRUM OF C13 O162.

269 855 0180 THE ROTATIONAL PERTURBATION OBSERVED BY COURTOY IN THE LEVEL 0311 OF C13O162 IS INTERPRETED AS RESULTING FROM BOTH FERMI RESONANCE AND SECOND ORDER CORIOLIS RESONANCE.

269 855 0179 (*MOLECULAR SPECTROSCOPY, CARBON, OXYGEN, ISOTOPES, MOLECULES, *QUANTUM MECHANICS, THEORY.) (PERTURBATION THEORY, RESONANCE, NUCLEI, MAGNETO-OPTIC ROTATION.) (OPERATORS (MATHEMATICS), MATRIX ALGEBRA, INTEGRAL EQUATIONS, TRANSFORMATIONS (MATHEMATICS), NUMERICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS.) -

269 072 0181 AN INSTRUMENTATION SYSTEM FOR THE MEASUREMENT OF TERRAIN PROFILE,

269 072 0181 AN INSTRUMENTATION SYSTEM FOR THE MEASUREMENT OF TERRAIN PROFILE WAS DEVELOPED AND TESTED. ITS PURPOSE IS TO PROVIDE A MEANS FOR THE RAPID AND ACCURATE COLLECTION OF TERRAIN-PROFILE DATA USEFUL IN ANALYZING THE ROUGH-GROUND PERFORMANCE OF CROSS-COUNTRY VEHICLES. THE FIELD EQUIPMENT CONSISTS OF A TWO-WHEELED MEASURING ASSEMBLY WHICH IS TOWED ACROSS THE GROUND AT A SPEED NOT EXCEEDING 5 MPH. ELECTRICAL INSTRUMENTS MOUNTED ON THE ASSEMBLY CONTINUOUSLY MEASURE THE SLOPE OF THE GROUND AND THE DISTANCE TRAVELED ALONG THE SURFACE. THESE QUANTITIES ARE RECORDED ON MAGNETIC TAPE. THE MAGNETIC TAPE IS THEN RETURNED TO A LABORATORY DATA-PROCESSING SYSTEM WHICH OBTAINS THE PROFILE DATA BY INTEGRATING THE SLOPE OF THE GROUND WITH RESPECT TO SURFACE TRAVEL. PRELIMINARY ANALYSIS AND TESTS INDICATE THAT THE SYSTEM IS CAPABLE OF OBTAINING TERRAIN PROFILE WITH AN ERROR HAVING A STANDARD DEVIATION OF NOT MORE THAN 4 INCHES IN 100 FEET.

269 072 0180 (*TERRAIN, GEOMETRY, MEASUREMENT, INSTRUMENTATION.) (VEHICLES, MOTION, TERRAIN, DYNAMICS, ANALYSIS.) (TRACKED VEHICLES, GYROSCOPES, *ODOMETERS, ELECTRONIC EQUIPMENT, DATA PROCESSING EQUIPMENT.) (ERRORS, ANALYSIS.) (ARMY OPERATIONS, *MILITARY TRANSPORTATION, *TERRAIN.) -

269 075 0182 AN INSTRUMENTATION SYSTEM FOR MEASURING STRESS-STRAIN RELATIONSHIPS OF SOIL,

269 075 0182 AN INSTRUMENTATION SYSTEM FOR COLLECTING AND ANALYZING DATA ON STRESS-STRAIN RELATIONSHIPS OF THE SOIL WAS DESIGNED AND CONSTRUCTED. THE FIELD PORTION OF THE SYSTEM CONSISTS OF A SHEARMETER AND TWO PENETROMETERS FOR MEASURING THE EFFECTS OF HORIZONTAL AND VERTICAL LOADING OF THE SOIL, RESPECTIVELY. THESE UNITS, HYDRAULICALLY OPERATED, ARE MOUNTED ON THE REAR UNIT OF A POLECAT, AN ARTICULATED TRACKED VEHICLE. TEST RUNS ARE RECORDED IN THE FIELD ON MAGNETIC TAPE. A GENERAL-PURPOSE DATA-PROCESSING SYSTEM FOR LABORATORY INSTALLATION HAS ALSO BEEN PROVIDED TO PERMIT MAGNETIC-TAPE PLAYBACK OF THE TEST RUNS, AND CONVERSION TO DIGITAL FORM FOR INSERTION INTO A DIGITAL COMPUTER.

269 075 0181 (*SOILS, PHYSICAL PROPERTIES, LOAD DISTRIBUTION, PRESSURE, PENETRATION, SHEAR STRESSES, DEFORMATION, MEASUREMENT, INSTRUMENTATION, TRACKED VEHICLES, STRAIN GAGES, DATA PROCESSING SYSTEMS.) (*ARMY OPERATIONS, *MILITARY TRANSPORTATION, TERRAIN, SOILS.) -

269 103 0183 HOMEOSTASIS THEORY OF SMALL GROUPS. VI. VOLUNTARY ORGANIZATIONS,

269 103 0183 SEVERAL TECHNIQUES WERE USED TO TAKE MEASUREMENTS OF TWELVE RELATIVELY UNCONSTRAINED GROUPS (VOLUNTEER FIRE COMPANIES) WITH REFERENCE TO GROUP NEED SATISFACTION (G.N.S.), FORMAL ACHIEVEMENT (F.A.), ADJUSTABILITY AND SELECTED PREDICTOR VARIABLES. HOMEOSTATIC THEORY WAS TESTED WITH REFERENCE TO THESE GROUPS. HYPOTHESIS ONE IF G.N.S. AND F.A. ARE AT A HIGH AND APPROXIMATELY EQUALLY BALANCED LEVEL,

AN EXTERNALLY UNCONSTRAINED GROUP WILL PERSIST IN ITS EXISTENCE OVER A PERIOD OF TIME AND BE CAPABLE OF ADJUSTING ITSELF TO CHANGES OR DISTURBANCES IMPOSED ON IT. THE CONVERSE WAS ALSO HYPOTHESIZED. SUPPORTING EVIDENCE FOR THIS HYPOTHESIS WAS FOUND IN THIS STUDY. HYPOTHESIS TWO PREDICTORS OF G.N.S., F.A. AND ADJUSTABILITY COMPENSATE AMONG THEMSELVES TO MAINTAIN EACH OF THESE GROUP CRITERIA WITHIN LIMITS. EVIDENCE WITH REFERENCE TO THIS HYPOTHESIS WAS MIXED. THE RESULTS SUPPORTED THE IDEA THAT THESE VARIABLES OPERATED WITHIN PREDEFINED LIMITS HOWEVER, THE EVIDENCE FOR THE COMPENSATORY OPERATION OF THE PREDICTORS WAS MIXED.

269 103 0182 (*GROUP DYNAMICS, *SOCIAL COMMUNICATION, *ADJUSTMENT (PSYCHOLOGY), SELECTION, MATHEMATICAL PREDICTION.) (BEHAVIOR, THEORY.)

269 111 0184 LAUNCHER, ROCKET, 318 MM, XM34E1.

269 111 0184 NO ABSTRACT AVAILABLE

269 111 0183 *ROCKET LAUNCHERS, ARTILLERY ROCKETS. -
269 135 0185 DEVELOPMENT OF RADIOGRAPHIC TECHNIQUES FOR THE INSPECTION OF URANIUM TUBULAR SHAPES.

269 135 0185 VARIOUS RADIOGRAPHIC TECHNIQUES WERE INVESTIGATED TO DETERMINE OPTIMUM TECHNIQUES, USING SUITABLE RADIATION SOURCES, IN EXAMINING URANIUM TUBULAR SHAPES. ONE-MEV RESONANCE TRANSFORMER AND TWOMEV CONSTANT POTENTIAL RADIOGRAPHIC UNITS CAN BE EMPLOYED TO YIELD 2 T RADIOGRAPHY OF THE URANIUM TUBULAR SHAPES AS WELL AS OTHER URANIUM CONFIGURATIONS. THE DATA GENERATED SHOULD PROVE USEFUL IN PREPARING INSPECTION REQUIREMENTS FOR END ITEM SPECIFICATIONS.

269 135 0184 (*URANIUM, URANIUM ALLOYS, NON-DESTRUCTIVE TESTING, X-RAY PHOTOGRAPHY, *RADIOGRAPHY, *X-RAY GENERATORS, TEST EQUIPMENT, PROCESSING, TEST METHODS, QUALITY CONTROL. -

269 171 0186 ACCELERATED STORAGE STABILITY TESTS,

269 171 0186 THE STORAGE LIFE OF MIL-L-7808 OILS WAS IMPROVED BY THE USE OF AMINE TYPE ADDITIVES. THE ACCELERATED STORAGE TESTS USED TO ARRIVE AT QUALIFICATION LIMITS ARE DESCRIBED. THE TIME-TEMPERATURE RELATIONSHIPS FOR THE STORAGE LIFE OF MIL-L-7808 OILS ARE GIVEN. FROM THESE RELATIONSHIPS, THE STORAGE LIFE CAN BE ESTIMATED AT ANY TEMPERATURE FROM DATA AT ONE GIVEN TEMPERATURE.

269 171 0185 (JET ENGINES, *AIRPLANE ENGINE OILS, *OILS, *LUBRICANTS, HYDRAULIC FLUIDS, STORAGE, DETERIORATION, WATER, ADDITIVES, AMINES, TESTS, HIGH TEMPERATURE RESEARCH.) (LEAD, CORROSION, TEST METHODS, TEST EQUIPMENT, OVENS.) (BUTYL RADICALS, METHYL RADICALS, AMINES, CRESYL RADICALS, HYDROXIDES.) -

269 201 0187 BIBLIOGRAPHY ON VACCINIA, VIRIOLA, AND ANIMAL POX SUPPLEMENT, 1956-1960.

269 201 0187 NO ABSTRACT AVAILABLE

269 201 0186 (*BIBLIOGRAPHY, *SMALLPOX, PATHOLOGY, IMMUNIZATION, *VIRUS VACCINES.) -

269 207 0188 THE DESIGN AND CONSTRUCTION OF THE ARGMA, 8,000-KW PLASMA FACILITY.

269 207 0188 COMPLETE DESIGN CONSIDERATIONS FOR THE ARGMA 8,000-KW PLASMA FACILITY ARE REVIEWED. BOTH FACILITY REQUIREMENTS AND PERFORMANCE CHARACTERISTICS ARE DISCUSSED FOR TYPICAL MINIMUM ENERGY ICBM AND IRBM REENTRY TRAJECTORIES. CALCULATED STAGNATION CONDITIONS ARE SHOWN TO BE IN THE REALM OF MODEM PLASMA ARC TECHNOLOGY. CAPABILITY OF THE INSTALLED ELECTRIC GENERATION SYSTEM IS SHOWN TO BE ADEQUATE TO MEET REQUIREMENTS.

269 207 0187 (DESIGN OF *TEST FACILITIES FOR *HIGH TEMPERATURE RESEARCH.) (HYPERSONIC WIND TUNNELS FOR PRODUCTION OF GAS DISCHARGES.) (SIMULATION OF SHOCK WAVES AROUND BLUNT BODIES.) (SIMULATION OF ATMOSPHERE DURING ATMOSPHERE ENTRY OF RE-ENTRY VEHICLES.) (VACUUM SYSTEMS, DESIGN.) PLASMA PHYSICS. -

269 210 0189 PRODUCTION ENGINEERING MEASURE FOR RUGGEDIZED TAUT BAND SUSPENSION PANEL METERS PER SIGNAL CORPS TECHNICAL REQUIREMENTS SCS-43A.

269 210 0189 SIGNIFICANT PROGRESS WAS MADE IN OBTAINING THE REQUIRED PERFORMANCE FOR THE 2-1/2 INCH 100 DEGREE INSTRUMENTS AFTER SUBJECTION TO VIBRATION, TUMBLING AND SHOCK TESTS. THE PROBLEM OF RIBBON BREAKAGE DURING TESTS WAS SOLVED FOR RIBBON SIZES SUITABLE FOR APPLICATION IN INSTRUMENTS HAVING A FULL SCALE SENSITIVITY OF 20 MICROAMPERES. THE ELECTRICAL TEST RESULTS OF THE INSTRUMENTS EMPHATICALLY DEMONSTRATE THE SUPERIOR PERFORMANCE OF RUGGEDIZED TAUT BAND SUSPENSION METERS OVER CONVENTIONAL RUGGEDIZED PIVOTED METERS. THE PROBLEM OF RIBBON BREAKAGE DURING THE HIGH SHOCK TESTS WAS ANALYZED WITH AN ACCELEROMETER-OSCILLOSCOPE TECHNIQUE. A GOOD MEASURE OF PROGRESS WAS ATTAINED IN SUSPENSION RIBBON FABRICATION. QUANTITIES OF THE SMALLEST SIZE RIBBON REQUIRED FOR INSTRUMENTS ON THIS CONTRACT WERE MADE. ENGINEERING DRAWING FOR THE 1 INCH - 180 DEGREES AND THE 2-1/2 AND 3-1/2 INCH 250 DEGREE METERS WERE COMPLETED. THE SHORT TAUT BAND SUSPENSION RIBBONS PERMIT THE OVER-ALL DIMENSIONS TO BE PHYSICALLY INTERCHANGEABLE WITH CONVENTIONAL PIVOTED TYPE METERS.

269 210 0188 (*METERS, DESIGN, PRODUCTION.) (*SPRINGS, SHOCK, VIBRATION, TESTS.) -

269 211 0190 SOME CHARACTERISTICS OF HORIZONTAL DIPOLE ANTENNAS AT E. L. F.

269 211 0190 THE PERFORMANCE OF ANY ANTENNA IS DEPENDENT ON THE ELECTRICAL PROPERTIES OF THE EARTH BENEATH IT. UNLIKE A VERTICAL DIPOLE, THE HORIZONTAL DIPOLE ANTENNA OPERATES BEST OVER A POOR, LOW CONDUCTIVITY MATERIAL. WHEN POSITIONED ELECTRICALLY CLOSE TO A LOSSY MATERIAL SUCH AS THE EARTH (WHICH IT MUST BE AT VLF AND ELF), IT IS A VERY INEFFICIENT RADIATOR. NEVERTHELESS, ITS POWER RADIATING CAPABILITY MAY EASILY BE MADE TO EXCEED THAT ATTAINABLE FROM EXISTING VERTICAL DIPOLES (VLF ANTENNAS) AT ELF. THIS IS TRUE BASICALLY BECAUSE THE VERTICAL DIPOLE IS VOLTAGE LIMITED WHILE THE HORIZONTAL DIPOLE IS CURRENT LIMITED. APPARENT CONDUCTIVITIES WERE MEASURED IN 2 LOCATIONS - BOULDER, COLORADO, AND POLE MOUNTAIN DISTRICT OF THE MEDICINE BOW NATIONAL FOREST, WYOMING. ANTENNA PERFORMANCES FOR ARBITRARY 10 MILE LONG HORIZONTAL DIPOLES ARE CALCULATED FOR EACH LOCATION AT FREQUENCIES FROM 12 TO 330 C. VERTICAL ELECTRIC FIELDS WHICH WOULD BE PRODUCED AT

DISTANCES OF 1,000, 4,000, AND 10,000 KM BY A 1 MEGAWATT TRANSMITTER WITH A 10 MILE ANTENNA LOCATED IN THE POLE MOUNTAIN DISTRICT ARE ALSO GIVEN. THE PRECAMBRIAN GRANITE IN THE POLE MOUNTAIN DISTRICT WAS FOUND TO HAVE AN EFFECTIVE CONDUCTIVITY AS SEEN BY AN INCIDENT ELECTROMAGNETIC WAVE OF APPROXIMATELY 1/100,000 MHOS/METER.

269 211 0189 (*DIPOLE ANTENNAS, *COMMUNICATION EQUIPMENT, ELECTRICAL PROPERTIES, EARTH, CONDUCTIVITY, ELECTRIC FIELDS, VERY LOW FREQUENCY, IMPEDANCE, ATTENUATION, ELECTRO-MAGNETIC WAVES, MATHEMATICAL ANALYSIS, MEASUREMENT, TESTS.) ANTENNAS. -

269 212 0191 A COMPUTER-PROGRAMMED COMPONENT TOLERANCE ANALYSIS,

269 212 0191 A TECHNIQUE FOR TESTING THE OPERABILITY OF A BINARY COUNTER DESIGN IS DESCRIBED. THE SIX INEQUALITIES EMPLOYED IN THIS TECHNIQUE WERE DERIVED. THESE INEQUALITIES, THE OPERATING EQUATIONS, DESCRIBED NECESSARY CONDITIONS FOR THE TRANSISTORS TO BE IN THE ON AND OFF STATES AND THE NECESSARY CONDITIONS FOR SWITCHING EITHER TRANSISTOR FROM THE ON TO THE OFF STATE. THE OPERATING EQUATIONS FORMED THE BASIS FOR A COMPUTER PROGRAM WHICH WAS WRITTEN IN A MANNER SUCH THAT THE IBM 704 COULD PREDICT THE PROBABILITY THAT A BINARY COUNTER EMPLOYING, FIRST +50PERCENT TOLERANCES PASSIVE COMPONENTS AND SECOND, OPERATE NORMALLY. THE RESULTS INDICATE THAT +50PERCENT TOLERANCE COMPONENTS AFFORD A PROBABILITY OF NORMAL CIRCUIT OPERATION EQUAL TO 0.919, COMPARED WITH 1.0 PROBABILITY FOR 20-PERCENT TOLERANCE COMPONENTS.

269 212 0190 (*RELIABILITY, *DIGITAL COMPUTERS, PROGRAMMING, ELECTRONIC CIRCUITS.) (SEMICONDUCTORS, TRIGGER CIRCUITS.) -

269 214 0192 ON THE COMPENSATION OF THE INFLUENCE OF DELAYS IN MULTIVARIABLE DISCRETE AUTOMATIC CONTROL SYSTEMS,

269 214 0192 A GENERAL METHOD FOR THE COMPENSATION OF THE INFLUENCE OF DELAYS IN MULTIVARIABLE LINEAR DISCRETE AUTOMATIC CONTROL SYSTEMS IS PRESENTED. AS A RESULT OF THE SYNTHESIS BASED ON THE PRESENTED METHOD, A COMPENSATED SYSTEM IS OBTAINED. THE RESULTING CLOSED-LOOP DYNAMICS OF THE COMPENSATED SYSTEM IS IDENTICAL WITH THE CLOSED-LOOP DYNAMICS OF THE SYSTEM WITHOUT DELAYS, AND ONLY THE BEHAVIOR OF THE OUTPUT SIGNAL OF CLOSED-LOOP COMPENSATED SYSTEM IS AFFECTED BY THE OCCURRING DELAYS. CERTAIN PROPERTIES OF MULTIVARIABLE SYSTEMS, WHICH DISTINGUISH THE PROBLEM FROM THE ANALOGOUS ONE IN A SINGLE-VARIABLE CASE, ARE EMPHASIZED. SOME ADVANTAGES FOR THE COMPENSATION OF THE INFLUENCE OF DELAYS IN DISCRETE SYSTEMS IN COMPARISON TO THE SAME IN CONTINUOUS SYSTEMS ARE DISCUSSED. IN THE CONCLUSION SOME PROSPECTS OF THE METHOD AND A POSSIBLE DIRECTION OF FURTHER INVESTIGATION ARE GIVEN.

269 214 0191 (*CONTROL SYSTEMS, AUTOMATIC, TIME DELAY RELAYS, *LINEAR SYSTEMS, THEORY, MATHEMATICAL ANALYSIS, INTEGRAL TRANSFORMS.) (DATA PROCESSING SYSTEMS, DIGITAL SYSTEMS.) -

269 216 0193 HIGH TEMPERATURE DIELECTRIC MATERIALS.

269 216 0193 TECHNIQUES WERE DEVELOPED AND ADAPTED TO PREPARE REFRACTORY OXIDES, PARTICULARLY SINGLE CRYSTALS, FOR DIELECTRIC ANALYSES. IN PARTICULAR, METHODS OF SPUTTERING AND EVAPORATION WERE EXTENDED TO PROVIDE HEAVY NOBLE METAL ELECTRODES. THE DC RESISTIVITY AT ELEVATED TEMPERATURES OF MgO SINGLE CRYSTALS WAS INCREASED BY THE APPLICATION OF DC FIELDS AT TEMPERATURES FROM 25 TO 560 C THE SAME

WAS TRUE FOR THE AC RESISTIVITY. THE EFFECT OF EXPOSURE TO HIGH TEMPERATURES ALONE GENERALLY LOWERED THE RESISTIVITY. THIN FILMS OF AL₂O₃ FORMED ANODICALLY AND HEAT TREATED, HAD GOOD DIELECTRIC PROPERTIES AT MODERATE TEMPERATURES. TiO₂ FILMS PREPARED BY THE PYROLYSIS OF TiCl₄ WERE EXCELLENT DIELECTRICS.

269 216 0192 (*DIELECTRICS, *REFRACTORY MATERIALS, CERAMIC MATERIALS, CAPACITORS, PREPARATION, SINGLE CRYSTALS, *CERMETS, *THIN FILMS, IMPURITIES.) (MAGNESIUM COMPOUNDS, ALUMINUM COMPOUNDS, TITANIUM COMPOUNDS, STRONTIUM COMPOUNDS, BARIUM COMPOUNDS, OXIDES.) (PROCESSING, PYROLYSIS, ELECTRO-DEPOSITION, EVAPORATION.) (HIGH TEMPERATURE RESEARCH, DIELECTRIC PROPERTIES.) -

269 218 0194 SPACE BACKGROUND STUDY.

269 218 0194 A SUMMARY REPORT IS PRESENTED OF A TWO-YEAR EFFORT TO OBTAIN AND PRESENT ASTRONOMICAL DATA DESIGNED TO SHOW THE NATURE AND EXTENT OF THE INFRARED SPACE BACKGROUND. EMPHASIS IN THE FIRST PHASE WAS PLACED ON HISTORICAL AND THEORETICAL CONSIDERATIONS OF THE PROBLEM. A SUMMARY TABLE OF THE COMPUTED INFRARED MAGNITUDES OF 235 STARS IN THREE INFRARED WAVEBANDS IS PRESENTED, BASED ON THE ASSUMPTION THAT STARS RADIATE AS BLACKBODIES OVER THEIR ENTIRE SPECTRAL RANGE. THE SECOND PHASE WAS DESIGNED TO TEST THE FOREGOING ASSUMPTION BY OBSERVING AND MEASURING, IN THE INFRARED, A NUMBER OF SELECTED ASTRONOMICAL SOURCES. TO THIS END, TWO INFRARED PHOTOMETER SYSTEMS WERE DESIGNED, CONSTRUCTED AND EMPLOYED ON THE PERKINS AND MOUNT WILSON OBSERVATORIES' TELESCOPES. THE RESULTS OF THE OBSERVATIONS MADE WITH THESE PHOTOMETERS FROM OCTOBER, 1960 TO SEPTEMBER, 1961, ARE PRESENTED.

269 218 0193 (*ANTI-AIRCRAFT DEFENSE SYSTEMS, OPTICAL SYSTEMS, *INFRARED OPTICAL SYSTEMS, DESIGN, *AERIAL TARGETS, DETECTION, *ASTRONOMICAL DATA, *INFRARED RADIATION, *STAR MODELS, BLACKBODY RADIATION, THEORY, LITERATURE.) (*INFRARED RADIATION, MEASUREMENT, INSTRUMENTATION, *INFRARED OPTICAL SYSTEMS, *PHOTOMETERS, DESIGN, CONSTRUCTION, TELESCOPES.) -

269 219 0195 INVESTIGATION OF ANTENNA BEAM SCANNING.

269 219 0195 A THEORETICAL STUDY OF THE ANTENNA CONFIGURATION WAS MADE TO DETERMINE (1) DESIGN DATA FOR THE WULLENWEBER ARRAY, AND (2) DESIGN OF A COMMUTATOR SUITABLE FOR GENERATING THE PROPER DRIVING DISTRIBUTION. FAR FIELD CONTOUR PATTERNS WERE CALCULATED FOR THE FEED RING RADII OF 10, 20, 40, AND 60 LAMBDA AND FOCAL LENGTHS OF 5 AND 7.5 LAMBDA. PATTERNS WERE ALSO CALCULATED FOR THE FEED RING POSITIONED OFF FOCUS BY 1, 2, AND 3 BEAMWIDTHS TO DETERMINE HIGHER ANGLE COVERAGE CAPABILITIES. COMMUTATOR WORK CONSISTED MAINLY OF THE REDESIGN OF A PREVIOUSLY BUILT COMMUTATOR.

269 219 0194 (*RADAR ANTENNAS, ANTENNAS, *ELECTRONIC COMMUTATORS, COMMUTATORS, REFLECTORS, ANTENNA HORNS, TRANSMISSION LINES, FOCUSING, DESIGN.) (*ANTENNA RADIATION PATTERNS, LOBING, PHASE MEASUREMENT, MATHEMATICAL ANALYSIS, MEASUREMENT.) -

269 221 0196 INVESTIGATION OF THE EFFECTS OF MAGNETIC FLUX ON DISLOCATION MOVEMENT AND ALIGNMENT.

269 221 0196 OBSERVATIONS HAVE LED TO THE HYPOTHESIS THAT UNDER SOME CONDITIONS, MAGNETIC FLUX INFLUENCES THE MOVEMENT OF DISLOCATIONS WITHIN THE GRAINS OF A FERROMAGNETIC MATERIAL. BASED ON X-RAY DIFFRACTION EXTINCTION CONTRAST, A TECHNIQUE WAS DERIVED FROM THE WORK ON THIS PROJECT THAT MAKES IT POSSIBLE TO MAKE A DIRECT OBSERVATION OF DISLOCATIONS IN NICKEL FOIL SAMPLES THE DISLOCATION MOVEMENTS CAN THEREBY BE FOLLOWED WHEN THE SAMPLES ARE SUBJECTED TO MAGNETIC FLUX. AN UNMISTAKABLE CHANGE IN THE IMPERFECTION STRUCTURE WAS OBSERVED. IT IS RECOMMENDED THAT THIS OBSERVATION BE FOLLOWED BY A MORE COMPLETE INVESTIGATION OF THE NATURE OF THE CHANGE AND THE MANNER IN WHICH IT IS INFLUENCED BY MAGNETIC FLUX.

269 221 0195 (*GRAINS (METALLURGY), DEFORMATION, STRESSES, FERROMAGNETIC MATERIALS, CRYSTAL STRUCTURE, MAGNETIC EFFECTS, NICKEL.) (X RAYS, REFLECTION, *X-RAY DIFFRACTION ANALYSIS, PHOTOGRAPHIC ANALYSIS, X-RAY DIFFRACTION CAMERAS.) -

269 222 0197 AN EXAMPLE OF CHROMOSPHERIC STRIATION OBSCURATION BY A GREAT FLARE,

269 222 0197 CERTAIN GREAT SOLAR FLARES PRODUCE A TEMPORARY OBSCURATION OR DISRUPTION OF THE NEIGHBORING CHROMOSPHERIC STRIATION PATTERNS. THESE PATTERNS ARE BASICALLY HYDRODYNAMIC PHENOMENA, BUT ARE CLOSELY LINKED TO THE LOCAL MAGNETIC FIELD. HENCE THEIR BEHAVIOUR IS IMPORTANT TO AN UNDERSTANDING OF THE PHYSICAL PROCESSES IN FLARES. SEVENTEEN GREAT FLARES ON SACRAMENTO PEAK FILMS WERE EXAMINED FOR THIS EFFECT. ONE OUTSTANDING EXAMPLE WAS FOUND ON 6 MAY 1960 THIS CASE IS DESCRIBED IN DETAIL. EVIDENCE CLEARLY SHOWS THAT THE EFFECT RESULTS FROM LOCAL OBSCURATION BY FLARE SURGE MATERIAL IN THE CORONA IT IS NOT NECESSARY TO INVOKE ANY CATASTROPHIC CHANGE IN THE MAGNETIC FIELD.

269 222 0196 (*SOLAR ATMOSPHERE, SOLAR DISTURBANCES, INTERFERENCE, *SOLAR FLARES, VORTICES, MAGNETIC FIELDS.) -

269 223 0198 XM143E1 WARHEAD SECTION SHIPPING AND STORAGE CONTAINER STUDY.

269 223 0198 WORK IS REPORTED ON THE REDESIGN OF THE XM143 ATOMIC WARHEAD CASE. THE NEW UNIT WAS DESIGNATED THE XM143E1 CONTAINER. THE DESIGN OF THE CONTAINER WAS REFINED TO REDUCE BOTH WEIGHT AND COST, WHILE KEEPING THE CONTAINER'S UNIVERSALITY. THE CASE WAS DESIGNED TO UTILIZE STANDARD MANUFACTURING TECHNIQUES. DESIGN OF THE SUSPENSION FRAME WAS REQUIRED TO MAINTAIN FUNCTION AND SUPPORT LOCATION AND TO IMPROVE LOADING ACTION. STACKING BRACKETS, SHOCK MOUNTS, AND LATCHES WERE REDESIGNED. THE DESIGN OF THE OVER-ALL CONTAINER WAS REFINED TO INSURE MAXIMUM USAGE OF THE MOST ECONOMICAL STANDARD HARDWARE AND MATERIALS AVAILABLE.

269 223 0197 (GUIDED MISSILE WARHEADS, *NUCLEAR WARHEADS, *CONTAINERS, STORAGE, SHIPPING, HANDLING, MOUNTING BRACKETS, VIBRATION ISOLATORS, EFFECTIVENESS, COSTS, DESIGN.) -

269 224 0199 DEVELOPMENT OF A HIGH-TEMPERATURE,
NUCLEAR RADIATION-RESISTANT PNEUMATIC POWER SYSTEM FOR FLIGHT VEHICLES.

269 224 0199 THE DEVELOPMENT STATUS OF THE ROTARY ACTUATOR AND
SERVO VALVE, PRESSURE REGULATOR, RELIEF VALVE, ACCUMULATOR, FILTER AND
CHECK VALVE AS WELL AS THE TURBO-COMPRESSOR ARE DISCUSSED. PROGRESS
WAS MADE ON REFINING THE TEST PROGRAM FOR THE TUBE FITTINGS AND BOSS
SEALS. A HIGH-TEMPERATURE FACILITIES SURVEY WAS UNDERTAKEN TO EVALUATE
INSTRUMENTATION, PROCEDURES, AND SAFETY REGULATIONS USED BY OTHER
COMPANIES CONCERNED WITH HIGH-TEMPERATURE AND NUCLEAR RADIATION
TESTING. RESULTS OF THIS SURVEY ARE ALSO INCLUDED. INITIAL
PREPARATIONS WERE UNDERTAKEN TO PREPARE THE HIGH TEMPERATURE TEST
LABORATORY FOR THE TEST PHASE. MODIFICATION OF THE ENVIRONMENTAL
CHAMBER AND AIR HEATER ARE UNDERWAY. INSTRUMENTATION REQUIREMENTS WERE
REVIEWED AND PRELIMINARY PROCUREMENT WAS INITIATED ON LONG LEAD TIME
TEST EQUIPMENT.

269 224 0198 (*PNEUMATIC SYSTEMS, RESISTANCE, TEMPERATURE, THERMAL R
ADIATION, HIGH TEMPERATURE RESEARCH, RADIATION DAMAGE, RADIATION EFFECTS.) (AIRCRAFT EQUIPMENT, TURBO-RAMJETS, COMPRESSORS, ROTARY COMPRESSORS
, HIGH PRESSURE COMPRESSORS, COMPRESSED AIR, PNEUMATIC SYSTEMS, CONTROL
SYSTEMS, HYDRAULIC POWER SYSTEMS, DESIGN.) (*PNEUMATIC DEVICES, PNE
UMATIC VALVES, PNEUMATIC SERVOMECHANISMS, HIGH PRESSURE VALVES, CHECK V
ALVES, PRESSURE REGULATORS, CONTROL VALVES.) -

269 226 0200 STRUCTURE OF VITREOUS AND LIQUID BORON TRIOXIDE AND
SOME SIMPLE BORATES.

269 226 0200 RESEARCH WAS CONDUCTED TO OBTAIN STRUCTURAL
INFORMATION ON THE VITREOUS AND LIQUID B₂O₃ AND BINARY BORATES. BY
THE USE OF HIGH-PRESSURE TECHNIQUES, SIMPLE CRYSTALS OF TWO FORMS OF
B₂O₃ WERE PREPARED FOR X-RAY DIFFRACTION STUDIES. THE TENTATIVE PHASE
DIAGRAM FOR LIQUID AND CRYSTALLINE B₂O₃ WAS CONSTRUCTED UP TO 1100 °C
AND 90,000 ATMOSPHERES. THE EFFECTS OF WATER ON THE VISCOSITY,
ELECTRIC CONDUCTANCE, AND DENSITY OF LIQUID B₂O₃ WERE EXAMINED
INDICATING THAT SOME OF THE CURRENT HYPOTHESES CONCERNING THE STRUCTURE
OF LIQUID B₂O₃ CAN BE REJECTED. PRELIMINARY RESULTS ON THE IR
ABSORPTION OF SOLID AND LIQUID B₂O₃ WERE OBTAINED. OTHER WORK IN
PROGRESS INCLUDES NUCLEAR MAGNETIC RESONANCE ABSORPTION, VISCOSITY
MEASUREMENTS OF BINARY BORATES AT TEMPERATURES BELOW THE LIQUIDUS, AND
SINGLE-CRYSTAL DIFFRACTION ON ALPHA-AND BETA-B₂O₃.

269 226 0199 (*BORON COMPOUNDS, *OXIDES, CRYSTALS, SINGLE CRYSTALS,
PREPARATION, LIQUIDS, *GLASS, PHASE STUDIES, PHASE TRANSITIONS, CRYST
AL STRUCTURE.) (LIQUIDS, VISCOSITY, ELECTRICAL PROPERTIES, CONDUCTIVIT
Y, DENSITY, WATER.) (*BORATES, SODIUM COMPOUNDS, VISCOSITY.) (HIGH TEMP
ERATURE RESEARCH, HIGH PRESSURE RESEARCH, INFRARED SPECTROSCOPY, NUCLEAR
MAGNETIC RESONANCE.) -

269 227 0201 RESEARCH ON LOW TEMPERATURE FUEL CELL SYSTEMS.

269 227 0201 FUEL ELECTRODE STUDIES RESULTED IN THE FOLLOWING
DEVELOPMENT OF TWO ELECTRODE STRUCTURES FOR CARRYING OUT FUEL AND
ELECTROCATALYST INVESTIGATIONS IN MATRIX-TYPE FUEL CELLS, AND CELL
STRUCTURES INCLUDING ONE WITH REFERENCE ELECTRODES A SURVEY OF
CHEMICAL ELEMENTS FOR ELECTROCATALYTIC ACTIVITY WITH H₂, HYDROCARBONS,
AND OTHER FUELS, C BASE ELECTROCATALYSTS FOR ACTIVITY WITH H₂,
HYDROCARBONS, AND O₂, AND A NUMBER OF MECHANICAL MIXTURES AND COMPOUNDS
AND A FEW ALLOYS FOR ELECTROCATALYTIC ACTIVITY IN FUEL CELLS

IDENTIFICATION OF PT AS THE MOST ACTIVE SIMPLE CATALYST FOR ANODIC OXIDATION OF HYDROCARBONS IN FUEL CELLS DISCOVERY THAT SATURATED HYDROCARBONS ARE MORE RAPIDLY OXIDIZED IN ACIDIC ELECTROLYTE CELLS AS COMPARED WITH BASIC ELECTROLYTE CELLS AND THAT WITH OLEFINS THE ELECTROLYTE EFFECT IS SMALLER AND IN FAVOR OF THE BASIC ELECTROLYTE AND IDENTIFICATION OF STRONG EFFECTS OF ELECTROLYTE UPON ADSORPTION RATES OF HYDROCARBON FUELS WHICH CORRELATES WITH THE OBSERVATIONS OF THE PRECEDING ITEM.

269 227 0200 (*FUEL CELLS, LIQUIDS, HYDRO-CARBONS, OXIDATION-REDUCTI ON REACTIONS, LOW TEMPERATURE RESEARCH, GASES.) (ELECTRODES, ELECTROLYT IC CELLS, STRUCTURES, CATALYSIS.) (CATALYSTS, PLATINUM, METALS.) (ELECT ROLYTES, ACIDS, HYDROXIDES.) (CHEMICAL REACTIONS, AD-SORPTION, VOLUMET RIC ANALYSIS, ANODES (ELEC-TROLYTIC CELL).) -

269 059 0204 ENGINEERING FOR PRODUCTION OF CARTRIDGE, 20MM, HPT, M54E2,

269 059 0204 FEEDING AND RAMMING DIFFICULTIES DURING SHORT BURST AUTOMATIC FIRE WITH THE CARTRIDGE, 20MM, HPT, M54 WERE TRACED TO THE EXTERNAL CONFIGURATION OF THE PROJECTILE NOSE, A REDESIGN BEING INDICATED. THE T46 AND T51 PROJECTILES WERE DEVELOPED WHICH PROVED TO BE SATISFACTORY IN LIMITED TESTS. THE T46 CLOSELY FOLLOWED STANDARD (M55) PROJECTILE DESIGN, BUT THE T51 WAS COMPLETELY UNCONVENTIONAL, BEING OF ONE-PIECE CONSTRUCTION AND HAVING A DISTINCTIVE DUMBBELL SHAPE. A COST STUDY INDICATED THE T51 DESIGN TO BE THE MORE ECONOMICAL TO MANUFACTURE AND ITS UNUSUAL SHAPE MADE IT INHERENTLY IDENTIFIABLE. THE ONE-PIECE CONSTRUCTION ALSO ELIMINATED NOSE ASSEMBLY DIFFICULTIES AND SECURITY PROBLEMS DURING FEEDING AND RAMMING. MINOR DESIGN AND DIMENSIONAL CHANGES WERE MADE TO THE T51 PROJECTILE TO PROMOTE VOLUME PRODUCTION, AND IT WAS DESIGNATED THE M54E2. IT IS RECOMMENDED THAT THE CARTRIDGE, 20MM, HPT, M54E2 BE STANDARDIZED AS THE CARTRIDGE, 20MM, HPT, M54A1 FOR PROCUREMENT WHERE HIGH PRESSURE TEST AMMUNITION IS REQUIRED FOR USE IN 20MM AIRCRAFT WEAPONS.

269 059 0201 (*AIRCRAFT AMMUNITION, DESIGN, TESTS, COSTS.) (AMMUNIT ION, PRESSURE, TESTS, GUN BARRELS, GUNS, AIRCRAFT GUNS, AUTOMATIC WEAPON S.) -

269 099 0205 PHENYLPHOSPHONIC DIISOCYANATE AND SOME OF ITS REACTION PRODUCTS,

269 099 0205 PURE PHENYLPHOSPHONIC DIISOCYANATE (I) AND PHENYLPHOSPHINYLDIENE BIS(3-PHENYLUREA) (VI) WERE PREPARED AND IDENTIFIED THEIR THERMAL STABILITIES WERE STUDIED. ATTEMPTS WERE MADE TO OBTAIN THERMALLY STABLE POLYMERS BY THE ADDITION COPOLYMERIZATION OF I WITH 3,6-DIAMINOTETRAZINE, BENZOGUANAMINE, O-, M- AND P-PHENYLENEDIAMINE, SULFAMIDE, 1,3-DIMETHYL- AND 1,3-DIPHENYLSULFAMIDE. THE POLYMERIZATION PRODUCT WITH PPHENYLENEDIAMINE APPEARED TO BE A MIXTURE (70% OF COPOLYMER OR OF PHENYLPHOSPHINYLDIENE BIS(3P-AMINOPHENYLUREA) OR PHENYLPHOSPHINYLDIENE 3,3'-P-PHENYLENEDIUREA WITH 30% OF HOMOPOLYMERIC PHENYLPHOSPHONIC DIISOCYANATE) QUITE STABLE AT 250 C (9.4% WT. LOSS). THE PRODUCT WITH M-PHENYLENEDIAMINE WAS CONSIDERED AS A MIXTURE OF 80% OF COPOLYMER OR PHENYLPHOSPHINYLDIENE BIS(3-M-AMINOPHENYLUREA) OR PHENYLPHOSPHINYLDIENE 3,3'-M-PHENYLENEDIUREA AND 20% OF HOMOPOLYMER.

269 099 0202 (*PHOSPHORUS COMPOUNDS, PHENYL RADICALS, *PHOSPHONYL RADICALS, *CYANATES AND PHOSPHINES, UREA, SYNTHESIS, TEMPERATURE, STABILITY, PYROLYSIS, INFRARED SPECTROSCOPY.) (CATALYSTS, ETHYL RADICALS, AMINES.) (*POLY-MERS, POLYMERIZATION, COPOLYMERIZATION WITH AMINES, PYRIDINES OR BENZOYL RADICALS, GUANI-DINES OR METHYL RADICALS, PHENYL RADICALS, SULFAMYL RADICALS, AMINES, HETEROCYCLIC COM-POUNDS.) CHEMICAL REACTIONS.

269 126 0206 STUDY OF CRATER PHYSICS.

269 126 0206 THE WORK PERFORMED ON THE CALIBRATION AND STUDY OF VARIOUS METEORITE DETECTORS IS REVIEWED. DYNAMIC MEASUREMENTS ARE REPORTED FOR DETECTORS DESIGNED TO UTILIZE IMPACT FLASH, IMPACT IONIZATION, AND MOMENTUM TRANSFER EFFECTS MICROPHONE DETECTORS USED TO STUDY THE PRODUCTION OF A SIGNAL PARTICLE IMPACT ARE ALSO REVIEWED.

269 126 0203 (*METEORITES, *CRATERING, DYNAM-ICS, DETECTION, MEASUREMENT, THEORY, TESTS.) (DETECTORS, ACOUSTIC DETECTORS, THIN FILMS.) (PARTICLES, IONIZATION, ENERGY, VELOCITY.) (TEST METHODS, TEST EQUIPMENT.)

269 102 0207 SIMULATION STUDIES ON THE ELECTROMAGNETIC PROPERTIES OF THE WAKE OF A RE-ENTRY BODY.

269 102 0207 THE INITIAL PHASES OF AN EXPERIMENTAL PROGRAM ON THE LABORATORY SIMULATION OF THE ELECTROMAGNETIC PROPERTIES OF THE WAKE OF A RE-ENTRY BODY ARE DESCRIBED. THE SCALING CONSIDERATIONS INVOLVED IN THE COMPARISON OF THE LABORATORY AND FULLSCALE SYSTEMS ARE DISCUSSED, AND THE FLOW SYSTEM WHICH WAS DEVELOPED IS DESCRIBED. THE RESULTS OF SEVERAL PLASMA DIAGNOSTIC METHODS ARE PRESENTED. THESE INCLUDE A FLOW VISUALIZATION TECHNIQUE, HIGH SPEED MICROWAVE TRANSMISSION AND REFLECTION MEASUREMENTS ON SUPERSONIC PLASMA FLOW STREAMS, AND FLOATING DOUBLE PROBE MEASUREMENTS IN NONSTATIONARY PLASMAS. MANY INTERESTING PHENOMENA WHICH WERE OBSERVED, INCLUDING TURBULENCE IN THE PLASMA STREAM, ARE DESCRIBED.

269 102 0204 (*ANTIAIRCRAFT DEFENSE SYSTEMS, *AERIAL TARGETS, GUIDED MISSILES, DETECTION.) (SIMULATION, *ELECTROMAGNETIC PROPERTIES, WAKE, CONDENSATION TRAILS, *RE-ENTRY VEHICLES, RE-ENTRY AERODYNAMICS.) (EXPERIMENTAL DATA, *PLASMA PHYSICS, *ELECTROMAGNETIC WAVES, *SU-PERSONIC FLOW, MEASUREMENT, MICROWAVE PROBES, WAVE TRANSMISSION, REFLECTION, TURBULENCE.)

269 130 0208 DEVELOPMENT OF NIOBIUM-BASE ALLOYS.

269 130 0208 THE EFFECT OF O AND N ADDITIONS ON THE HARDNESS, WORKABILITY, STRAIN-HARDENING CHARACTERISTICS, AND RECRYSTALLIZATION BEHAVIOR OF NB WAS DETERMINED. N ADDITIONS WERE DETRIMENTAL TO COLD ROLLING CHARACTERISTICS. HARDNESS, WORKABILITY, AND MECHANICAL PROPERTY DATA FOR NB-C ALLOYS WERE OBTAINED. GRAIN BOUNDARY CARBIDES WERE DETRIMENTAL TO COLD WORKABILITY. CARBON ADDITIONS INCREASED THE DUCTILE-BRITTLE TRANSITION TEMPERATURE RANGE OF NB. MECHANICAL PROPERTY DATA WERE OBTAINED FOR MANY BINARY, TERNARY AND QUATERNARY NB BASE ALLOYS. RE, W, AND MO ADDITIONS INCREASED THE DUCTILE BRITTLE TRANSITION OF NB. A NUMBER OF ALLOYS WERE PREPARED BY THE CONSUMABLE ELECTRODE ARC MELTING PROCESS. INGOT BREAKDOWN WAS ACCOMPLISHED BY HIGH ENERGY RATE EXTRUSION (DYNAPAK). THE RESULTS OF DYNAPAK EXTRUSION

WERE VERY ENCOURAGING. SEVERAL HIGH STRENGTH ALLOYS WERE INVESTIGATED. ONE ALLOY, NB-10W-5V-1ZR, HAD EXCELLENT ROOM TEMPERATURE DUCTILITY AND ULTIMATE TENSILE STRENGTHS OF 64,800 PSI AND 29, 450 PSI AT 1205 AND 1315 C RESPECTIVELY.

269 130 0205 (*NIOBIUM ALLOYS, *NIOBIUM, MECHANICAL PROPERTIES.) (NIOBIUM, ADDITIVES, OXYGEN, NITROGEN, CARBON.) (NIOBIUM ALLOYS, PREPARATION, PROCESSING, EXTRUSION, MELTING, WELDING.) REFRACTORY MATERIALS.

269 014 0209 EFFECTS OF OUTER-SPACE ENVIRONMENT IMPORTANT TO SIMULATION OF SPACE VEHICLES.

269 014 0209 THE RESULTS OF A LITERATURE SURVEY TO DEFINE THE EFFECTS OF THE OUTER-SPACE ENVIRONMENT IMPORTANT TO THE SIMULATION OF SPACE VEHICLES ARE PRESENTED. THE DISCUSSION IS GENERAL, HAVING NOT BEEN CONSTRAINED BY THE INCLUSION OF SPECIFIC VEHICLES OR TRAJECTORIES. ONLY THE NATURAL ENVIRONMENT OF SPACE IS CONSIDERED AND THE SURVEY IS LIMITED TO THE SOLAR SYSTEM WITH PARTICULAR EMPHASIS ON THE REGION IN THE NEAR VICINITY OF THE EARTH-MOON SYSTEM AND AT HEIGHTS GREATER THAN 80 KILOMETER ABOVE THE EARTH'S SURFACE. TO SPECIFY THOSE EFFECTS THAT NEED TO BE INCORPORATED INTO A SPACE TRAINING SIMULATOR, THE EXTERIOR ENVIRONMENT, ITS EFFECTS ON THE VEHICLE AND CREW, AND THE MALFUNCTIONS THAT MAY RESULT MUST BE DETERMINED. THESE SUBJECTS ARE TREATED, ALONG WITH A CONSIDERATION OF THE ADEQUACY OF THE EXISTING DATA IN THE STUDY. RECOMMENDATIONS FOR FURTHER STUDY ARE PRESENTED.

269 014 0206 (*SPACE ENVIRONMENTAL CONDITIONS, SPACESHIPS, SPACESHIP CABINS, DESIGN, SIMULATION OF SPACE FLIGHT, FLIGHT SIMULATORS FOR TRAINING DEVICES.) (RADIATION HAZARDS, ELECTROMAGNETIC EFFECTS, RADIATION EFFECTS, SOLAR ENERGY, PARTICLES, COSMIC RAYS, X RAYS, GAMMA RAYS, IONS, PHOTONS.) (HAZARDS FROM METEORS, METEORITES, INTERSTELLAR MATTER, UPPER ATMOSPHERE, ELECTROMAGNETIC FIELDS, ELECTROSTATIC FIELDS, GRAVITY.)

269 000 0210 PRELIMINARY OBSERVATIONS ON THE EFFUSION COOLING OF CATALYTIC SOLIDS EXPOSED TO PARTIALLY DISSOCIATED NONEQUILIBRIUM GAS STREAMS,

269 000 0210 THE CONSEQUENCES OF GAS PHASE CHEMICAL REACTION BETWEEN AN EFFUSION COOLANT AND CHEMICALLY REACTIVE SPECIES PRESENT IN THE FREE STREAM ARE DISCUSSED WITH REGARD TO CONVECTIVE ENERGY TRANSFER TO CATALYTICALLY ACTIVE SOLIDS. A POROUS CU SURFACE WAS EXPOSED TO A SUPERSONIC STREAM OF ACTIVATED N. THE RELATIVE EFFECTIVENESS OF ETHYLENE, NH₃, N, AND NO₂ AS COOLANTS WAS MARKEDLY ALTERED BY THE EFFECTS OF SPECIFICITY IN THEIR GAS PHASE CHEMICAL BEHAVIOR. THIS SUGGESTED THAT DIFFERENCES IN GAS PHASE CHEMICAL REACTIVITY COULD BE USED IN SELECTING EFFUSION COOLANTS FOR CATALYTICALLY ACTIVE SOLIDS EXPOSED TO HIGH TEMPERATURE PARTIALLY DISSOCIATED STREAMS.

269 000 0207 (*SOLIDS, CATALYSTS, *FILM COOLING, *GASES, PRESSURE, TURBULENT BOUNDARY LAYER, THERMAL DIFFUSION, TRANSPORT PROPERTIES, HEAT OF FORMATION, CHEMICAL REACTIONS, REACTION KINETICS, THERMOCHEMISTRY.) (COOLANTS, NITROGEN, ETHYLENES, AMMONIA, NITROGEN COMPOUNDS, OXIDES.) ELECTRIC DISCHARGES.

269 001 0211 A STUDY TO CORRELATE FLIGHT MEASURED HELICOPTER VIBRATION DATA AND PILOT COMMENTS.

269 001 0211 THE RESULTS OF A STUDY AIMED AT IMPROVING THE CORRELATION BETWEEN RECORDED HELICOPTER VIBRATION DATA AND PILOT COMMENTS ARE PRESENTED. LISSAJOUS' PATTERNS OF RESULTANT DISPLACEMENT, VELOCITY, AND ACCELERATION ARE CONSTRUCTED AND EVALUATED TO DEFINE THOSE CHARACTERISTICS WHICH BEST CORRELATE WITH THE PERTINENT PILOT COMMENTS. A NEW MEASURE OF COMFORT LEVEL, EQUIVALENT VIBRATION LEVEL (VEQ) IS DEFINED. THESE QUANTITIES ARE CALCULATED FOR ALL LISSAJOUS' FIGURES, AND RESULTANT ACCELERATION IS SEEN TO BE THE MOST MEANINGFUL PARAMETER. AN IMPROVEMENT IN THE DEGREE OF CORRELATION BETWEEN MEASURED VIBRATION AND PILOT COMMENT IS SHOWN THROUGH THE USE OF VEQ FOR THE PATTERNS OF RESULTANT ACCELERATION, IN LIEU OF THE STANDARD VIBRATION CRITERIA.

269 001 0208 (*HELICOPTERS, *VIBRATION, DYNAMICS, FLIGHT TESTING, MEASUREMENTS.) (PILOTS, HUMAN ENGINEERING, PHYSIOLOGY.) -

269 003 0212 THE EFFECT OF PRESSURE ON THE CRYSTALLIZATION OF POLYETHYLENE FROM DILUTE SOLUTION,

269 003 0212 LINEAR POLYETHYLENE WAS CRYSTALLIZED ISOTHERMALLY FROM 0.05% TOLUENE SOLUTION AT ATMOSPHERIC PRESSURE AND UP TO 6000 ATM HYDROSTATIC PRESSURE. AT ATMOSPHERIC PRESSURE A HIGH TEMPERATURE FORM OF UNKNOWN STRUCTURE WAS FOUND CRYSTALLIZING ABOVE 90 C. SINGLE CRYSTAL LAMELLAE CRYSTALLIZED BETWEEN 75 AND 90 C. DENDRITES WERE FORMED BELOW 75 C. THE TEMPERATURE DIVIDING THE DENDRITIC GROWTH FROM SINGLE CRYSTALLINE GROWTH INCREASES WITH INCREASING PRESSURE. THE THICKNESS OF CRYSTALS GROWN AT APPROXIMATELY CONSTANT SUPERCOOLING, BUT AT ELEVATED TEMPERATURE AND PRESSURE INCREASED ONLY SLIGHTLY. DETERMINATION OF THE MORPHOLOGY OF THE CRYSTALS AND THE THICKNESS OF SINGLE CRYSTAL PLATELETS WAS DONE USING AN INTERFERENCE MICROSCOPE.

269 003 0209 (TOLUENES, SOLUTIONS, *POLYMERS, *ETHYLENES, *CRYSTALLIZATION, PRESSURE, HIGH PRESSURE RESEARCH, HIGH TEMPERATURE RESEARCH, *CRYSTALS, *SINGLE CRYSTALS, GROWTH, CRYSTAL STRUCTURE, THICKNESS, MEASUREMENT, THEORY.) LABORATORY EQUIPMENT, MICROSCOPY. -

269 002 0213 NO TITLE AVAILABLE

NO ABSTRACT AVAILABLE

269 002 0210 (*ELECTROMAGNETIC WAVES, PROPAGATION, VERY LOW FREQUENCY.) (*SOLID STATE PHYSICS, ELECTRONS, PARAMAGNETIC RESONANCE, NUCLEAR MAGNETIC RESONANCE.) (*ELECTROMAGNETIC WAVES, ANTENNAS, SCATTERING, REFLECTIONS.) (*FERROMAGNETISM, MATERIALS, MICROWAVES, RESONANCE. (*COMMUNICATIONS THEORY, *CONTROL SYSTEMS, STATISTICAL ANALYSIS, ELECTRICAL NETWORKS.) -

269 008 0214 STRONG CONSISTENCY OF STOCHASTIC APPROXIMATION METHODS.

269 008 0214 THE STRONG CONVERGENCE PROPERTIES OF CERTAIN STOCHASTIC APPROXIMATION METHODS ARE PRESENTED. SUCH METHODS ARE USED IN STATISTICAL PROBLEMS TO ESTIMATE THE ROOT OF A REGRESSION EQUATION, OR TO ESTIMATE THE POINT AT WHICH A REGRESSION FUNCTION ACHIEVES ITS MAXIMUM.

269 008 0211 (STATISTICAL ANALYSIS, *PROBABILITY, *MEASURE THEORY, STATISTICAL DISTRIBUTIONS, *STATISTICAL PROCESSES, MATRIX ALGEBRA.) THESES.

269 011 0215 AIR FORCE EVALUATION TESTING OF ATLAS D COMPONENTS THREE FUEL SHUT OFF VALVES GD/A PART NUMBER 7-02281-15 B. H. HADLEY PART NUMBER 10576 SERIAL NUMBERS 114, 122, 135.

269 011 0215 THREE POWER OPERATED SHUTOFF VALVES, CURRENTLY IN USE IN D SERIES ATLAS MISSILES, WERE EVALUATED. TWO MAJOR AREAS OF MALFUNCTION WERE ENCOUNTERED. THE POSITION INDICATOR SWITCH WAS EXTREMELY SUSCEPTIBLE TO MALFUNCTION. SPECIFICALLY, INDICATOR SWITCH MALFUNCTIONING OCCURRED AS A RESULT OF INADEQUATE QUALITY CONTROL DURING ASSEMBLY, AS A RESULT OF EXPOSURE TO EXTREME LOW TEMPERATURES IN THE -65 F RANGE, AS A RESULT OF EXPOSURE TO HIGH AMBIENT HUMIDITY CONDITIONS, AND AS A RESULT OF SHOCK LOADING. TESTING, AND SUBSEQUENT RESULTS, INDICATE THE POSITION INDICATOR SWITCHES SHOULD BE REPLACED. THE BUTTERFLY SEAL, AFTER EXPOSURE TO AN AMBIENT OF -65 F WHEN DRY, I.E., NOT WETTED WITH FUEL, ALLOWED EXCESSIVE HELIUM LEAKAGE. IF THIS CONDITION COULD OCCUR IN OPERATIONAL SERVICE, THE BUTTERFLY SEAL SHOULD BE REDESIGNED TO PRECLUDE LEAKAGE AT THIS CONDITION. A DESCRIPTION OF THE TEST PROGRAM, ALONG WITH THE TEST EQUIPMENT EMPLOYED IS INCLUDED.

269 011 0212 (TESTS OF *CUT-OFF VALVES, *BUTTERFLY VALVES IN GUIDED MISSILES, *FUEL SYSTEMS.) (GUIDED MISSILES, SURFACE TO SURFACE, FUEL SYSTEMS.)

269 016 0216 A VECTOR FORM OF COMPENSATION THEOREM AND ITS APPLICATION TO BOUNDARY-VALUE PROBLEMS.

269 016 0216 THE COMPENSATION THEOREM IS EXTENDED TO A VECTOR FORM. THE USE OF THE VECTOR FORM WOULD ENABLE ONE TO OBTAIN THE EXPRESSION FOR THE INCREMENTAL CHANGES IN THE ELECTRIC AND MAGNETIC VECTORS IN SPACE DUE TO A GIVEN SOURCE, UNDER THE CONDITION OF CHANGES IN THE ELECTRICAL CHARACTERISTICS IN A PORTION THE MEDIUM SURROUNDING THE SOURCE. IT IS WORTHWHILE TO POINT OUT THE NEED FOR DERIVING A VECTOR FORM OF THE THEOREM. THE PRESENT METHOD ENABLES ONE, IN A FIRST CASE, TO FORMULATE THE BOUNDARY VALUE PROBLEM IN TERMS OF FREDHOLM'S INTEGRAL EQUATION. THERE IS THEREFORE A POSSIBILITY OF OBTAINING APPROXIMATE SOLUTIONS OF THIS EQUATION BY USING ITERATIVE OR OTHER SYSTEMATIC SCHEMES.

269 016 0213 (*ELECTRICAL NETWORKS, *ELECTROMAGNETIC FIELDS, CONTINUOUS MEDIA, ELECTROMAGNETIC WAVES, DIELECTRICS, WAVEGUIDES, DIFFRACTION, SCATTERING, IMPEDANCE.) (*VECTOR ANALYSIS, INTEGRAL EQUATIONS.)

269 018 0217 INVESTIGATION OF INTERACTION OF INTERSTITIAL IMPURITIES WITH DEFECTS IN BCC METALS.

269 018 0217 RESEARCH WAS CONDUCTED ON THE INTERACTION OF INTERSTITIAL IMPURITIES WITH DISLOCATIONS. AN EXTENSIVE INVESTIGATION OF THE COLD-WORK INTERNAL FRICTION PEAK DUE TO N AND C IN DEFORMED ALPHA-Fe WAS MADE. SELF-ASSOCIATION OF INTERSTITIALS IN Fe WAS ALSO STUDIED. THIS INVESTIGATION WAS CONCERNED WITH THE DEPARTURE FROM RANDOMNESS OF SOLID SOLUTIONS OF N AND C IN Fe.

269 018 0214 (*METALS, *IRON, *WIRE, LATTICES, IMPURITIES, EFFECTIV
ENESS OF NITROGEN AND CARBON, ATOMS, DIFFUSION, CHEMICAL BONDS, THEORY.)
(RELAXATION TIME, FRICTION, ELASTICITY, STRESSES, ENERGY, THERMODYNAM
ICS, MEASUREMENT, TEST METHODS.) (SOLIDS, SOLUTIONS, HEAT TREATMENT, DE
FORMATION.) -

269 029 0218 DEVELOPMENT AND MANUFACTURE OF SPECIAL CALIBER .30
ELECTRIC PRIMERS.

269 029 0218 A NEW FIXTURE FOR HOLDING AND FIRING THE SWITCH WAS
MADE. PRIMERS WITH APPROXIMATELY 0.27 GRAINS OF XP-407 MIXTURE WERE
PRODUCED AND TESTED IN T2 SWITCHES WITH THE NEW FIXTURE. THERE WERE
NO FAILURES TO BREAK THE SWITCH FOIL AND NO DISRUPTION OF PARTS OF THE
SWITCH AND ELECTRODE ASSEMBLIES. AS A RESULT OF THESE TESTS, A 30HOLE
LABORATORY CHARGER PLATE WAS FABRICATED FOR CHARGING LARGER QUANTITIES
OF PRIMERS AT APPROXIMATELY 0.27 GRAINS FOR RELIABILITY TESTS IN T2
SWITCHES.

269 029 0215 (*ELECTRIC PRIMERS, ELECTRODES, SWITCHES, PRIMERS, MIXT
URES, CONDUCTIVITY, RELIABILITY, TESTS, TEST EQUIPMENT.) EXPLOSIVE ACTU
ATORS. -

269 030 0219 SM 65. AIRBORNE POWER SUPPLY SYSTEM TEST 9FACTORYO
TEST PROCEDURE,

269 030 0219 THE PROCEDURE FOR TESTING THE AIRBORNE POWER SUPPLY
(APS) USING DECK 9-702 IN THE AUTOMATIC PROGRAMMED CHECKOUT EQUIPMENT
(APCHE) IS DESCRIBED. DECK 9-702 PERFORMS A TEST TO DETERMINE THE
OPERATIONAL READINESS OF THE APS. THE APS INVERTER IS STARTED ON
GROUND POWER WITH NO LOAD AND ITS VOLTAGE AND FREQUENCY ARE CHECKED.
THE INVERTER INPUT IS THEN TRANSFERRED TO INTERNAL (SIMULATED BATTERY)
POWER, AND ITS OUTPUT IS TRANSFERRED TO THE MISSILE LOADS. THE VOLTAGE
AND FREQUENCY OF THE INVERTER OUTPUT ARE AGAIN MEASURED.

269 030 0216 (*GUIDED MISSILES, SURFACE TO SURFACE, ELECTRICAL EQUIP
MENT, ELECTRONIC EQUIPMENT.) (AIRBORNE, *POWER SUPPLIES, AUTOMATIC, TES
T METHODS, *TEST SETS.) -

269 033 0220 RESEARCH ON BINDER TECHNIQUES FOR HIGH TEMPERATURE
RADOME STRUCTURES.

269 033 0220 MICROWAVE ELECTRICAL DATA ON HIGH TEMPERATURE RADOME
MATERIALS, MICA LAMINATE AND SILICA FIBER-REINFORCED ALUMINUM PHOSPHATE
ARE DISCUSSED. PRELIMINARY DATA HAS BEEN GATHERED ABOUT SILICA
FIBER-REINFORCED ALUMINUM PHOSPHATE LAMINATES CONTAINING GLASS
MICROSPHERES. BOTH MATERIALS HAVE DIELECTRIC CHARACTERISTICS SUITABLE
FOR 1000 F RADOME APPLICATIONS. USE OF INORGANIC GLASS MICROSPHERES AS
FILLER FOR ALUMINUM PHOSPHATE BINDERS RESULTS IN LOWER PROCESSING
VISCOSITY, AND THE MICROSPHERE FILLER ALLOWS ABOUT HALF THE WATER TO BE
REMOVED FROM THE FORMULATIONS WITHOUT CAUSING HIGH VISCOSITY OR
PREMATURE GELLING. NO IMPROVEMENT IN ELECTRICAL CHARACTERISTICS WAS
NOTED. ONE FORMULATION PRESENTED GREATER LAMINATE FLEXURAL STRENGTH.
LONG-TERM AGING PROBLEMS EXIST IN THE SILICA FIBER-ALUMINUM PHOSPHATE
LAMINATE SYSTEM. THE LAMINATES LOSE AS MUCH AS ONE-HALF OF THEIR 1000
FLEXURAL STRENGTH AFTER EXPOSURE FOR 100 HOURS AT 1000 F. EVEN MORE
DRASTIC LOSS IN STRENGTH OCCURS BETWEEN INITIAL ROOM TEMPERATURE
STRENGTH AND ROOM TEMPERATURE STRENGTH AFTER EXPOSURE TO ELEVATED
TEMPERATURES. THE MICA LAMINATE (XS-1342) DOES NOT EXHIBIT THIS LOSS
AT 800 F.

269 033 0217 (*RADOMES, MATERIALS, REINFORC-ING MATERIALS, CERAMIC MATERIALS, CERAMIC FIBERS, ASBESTOS FIBERS, MICA, ALUMINUM COM-POUNDS, PHOSPHATES, SILICON COMPOUNDS, DIOXIDES, GLASS, SPHERES, *LAMINATES, *BINDERS, FILAMENT WOUND CONSTRUCTION.) (HIGH TEMPERATURE RE-SEARCH, DIELECTRIC PROPERTIES, MECHANICAL PROPERTIES, VISCOSITY, MANUFACTURING METHODS, AGING.) POROUS MATERIALS. -

269 034 0221 RESEARCH AND DEVELOPMENT ON THERMOCOUPLE ENERGY CONVERTERS 9PHASE IIO.

269 034 0221 EFFORTS ARE BEING MADE TO DEVELOP TECHNIQUES FOR FABRICATING, IN QUANTITY, GOOD QUALITY N- AND P-TYPE THERMOELECTRIC LEAD TELLURIDE CELLS AND TO ASSEMBLE THESE CELLS TO FORM 2 THERMOELECTRIC DEVICES WHICH WILL MEET THE FOLLOWING REQUIREMENTS (A) EACH OF THE 2 THERMOCOUPLE ENERGY CONVERTERS WILL CONSIST OF 9 COUPLES AND WILL HAVE AN OUTPUT OF 7.5 WATTS/CUBIC INCH OR BETTER AT A MINIMUM LOAD CURRENT OF 20 AMP WHEN A TEMPERATURE GRADIENT OF AT MOST 600 K/CM EXISTS ACROSS THE THERMOELECTRIC MATERIAL (B) THE CONVERTERS WILL BE CAPABLE OF OPERATION WITH THE HOT SIDE OF THE THERMOELECTRIC MATERIAL NEAR ITS MELTING POINT (917 C) AND THE PERFORMANCE INDICATED SHOULD BE ATTAINABLE AT A HOT SIDE TEMPERATURE OF AT LEAST 1000 K AND (C) THE DEVICES SHOULD BE OPERABLE FOR A MINIMUM OF ONE HOUR. CURRENT EFFORT HAS RESULTED IN PERFECTING THE CASTING TECHNIQUE SO THAT N- AND P-TYPE CELLS CAN BE MANUFACTURED IN QUANTITY. ALSO, THE DESIGN AND FABRICATION OF THE COMPLETE CELL ASSEMBLY INCLUDING A HERMETIC SEAL AT THE COLD JUNCTION SIDE, HAVING A MAXIMUM TEMPERATURE CAPABILITY OF 780 C, WAS REALIZED. (AUTHOR) AD-269 0349N6

269 034 0218 (*THERMOCOUPLES, *THERMOELEC-TRICITY, *POWER SUPPLIES, LEAD COMPOUNDS, TELLURIDES, MANUFACTURING METHODS, DESIGN.) (GENERATORS, SEALS, MATERIALS.) -

269 035 0222 A NUMERICAL METHOD FOR COMPUTING RADIATIVE TEMPERATURE CHANGES NEAR THE EARTH'S SURFACE,

269 035 0222 A METHOD OF COMPUTING THE TEMPERATURE CHANGES DUE TO INFRARED RADIATION FLUX DIVERGENCE IS PRESENTED. THE METHOD IS BASED UPON A TABULAR SCHEME DEVELOPED BY D. L. BROOKS (J. METEOR. 7313-321, 1950). APPLICATION OF THE METHOD TO ACTUAL DATA SHOWS THAT THE RADIATIVE TEMPERATURE CHANGES CAN EXCEED THE OBSERVED TEMPERATURE CHANGES AT NIGHT. THE RADIATIVE TEMPERATURE CHANGES DECREASE WITH ELEVATION AND BECOME 1 - 2 DEGREES PER DAY AT ABOUT 100 METERS. SEVERAL APPLICATIONS OF THE METHOD IN BOUNDARY LAYER STUDIES ARE ALSO INDICATED.

269 035 0219 (NUMERICAL ANALYSIS, *INFRARED RADIATION, EARTH, SURFACE PROPERTIES.) (TEMPERATURE, ATMOSPHERE, *CLIMATE, WATER VAPOR, SPECIFIC HEAT, AIR, DENSITY, FOG.) (DIGITAL COMPUTERS, PROGRAMMING, PARTIAL DIFFERENTIAL EQUATIONS.) -

269 037 0223 RESEARCH AND DEVELOPMENT STUDY ON STRESS-STRAIN CHARACTERISTICS OF SHELLS AND HIGH EXPLOSIVES.

269 037 0223 A COMPLETE EXPERIMENTAL AND THEORETICAL ELASTIC ANALYSIS HAS BEEN MADE OF THE FLAT BASE SHELL AND A PROCEDURE FOR PROGRAMMING THE ANALYSIS ON A DIGITAL COMPUTER HAS BEEN PROVIDED. EXCELLENT PROGRESS WAS MADE ON THREE PRINCIPAL REMAINING PROBLEMS, NAMELY THE BEHAVIOR OF FILLER MATERIALS, THE INTERACTION BETWEEN FILLER AND SHELL, AND YIELDING OF THE SHELL IN THE VICINITY OF THE ROTATING BAND.

269 037 0220 (*PROJECTILES, DESIGN, ROTATING BANDS, EXPLOSIVES, *STRESSES, DEFORMATION, ELASTICITY, PLASTICITY.) -

269 040 0224 INSTRUMENTATION FOR THE DETERMINATION OF THE COMPOSITION OF THE UPPER ATMOSPHERE.

269 040 0224 THE ROCKET-BORNE HELIUM MASS SPECTROMETER TESTING WAS BEGUN TO FIND THE OPTIMUM OPERATING CHARACTERISTICS OF THE SYSTEM. THE MAIN EMPHASIS IN THE SURVEY OF LITERATURE DEALING WITH HELIUM IN THE ATMOSPHERE WAS FOCUSED ON PAPERS FROM THE USSR. HELIUM PARTIAL PRESSURE PROFILES WERE CALCULATED FOR DIFFERENT ASSUMPTIONS ABOUT THE HEIGHT OF THE MICTOPAUSE. THE ATOMIC SPECIES CALIBRATION SYSTEM WAS TESTED IN THE LABORATORY AND MODIFICATIONS BASED ON THESE OPERATIONS HAVE BEEN INITIATED IN ORDER TO PRODUCE A BETTER OVER-ALL SYSTEM. THE ORIGINAL OF THE GCA COLD CATHODE IONIZATION GAUGE WAS OPERATED IN THE LABORATORY AND A NEW, ALL FUSION WELDED, METALCERAMIC GAUGE WAS DESIGNED AND ASSEMBLED FOR TESTING. THE VACUUM GAUGE CALIBRATION SYSTEM WAS USED TO CALIBRATE IONIZATION GAUGES AS A SECONDARY PRESSURE STANDARD. A REVISION OF THE 1959 ARDC STANDARD ATMOSPHERE WAS ISSUED DURING THE PAST PERIOD BY COESA. THIS REVISION WAS A RESULT OF AN INTENSIVE SURVEY OF RECENT ATMOSPHERIC RESEARCH LITERATURE THE BASIS FOR THIS REVISION IS DISCUSSED.

269 040 0221 (*GEOPHYSICS, SOUNDING ROCKETS, MASS SPECTROMETERS, INSTRUMENTATION, DESIGN, TESTS FOR *MASS SPECTROSCOPY OF OXYGEN, HELIUM IN ATMOSPHERE, *UPPER ATMOSPHERE, SPECTROGRAPHIC ANALYSIS.) (IONIZATION GAUGES, PRESSURE GAUGES, MANOMETERS, CALIBRATION, TESTS.) (ATMOSPHERE MODEL S, ANALYSIS.) -

269 043 0225 A PILOT STUDY OF TEMPORARY THRESHOLD SHIFTS RESULTING FROM EXPOSURE TO HIGH-INTENSITY IMPULSE NOISE,

269 043 0225 THIS INVESTIGATION WAS A PILOT STUDY TO DETERMINE THE TEMPORARY THRESHOLD SHIFTS RESULTING FROM EXPOSURE TO HIGH-INTENSITY IMPULSE NOISE. THE THRESHOLD SHIFTS INDUCED WERE OF A TEMPORARY NATURE, I.E., THERE WERE NO INSTANCES OF PERMANENT HEARING LOSSES ALONG ANY OF THE EXPERIMENTAL SUBJECTS. THE PURPOSE WAS TO EXPLORE VARIOUS PHYSICAL PARAMETERS OF A SOUND SOURCE AND RELATE THEM TO ANY DECREMENTS THEY MAY HAVE ON AUDITORY ACUITY. THIRTY ENLISTED MEN RECEIVED AUDIOMETRIC TESTS BOTH BEFORE AND AFTER EXPOSURE TO A HIGH-INTENSITY IMPULSE NOISE GENERATED BY AN M-14 RIFLE. RATE AND NUMBER OF IMPULSES WERE VARIED SEPARATELY AND EXAMINED AT THREE TEST FREQUENCIES. DUE TO INTER-SUBJECT DIFFERENCES, ONLY GENERAL IMPLICATIONS ARE INDICATED. RECOMMENDATIONS ARE INCLUDED FOR FUTURE RESEARCH.

269 043 0222 (*NOISE, AUDITORY SIGNALS, HEARING, *AUDITORY THRESHOLDS, AUDITORY ACUITY, SENSITIVITY, HAZARDS.) (MILITARY PERSONNEL, *HUMAN ENGINEERING.) (ORDNANCE, WEAPONS.) -

269 047 0226 PRODUCTION ENGINEERING MEASURES FOR QUARTZ CRYSTAL FILTER UNITS AT 15MC, 20MC, 20.55MC, 25MC, 30MC.

269 047 0226 CRYSTAL FILTERS AT 15, 20, 20.55, 25 AND 30 MC WILL BE FABRICATED FROM NATURAL AND CULTURED QUARTZ, ANTICIPATING THE POSSIBLE SHORTAGE OF NATURAL QUARTZ DURING A NATIONAL EMERGENCY. MASS PRODUCTION TECHNIQUES AND FACILITIES WILL BE DEFINED WHICH WILL MAKE IT POSSIBLE TO REDUCE THE TIME REQUIRED FOR DELIVERY OF PRODUCTION QUANTITIES DURING AN EMERGENCY. THE BASIC DESIGN CONCEPT TO BE USED ON ALL CRYSTAL FILTER UNITS WAS ESTABLISHED AND DETAILED DESIGN WORK WAS INITIATED.

269 047 0223 (*QUARTZ CRYSTALS, *CRYSTAL FILTERS, CRYSTALS, HIGH FREQUENCY, RADIO-FREQUENCY FILTERS, QUARTZ RESONATORS, DESIGN, *PRODUCTION, *MANUFACTURING METHODS, TESTS.) -

269 050 0227 ELECTROCHEMISTRY OF FUSED SALTS.

269 050 0227 A LIST OF TITLES TECHNICAL REPORTS AND PUBLICATIONS ARISING FROM RESEARCH UNDER THIS CONTRACT IS PRESENTED. PRELIMINARY RESULTS ARE GIVEN OF AN INVESTIGATION OF THE H-HYDRIDE ION ELECTRODE IN MOLTEN LiCl-KCl EUTECTIC AT 450 C. THE INITIAL ATTEMPTS AT MEASUREMENT OF THE POTENTIAL OF THE H-HYDRIDE ION ELECTRODE WERE UNSUCCESSFUL BECAUSE OF THE CHEMICAL INSTABILITY OF HYDRIDE IN THE PRESENCE OF AVAILABLE CONTAINER MATERIALS.

269 050 0224 (*ELECTROCHEMISTRY, *LIQUID METALS, *SALTS, METALLIC COMPOUNDS, HALIDES, ELECTRIC POTENTIAL, MEASUREMENT.) (HYDROGEN, HYDRIDES, IONS, ELECTRODES IN *LITHIUM COMPOUNDS, *POTASSIUM COMPOUNDS, *CHLORIDES, EUTECTICS.) HIGH TEMPERATURE RESEARCH, LABORATORY FURNACES. -

269 052 0228 PROTEIN AND AMINO ACID NUTRITION OF MAN IN HEALTH AND DISEASE.

269 052 0228

269 052 0225 (*NUTRITION, *PROTEINS, *AMINO ACIDS, HORMONES, CHOLESTEROL.) -

269 053 0229 AUTOMATIC DATA PROCESSING SYSTEM MINIMAL INFORMER.

269 053 0229 PROGRESS IS REPORTED ON THE DESIGN EVALUATION AND TESTING IN EACH OF THE AREAS OF THE MINIMAL INFORMER SYSTEM. FURTHER DETAILS ARE AVAILABLE IN THE PRELIMINARY DESIGN PLAN AND THE ADDENDUM FOR THE DC/R EQUIPMENT, THE FINAL DESIGN PLAN, AND THE MAINTENANCE AND OPERATIONAL MANUALS OF THE MINIMAL INFORMER SYSTEM.

269 053 0226 (*DATA PROCESSING SYSTEMS, DATA STORAGE SYSTEMS, MAGNETIC TAPE, AUTOMATIC, DESIGN, TEST EQUIPMENT, TESTS.) -

269 056 0230 FIBERGLASS MOTOR CASE STUDY. POLARIS SECOND STAGE END CLOSURE.

269 056 0230 INVESTIGATIONS WERE MADE TO PREPARE HARDWARE AND DETERMINE DEFLECTION AND STRESS CHARACTERISTICS ON THE SCALE MODEL POLARIS ROCKET CASE CONFIGURATION. THE FABRICATION IS DESCRIBED OF THE HYDROSTATIC TEST RIG FOR THE 1/4 SCALE POLARIS CASE. FABRICATION AND TESTING OF THE INITIAL 1/4 SCALE MODEL POLARIS CASE IS ALSO DESCRIBED. THE CASE WAS CHECKED AT 40 PSIG AND THEN BROUGHT UP TO THE PROOF PRESSURE OF 390 PSIG AT A RATE OF 150 PSIG PER MINUTE AND REMAINED AT THIS PRESSURE FOR ONE MINUTE. THE PRESSURE WAS THEN REDUCED TO 50 PSIG TO PERMIT REMOVAL OF SEVERAL DIAL INDICATORS WHICH WOULD BE DAMAGED DURING THE SUBSEQUENT BURST TEST. THE CASE WAS THEN REPRESSURIZED AT APPROXIMATELY 42 PSIG PER SECOND UNTIL BURST OCCURRED AT 590 PSIG. THE

FAILURE OCCURRED AT THE DOME SKIRT JUNCTURE AND EXTENDED ABOUT 220 DEGREES AROUND THE CIRCUMFERENCE. PRELIMINARY CALCULATIONS SHOW THE COMPOSITE HOOP WALL STRESS IN THE CYLINDER (BASED ON WALL THICKNESS) AT FAILURE WAS 127,000 PSI YIELDING A HOOP AND LONGITUDINAL GLASS LOADING OF 6.3 LB/END AND 6/18 LB/END, RESPECTIVELY.

269 056 0227 (*GUIDED MISSILES, UNDERWATER TO SURFACE, ROCKET MOTORS, *ROCKET CASES, GLASS TEXTILES, FILAMENT WOUND CONSTRUCTION, HYDROSTATIC PRESSURE, STRESSES, TESTS, MODEL TESTS.) -

269 057 0231 ON COMPUTING MINIMA BY THE PENALTY FUNCTION APPROACH,

269 057 0231 NO ABSTRACT AVAILABLE

269 057 0228 (*CALCULUS OF VARIATIONS, DIGITAL COMPUTERS, PROGRAMMING, DATA STORAGE SYSTEMS, PARTIAL DIFFERENTIAL EQUATIONS, NUMERICAL ANALYSIS.) -

269 058 0232 STUDY OF THE WELDED ROTATING BAND FOR 20MM AIRCRAFT AMMUNITION,

269 058 0232 A STUDY WAS CONDUCTED TO DETERMINE CAUSES FOR THE LOW BARREL LIFE WITH OVERLAY WELDED ROTATING BANDS ON 60/20MM AIRCRAFT AMMUNITION. EXTENSIVE METALLURGICAL DATA WERE COMPILED ON ALL TEST ITEMS TO AID IN THE EVALUATION OF TEST RESULTS, AND TO ASSURE RECOGNITION OF PERTINENT WELDED BAND PARAMETERS. TEST RESULTS CONFIRMED EXISTING PRINCIPLES THAT FRINGING CAN BE ALLEVIATED OR ELIMINATED BY THE DESIGN OF THE BAND ITSELF AND THAT THE IRON CONTENT OF THE BAND IS AFFECTED BY TEMPERATURE OF APPLICATION AND HAS NO APPRECIABLE EFFECT ON BARREL LIFE.

269 058 0229 (*AIRCRAFT AMMUNITION, HIGH EXPLOSIVE AMMUNITION, INCENDIARY AMMUNITION, PROJECTILES, *ROTATING BANDS, WELDS, DESIGN, TESTS, METALLURGICAL ANALYSIS.) (AIRCRAFT GUNS, AUTOMATIC WEAPONS, GUN BARRELS, ERO-SIGN.) SWITZERLAND. -

269 064 0233 THEORETICAL AND EXPERIMENTAL INVESTIGATION OF LARGE-SIGNAL TRAVELING-WAVE TUBES.

269 064 0233 A GENERAL 2-DIMENSIONAL NONLINEAR INTERACTION THEORY IS DEVELOPED FOR TRAVELING-WAVE TUBES AND SPECIALIZED TO INCLUDE KLYSTRONS. THE EQUATIONS ARE DEVELOPED USING A LAGRANGIAN ANALYSIS AND THE SPACE-CHARGE FIELDS ARE FOUND BY 2-DIMENSIONAL GREEN'S FUNCTION TECHNIQUES. EXPERIMENTAL DATA ARE GIVEN ON A UHF CRESTATRON DESIGNED TO OPERATE OVER THE FREQUENCY RANGE FROM 300 TO 900 MC. BOTH COLD-TEST AND HOT-TEST MEASUREMENTS ARE GIVEN ON TUBE NO. 4 OPERATING UNDER PULSED CONDITIONS. THE DESIGN OF A MICROPERVEANCE-ONE AXIALLY SYMMETRIC ELECTRON GUN WITH THE POISSON CELL IS OUTLINED AND DETAILED INFORMATION ON THE SPACE-CHARGE DENSITY DISTRIBUTION AND POTENTIAL GRADIENT AT THE CATHODE ARE GIVEN.

269 064 0230 (*TRAVELING WAVE TUBES, *KLYSTRONS, *MICROWAVE AMPLIFIERS, ULTRA HIGH FREQUENCY, HELIXES, S BAND, THEORY.) (AMPLIFIERS, ELECTRON TUBES, *ELECTRON GUNS, CATHODES (ELECTRON TUBES), SPACE CHARGES, DENSITY, DISTRIBUTION, GREEN'S FUNCTION, MATHEMATICAL ANALYSIS.) (ELECTRON BEAMS, PLASMA PHYSICS, GAS IONIZATION, ELECTRIC FIELDS.) -

269 067 0234 RESEARCHES ON HYDROGEN OVERVOLTAGE ON METALLIC SINGLE CRYSTALS BISMUTH.

269 067 0234 HYDROGEN OVERVOLTAGE ON BI POLYCRYSTALLINE AND SINGLE CRYSTAL CATHODES, ORIENTED FOLLOWING THE (100), (110) AND (111) PLANES, WAS INVESTIGATED IN HClO₄ SOLUTIONS IN A CURRENT DENSITY RANGE TO 100 AMP/SQ M AT 25 AND 55 C. THE TAFEL LAW HOLDS TRUE AT HIGH CURRENT DENSITY VALUES THE PARAMETERS BEING DIFFERENT FOR THE DIFFERENT ELECTRODES. IN THE LOWER CURRENT DENSITY RANGE, THE BEHAVIOR, AS REVEALED BY OSCILLOGRAPHIC RECORDINGS, IS ANOMALOUS AND DIFFERENT FROM THAT OBSERVED WITH OTHER METALS.

269 067 0231 (ELECTROCHEMISTRY, HYDROGEN, VOLTAGE ON *BISMUTH, CRYSTALS, *SINGLE CRYSTALS, METALLIC CRYSTALS, ELECTRODES IN PERCHLORIC ACID, SOLUTIONS, MEASUREMENT, OSCILLOGRAMS.) -

269 068 0235 A FACTOR ANALYSIS OF PERSONNEL SELECTION DATA INTRA- AND INTER-AREA RELATIONSHIPS OF BIOCHEMICAL, PHYSIOLOGICAL, PSYCHOLOGICAL, AND ANTHROPOMETRIC MEASURES,

269 068 0235 TESTS USED IN ROUTINE SCREENING, TOGETHER WITH SPECIAL ADDITIONAL MEASURES, WERE ADMINISTERED TO 120 RANDOMLY SELECTED ENLISTED SUBMARINE CANDIDATES UNDER CAREFULLY CONTROLLED CONDITIONS. THE 362 VARIABLES INCLUDED DATA FROM THE BIOCAL, ANTHROPOMETRICAL, AND PHYSICAL EXAMINATION FIELDS. DATA FOR THE VARIOUS AREA STUDIES ARE APPENDED IN SUFFICIENT DETAIL TO PERMIT ADDITIONAL INVESTIGATIONS BY INTERESTED SPECIALISTS. THESE INCLUDE MATERIAL ON THE BIOCHEMISTRY OF NERVOUS STABILITY CO-RELATIONAL RELATIONSHIPS OF THE VARIOUS WHITE BLOOD CELLS IN HEALTHY MALE ADULTS PHYSICAL FITNESS, ANTHROPOMETRIC AND SOMATOTYPING MEASURES TWO INDEPENDENT SCORINGS OF THE RORSCHACH INK-BLOT TEST PERSONAL INTERVIEWS GIVEN EACH SUBJECT SEPARATELY BY TWO INTERVIEWERS, AND SEVERAL PSYCHOLOGICAL TESTS EMPLOYED IN SELECTION.

269 068 0232 (*NAVAL PERSONNEL, *MILITARY PERSONNEL, *SELECTION, TESTS.) (*FACTOR ANALYSIS, BIOCHEMISTRY, PHYSIOLOGY, PHYSICAL FITNESS, PSYCHOLOGY, ANTHROPOMETRY, DATA.) -

269 071 0236 SOME PROPERTIES OF GENERALIZED AXIALLY SYMMETRIC POTENTIALS,

269 071 0236 SOME PROPERTIES OF THE FUNCTIONS OF GENERALIZED AXIALLY SYMMETRIC POTENTIAL THEORY (GASPT) ARE INVESTIGATED BY THE SONINE-BERGMAN OPERATOR. GASPT FUNCTION ELEMENTS ARE CONSIDERED IN THE CASE OF ENTIRE AND MEROMORPHIC ASSOCIATES. THEOREMS CONCERNING INEQUALITIES AND LOCATION OF SINGULARITIES ARE OBTAINED.

269 071 0233 (OPERATORS (MATHEMATICS), COMPLEX VARIABLES, TRANSFORMATIONS (MATHEMATICS), *PARTIAL DIFFERENTIAL EQUATIONS, POTENTIAL THEORY, POLYNOMIALS.) -

269 079 0237 MINIATURE THIN-FILM INDUCTORS.

269 079 0237 RESEARCH WAS CONTINUED ON THE DEVELOPMENT OF A METHOD FOR FABRICATING MINIATURE INDUCTORS EMPLOYING THIN-FILM SPIRAL CONDUCTORS ON FERRITE SUBSTRATES. STUDIES AND EVALUATIONS ARE PRESENTED OF VARIOUS FERRITE SUBSTRATES, THE FABRICATION OF CONDUCTING SPIRAL PATTERNS, AND MEASUREMENT OF THE INDUCTANCES AND Q VALUES OBTAINED AT ONE MEGACYCLE PER SECOND. THE CHOICE OF FERRITE MATERIALS IS DISCUSSED ALONG WITH TECHNIQUES FOR OBTAINING LARGE-VALUE INDUCTANCES.

269 079 0234 (*COILS, *RADIOFREQUENCY COILS, *MINIATURE ELECTRONIC EQUIPMENT, FERROMAGNETIC MATERIALS, FERRITES, THIN FILMS, NICKEL ALLOYS, ZINC ALLOYS, COBALT ALLOYS, ELECTROPLATING, PROCESSING, *MANUFACTURING METHODS, PRODUCTION, DESIGN.) (COILS, INDUCTANCE, MEASUREMENT.) -

269 081 0238 THERMODYNAMIC PROPERTIES OF POLYETHYLENE,

269 081 0238 THE LACK OF FUNDAMENTAL DATA ON THE PROPERTIES OF POLYETHYLENE PROMPTED A STUDY OF THE AVAILABLE THERMODYNAMIC PARAMETERS OF THIS MATERIAL. FROM PUBLISHED DATA THE ENTROPY, ENTHALPY, AND GIBBS FREE ENERGY VALUES OF CONVENTIONAL HIGH PRESSURE POLYETHYLENE WERE CALCULATED OVER THE RANGE 0 TO 315 K. THE USE OF A LINEAR TARASSOV FUNCTION TO ESTIMATE THE SPECIFIC HEAT OF POLYETHYLENE IS DISCUSSED. THE THERMODYNAMIC FUNCTION, CP/T VERSUS T , HAS BEEN CALCULATED AND EXHIBITS AN INCREASE AT 60 K. AN APPROXIMATION IS MADE OF THE NUMBER OF VIBRATING UNITS PER REPEATING UNIT AT 273 K. $CP-CV$ IS CALCULATED AT 273 K AND FOUND TO BE 0.082 CAL/DEG GM.

269 081 0235 (*POLYMERS, *ETHYLENES, *THERMO-DYNAMICS, SPECIFIC HEAT, ENTROPY, ENTHALPY, TRANSITION TEMPERATURE, THEORY.) -

269 082 0239 TABLES OF INTERFERENCE FACTORS FOR USE IN WIND-TUNNEL AND GROUND-EFFECT CALCULATIONS FOR VTOL-STOL AIRCRAFT. PART I - WIND TUNNELS HAVING WIDTH-HEIGHT RATIO OF 2.0,

269 082 0239 TABLES OF INTERFERENCE FACTORS FOR USE IN WIND-TUNNEL AND GROUND-EFFECT CALCULATIONS FOR VTOL-STOL AIRCRAFT ARE PRESENTED FOR WIND TUNNELS HAVING A WIDTH-HEIGHT RATIO OF 2.0. THESE TABLES WERE MACHINE-CALCULATED AND ARE INTENDED FOR USE WITH THE PROCEDURES OF NASA TECHNICAL REPORT R-124. THESE TABLES ARE PRESENTED WITHOUT COMMENT.

269 082 0236 (*VERTICAL TAKE-OFF PLANES, *SHORT TAKE-OFF PLANES, WIND TUNNEL MODELS, *WIND TUNNELS, CONFIGURATION, GROUND EFFECT, INTERFERENCE, AERODYNAMICS, MATHEMATICAL ANALYSIS, TABLES.) -

269 087 0240 ERROR PROBABILITY OF CASCADED BINARY COMMUNICATION LINKS PERTURBED BY ADDITIVE GAUSSIAN NOISE AND RAYLEIGH FADING,

269 087 0240 THE PERFORMANCE OF CASCADED BINARY COMMUNICATION LINKS IN THE PRESENCE OF ADDITIVE WHITE GAUSSIAN NOISE IS INVESTIGATED FOR THE CASES OF CONSTANT AND RAYLEIGH DISTRIBUTED SIGNAL LEVELS. AN EXACT EXPRESSION IS DERIVED FOR OVER-ALL ERROR PROBABILITY FOR ANY NUMBER OF LINKS WITH CONSTANT SIGNAL LEVELS. WITH RAYLEIGH FADING, THE CASES OF INDEPENDENT AND COMPLETELY CORRELATED FADING ARE CONSIDERED. AN EXACT EXPRESSION IS DERIVED FOR AVERAGE OVER-ALL ERROR PROBABILITY FOR ANY NUMBER OF LINKS WITH INDEPENDENT RAYLEIGH FADING AND IDENTICAL AVERAGE SIGNAL-TO-NOISE RATIOS IN EACH LINK. A SIMPLE APPROXIMATION TO THIS EXPRESSION IS PRESENTED FOR HIGH AVERAGE S/N . ALTHOUGH THE CASE OF COMPLETELY CORRELATED FADING DOES NOT YIELD A GENERAL SOLUTION IN TERMS OF THE NUMBER OF CASCADED LINKS, EXACT SOLUTIONS FOR AVERAGE OVER-ALL ERROR PROBABILITY FOR 2 AND 3 LINKS ARE DETERMINED.

269 087 0237 (*COMMUNICATIONS THEORY, RADIO SIGNALS, *RADIO TRANSMISSION, SIGNAL-TO-NOISE RATIO, ATTENUATION, ABSORPTION, ERRORS.) (RADIO COMMUNICATION SYSTEMS, RADIO RELAY SYSTEMS, DIGITAL SYSTEMS, DATA TRANSMISSION SYSTEMS.) (SATELLITE VEHICLES, COMMUNICATION SYSTEMS, VERY HIGH FREQUENCY, ULTRA HIGH FREQUENCY.) -

269 089 0241 PHOTODEGRADATION OF HIGH POLYMERS. PART III -
PHOTOLYSIS OF POLY9METHYL METHACRYLATEO IN VACUUM AND IN AIR.

269 089 0241 THE PHOTODEGRADATION OF POLY(METHYL METHACRYLATE)
FILMS IN VACUUM AND IN AIR BY UV RADIATION FROM A MEDIUM-PRESSURE
MERCURY LAMP HAS BEEN INVESTIGATED AT ROOM TEMPERATURE. CHANGES IN
WEIGHT IN TERMS OF INTRINSIC VISCOSITIES, THE FORMATION OF VOLATILE
SUBSTANCES, AND THE INCREASE IN THE UV ABSORPTION OF THE FILMS WERE
FOLLOWED AS A FUNCTION OF ENERGY ABSORBED. QUANTUM YIELDS FOR RANDOM
CHAIN SCISSION IN POLY(METHYL METHACRYLATE) ARE ABOUT 0.04 AND 0.02 IN
VACUUM AND IN AIR, RESPECTIVELY. QUANTUM YIELDS IN VACUUM ARE THE
SAME AT 2 AND 0.02 MICRONS PRESSURE. THE QUANTUM YIELD FOR METHYL
FORMATE IS APPROXIMATELY THAT FOR CHAIN SCISSION THE FORMATE IS
ACCOMPANIED BY LARGER AMOUNTS OF METHANOL AND VERY SMALL QUANTITIES OF
MONOMER. INCREASED UV ABSORPTION OCCURS AFTER EXTENSIVE DEGRADATION IN
EITHER AIR OR VACUUM AND IS DUE TO CHROMOPHORES FORMED IN THE POLYMER
RATHER THAN IN LOW MOLECULAR WEIGHT FRAGMENTS.

269 089 0238 (*POLYMERS, *METHYL RADICALS, *ACRYLIC RESINS, THIN FIL
MS, *ORGANIC COATINGS, DECOMPOSITION BY *PHOTOLYSIS, VACUUM SYSTEMS, AI
R, ULTRAVIOLET RADIATION, STABILITY, SOLU-TIONS, VISCOSITY, MOLECULAR WE
IGHT.) (SOLAR ENERGY, SIMULATION.) -

269 090 0242 THE CHARACTERISTICS OF ELECTRIC SPARK DISCHARGES IN
MIXTURES OF HIGH-EXPLOSIVE AND ALUMINUM POWDERS,

269 090 0242 A METHOD IS DESCRIBED FOR OBTAINING THE AVERAGE
RESISTANCE OF A SPARK DISCHARGING THROUGH A GRANULAR CONDUCTIVE MIX IN
A NON-OSCILLATING DISCHARGE SYSTEM. THE SPARK RESISTANCE IS A LINEAR
FUNCTION OF THE SPARK GAP WIDTH FOR A GIVEN ELECTRODE ARRANGEMENT. THE
RESISTANCE IS RELATIVELY INDEPENDENT OF THE DENSITY OF THE MIX OVER THE
RANGE 0.7 TO 0.9 OHM.

269 090 0239 (*EXPLOSIVES, *ALUMINIZED EXPLOSIVES, ALUMINUM, POWDER
METALS, RDX, CARBOHYDRATES, *SPARKS, *ELECTRIC DISCHARGES.) (SPARKS, ELE
CTRIC DISCHARGES, CIRCUITS, TESTS, RESISTANCE, MEASUREMENT.) (EXPLOSIVE
S, DETONATION.) -

269 091 0243 TABLES OF INTERFERENCE FACTORS FOR USE IN WINDTUNNEL
AND GROUND-EFFECT CALCULATIONS FOR VTOLSTOL AIRCRAFT. PART II - WIND
TUNNELS HAVING WIDTH-HEIGHT RATIO OF 1.5,

269 091 0243 TABLES OF INTERFERENCE FACTORS FOR USE IN WINDTUNNEL
AND GROUND-EFFECT CALCULATIONS FOR VTOLSTOL AIRCRAFT ARE PRESENTED FOR
WIND TUNNELS HAVING A WIDTH-HEIGHT RATIO OF 1.5. THESE TABLES WERE
MACHINE-CALCULATED AND ARE INTENDED FOR USE WITH THE PROCEDURES OF NASA
TECHNICAL REPORT R-124. THESE TABLES ARE PRESENTED WITHOUT COMMENT.

269 091 0240 (*VERTICAL TAKE-OFF PLANES, *SHORT TAKE-OFF PLANES, WIN
D TUNNEL MODELS, *WIND TUNNELS, CONFIGURATION, GROUND EFFECT, INTERFEREN
CE, AERODYNAMICS, MATHEMATICAL ANALYSIS, TABLES.) -

269 092 0244 POLYSTATION DOPPLER TRACKING.

269 092 0244 THE MATHEMATICS FOR POLYDOP IS PRESENTED. THE
DEVELOPMENT STARTS WITH THE DERIVATION OF THE BASIC MATHEMATICAL
RELATIONS. THE CONDITIONS NECESSARY FOR THE EXISTENCE OF A UNIQUE
SOLUTION TO THESE EQUATIONS ARE DISCUSSED, AND THE SOLUTIONS TO A
NUMBER OF POLYDOP SYSTEM EQUATIONS ARE PRESENTED. THE PROBLEMS THAT
APPEAR WHEN MORE THAN ONE VEHICLE IS IN THE REGION OF OBSERVATION OF

THE SYSTEM AT ANY GIVEN TIME ARE DISCUSSED. SITUATIONS ARE CONSIDERED IN WHICH THE SAME DATA MIGHT BE TAKEN EVEN IF THE VEHICLE PATHS CORRESPONDING TO THIS DATA ARE NOT THE SAME. THE PROBLEM OF CONVERSION OF RANGE INFORMATION INTO CARTESIAN COORDINATE INFORMATION IS TREATED. THE TWO MOST COMMON MEASURES OF ERROR PROPAGATION AND A METHOD FOR FINDING THE POINTS OF INTERSECTION OF TWO CONICS ARE INCLUDED.

269 092 0241 (*DOPPLER TRACKING, SATELLITE VEHICLES, MATHEMATICAL ANALYSIS, ANALYTIC GEOMETRY, EQUATIONS, MATRIX ALGEBRA.) (*SATELLITE VEHICLE TRAJECTORIES, MATHEMATICAL ANALYSIS, STATISTICAL ANALYSIS, LEAST SQUARES METHOD.) (ERRORS, PROPAGATION, ANALYSIS OF VARIANCE, DETERMINANTS.) -

269 095 0245 NUCLEAR MAGNETIC RESONANCE IN METALLIC SINGLE CRYSTALS,

269 095 0245 A METHOD FOR OBSERVING NUCLEAR RESONANCE ABSORPTION IN METALLIC SINGLE CRYSTALS IS REPORTED. THE THICK-SAMPLE METHOD DESCRIBED APPEARS TO BE APPLICABLE TO A WIDE VARIETY OF PURE METALS AND ALLOYS, IN SINGLE CRYSTAL OR POLYCRYSTALLINE FORM. IN CASES WHERE THE SIGNAL TO NOISE RATIO IS UNFAVORABLE, SIMPLE GEOMETRY APPLICATIONS ARE NOT ADEQUATE. HOWEVER, THE TOTAL SURFACE OF THE SAMPLE CAN BE INCREASED BY CUTTING SLOTS IN THE CRYSTAL OR BY STACKING SEVERAL THICK CRYSTALS. ANISOTROPIC EFFECTS IN SINGLE CRYSTALS OF NONCUBIC METALS WILL BE OF PARTICULAR INTEREST. PURE QUADRUPOLE RESONANCE AND RELAXATION TIME MEASUREMENTS ON SINGLE METALLIC CRYSTALS SHOULD ALSO BE POSSIBLE.

269 095 0242 (*METALLIC CRYSTALS, *SINGLE CRYSTALS, *METALS, *ALLOYS, *CRYSTALS, *NUCLEAR MAGNETIC RESONANCE, HYSTERESIS, TEST METHODS.) -

269 110 0246 RESEARCH DIRECTED TOWARD DESIGN AND DEVELOPMENT OF EXPERIMENTAL DATA PROCESSING EQUIPMENT.

269 110 0246 DESIGN, DEVELOPMENT AND MODIFICATIONS ARE PRESENTED ON THE FOLLOWING COURSE GENERATOR UNIT, DIGITAL CIRCUIT ANALYZER, PUNCHED CARD DATA INSERTION, ANCILLARY DATA STORAGE AND DECODING, SUPPLEMENTARY DATA CONSOLE, DRUM STORAGE UNIT INSTALLATION AND CHECKOUT, CONSTANT LEVEL RECORDING AMPLIFIER, READOUT CAPABILITIES, X-H DISPLAY TECHNIQUES, RADAR SITE NUMBER INTENSIFICATION SELECTION, RAID SIZE MODIFICATION, SCALE FACTOR CONVERSION OF VELOCITY READOUTS, AND ELECTRONIC DISPLAY OF SITE LOCATION.

269 110 0243 (*DATA PROCESSING SYSTEMS, *LABORATORIES, DESIGN, RELIABILITY, SIMULATION, APPLIED PSYCHOLOGY, HUMAN ENGINEERING.) (AERIAL RECONNAISSANCE, AIR TRAFFIC CONTROL SYSTEMS, GROUND CONTROLLED INTERCEPTION SYSTEMS, COMMAND SYSTEMS, CONTROL SYSTEMS, GUIDED MISSILE RESEARCH.) -

269 112 0247 THE PROPERTIES OF CONDUCTION ELECTRONS IN ALKALI HALIDE CRYSTALS. II. A HARMONIC ANALYSIS OF THE ALTERNATING CURRENT SOLUTIONS OF THE EQUATION FOR MOTION OF MOBILE NEGATIVE CHARGE CARRIERS IN ADDITIVELY COLORED ALKALI HALIDE CRYSTALS,

269 112 0247 THE EQUATIONS OF MOTION FOR SPACE CHARGE LIMITED CARRIER DIFFUSION IN A TRAP FREE CRYSTAL ARE DISCUSSED. BOUNDARY CONDITIONS EQUIVALENT TO CURRENT BLOCKING ELECTRODES ARE INTRODUCED AND ONLY THE NEGATIVE CHARGE CARRIER IS ASSUMED MOBILE. A SINUSOIDAL VOLTAGE IS APPLIED TO THE CRYSTAL ELECTRODES AT $\pm L/2$, WHERE L IS THE CRYSTAL LENGTH. A GENERAL EXPRESSION FOR THE QTH HARMONIC OF THE SPACE

AVERAGE CURRENT AND THE NEGATIVE CHARGE CARRIER CONCENTRATION AT THE ELECTRODE IS GIVEN. IT IS SHOWN THAT FOR A SINUSOIDAL APPLIED VOLTAGE AND CURRENT BLOCKING ELECTRODES, THE FIELD AND CARRIER CONCENTRATIONS HAVE A DEFINITE PARITY WHICH ALTERNATES WITH THE ORDER OF THE HARMONIC, AND THE EVEN HARMONICS OF THE SPACE AVERAGE CURRENT ARE ZERO. NUMERICAL SOLUTIONS OF THE CURRENT AND NEGATIVE CHARGE CARRIER CONCENTRATION AT THE ELECTRODES SHOW THAT THE HARMONIC CONTENT AT LOW FREQUENCIES (LESS THAN 100 CPS) IS VERY LARGE FOR AN APPLIED VOLTAGE GREATER THAN KT/E . AT FREQUENCIES ABOVE APPROXIMATELY 100 CPS, THE SO-CALLED SMALL SIGNAL LINEARIZED THEORY IS APPLICABLE.

269 112 0244 (*SEMICONDUCTORS, ELECTRONS, *CONDUCTIVITY, *ALKALI METAL COMPOUNDS, HALIDES, CRYSTALS.) (*HARMONIC ANALYSIS, ALTER-NATING CURRENT, EQUATIONS, MOTION FOR SPACE CHARGES, ELECTRON CHARGE, DIFFUSION, DENSITY IN *POTASSIUM COMPOUNDS, *BROMIDES, COLOR CENTERS, LINEAR PROGRAMMING.) SOLID STATE PHYSICS. -

269 113 0248 SOLAR-FLARE RADIATION AND MANNED SPACE FLIGHT,

269 113 0248 SOLAR-FLARE EMISSION WILL BE THE DETERMINING FACTOR IN SHIELD DESIGN FOR MANNED INTERPLANETARY VEHICLES. PRESENT KNOWLEDGE OF SOLAR-FLARE CHARACTERISTICS IS INSUFFICIENT TO PERMIT AN ACCURATE CALCULATION OF THE RADIATION DOSAGE TO BE EXPECTED IN SPACE. FLARES OCCUR AT IRREGULAR INTERVALS, MAKING THEM DIFFICULT TO FORECAST. FURTHERMORE, THE INTENSITY AND DURATION VARY FROM ONE EVENT TO ANOTHER IN AN UNDEFINED MANNER. THIS MEMORANDUM SUMMARIZES THE CURRENTLY KNOWN FACTS ABOUT SOLAR FLARES, ILLUSTRATES SOME OF THE DIFFICULTIES IN ACCURATELY DETERMINING SHIELD REQUIREMENTS, AND POINTS OUT THE AREAS IN WHICH ADDITIONAL EXPERIMENTAL DATA WOULD BE OF GREATEST VALUE.

269 113 0245 (*SOLAR FLARES, *SPACE FLIGHT, MANNED, *RADIATION HAZARDS, *RADIATION INJURIES, MATHEMATICAL ANALYSIS.) (DOSE RATE, *SUNSPOTS, SOLAR ENERGY, VAN ALLEN RADIATION BELT, COSMIC RAYS.) -

269 122 0249 S WAVE STUDIES OF EARTHQUAKES OF THE NORTH PACIFIC. PART I KAMCHATKA,

269 122 0249 THE POLARIZATION OF S WAVES AT STATIONS DISTRIBUTED AZIMUTHALLY ABOUT THE SOURCE WAS EXAMINED FOR EACH OF 23 KAMCHATKA EARTHQUAKES OF 1950-1960. IN 19 OF THESE EARTHQUAKES THE P AND S WAVE DATA WERE IN AGREEMENT WITH A DOUBLE COUPLE SOURCE AS THE POINT MODEL OF THE FOCAL MECHANISM. THE S WAVES INDICATE A UNIFORM MECHANISM WHICH REPEATS ITSELF FROM EARTHQUAKE TO EARTHQUAKE AND FROM WHICH IT MAY BE INFERRED THAT THE AXES OF GREATEST AND LEAST STRESS AT THE FOCI TEND TO LIE IN A VERTICAL PLANE NORMAL TO THE TREND OF THE KAMCHATKA-KURILES ARC. THE AXIS OF LEAST STRESS USUALLY PLUNGES ALMOST VERTICALLY UNDER THE CONTINENT, BUT MAY ALSO PLUNGE LESS STEEPLY, AT ANGLES AS LOW AS 45 DEGREES. AT LEAST TWO EARTHQUAKES MAY BE REPRESENTED BY A SINGLE COUPLE SOURCE.

269 122 0246 (EARTHQUAKES, *USSR.) (*SEISMIC WAVES, *POLARIZATION, *DISTRIBUTION, SEISMIC STATIONS, STATISTICAL ANALYSIS, AZIMUTH, MAP PROJECTION.) -

269 414 0252

269 414 0252 A STUDY IS PRESENTED OF STATIC AND DYNAMIC SOLAR PANEL SYSTEMS FOR THE OPTIMUM CONVERSION OF SOLAR RADIATION TO ELECTRICAL ENERGY. THE INFLUENCE OF SOLAR PANEL ORIENTATION ON ENERGY COLLECTED IS ANALYZED TO DETERMINE THE PERCENTAGE CHANGE IN AVAILABLE TOTAL SOLAR RADIATION OVER THE DAY PERIOD. PRELIMINARY PANEL DRIVING-POWER REQUIREMENTS ARE ESTABLISHED FOR THE ASSUMED WIND LOADING OF THE 20-SQ-FT PANEL. OPEN- AND CLOSED-LOOP ORIENTATION SYSTEMS ARE INVESTIGATED AND RECOMMENDATIONS ARE GIVEN ACCORDING TO WEIGHTING FACTORS. SOLID-STATE DETECTOR TECHNIQUES ARE ANALYZED AND ORIENTATION SENSORS ARE EXAMINED FOR THEIR APPLICABILITY TO THE OVER-ALL SYSTEM WITH REFERENCE TO PERFORMANCE, REQUIRED EQUIPMENT, ACCURACY, AND COST. THE GEOMETRY OF THE WEDGE-TYPE ORIENTATION SENSOR IS GIVEN WITH CURVES OF SENSITIVITY AND TOTAL SENSOR OUTPUT VERSUS ROTATION FROM THE SUN LINE. A DESCRIPTION OF THE FIRST FEASIBILITY-DEMONSTRATION MODEL OF THE WEDGE-TYPE ORIENTATION SENSOR IS INCLUDED.

269 414 0249 (*SOLAR CELLS, *ELECTRIC POWER PRODUCTION, SOLAR ENERGY, THERMAL RADIATION, SUN, TRACKING, FOCUSING, DETECTORS, ROTATING STRUCTURES, DESIGN, SENSITIVITY, TESTS.) (POWER SUPPLIES, FEASIBILITY STUDIES.) -

269 491 0254 NO TITLE AVAILABLE

269 491 0254 THE CLIMATOLOGICAL BEHAVIOR OF THE BALLISTIC WIND AND DENSITY IS EXAMINED USING THE MEANS OF EQUALLY WEIGHTED VALUES OF UPPER-AIR WIND AND DENSITY AT ALTITUDES 2 KM APART. THESE MEAN VALUES ARE TERMED INTEGRATED WIND AND DENSITY, RESPECTIVELY. THREE INTEGRATED VALUES OF WIND AND DENSITY ARE USED, ONE FOR THE ATMOSPHERE BELOW 12 KM, ANOTHER FOR THE ATMOSPHERE BELOW CHOSEN FROM WIDELY DIVERSE CLIMATIC REGIMES, ARE EMPLOYED. THE SPECIFIC ASPECTS OF BEHAVIOR EXAMINED ARE THE EFFECTS OF VARIABILITY ON SHORT-PERIOD MEANS COMPARISON OF MONTHLY AND SEASONAL STATISTICS THE EFFECTS OF RESTRICTED AMOUNTS OF DATA AND THE RELATION BETWEEN INTEGRATED DENSITY AND INTEGRATED WIND.

269 491 0251 (*WIND, HIGH ALTITUDE, PERIODIC VARIATIONS, VELOCITY, DIRECTION FINDING, ANALYSIS, VECTOR ANALYSIS.) (CLIMATIC FACTORS, GUIDED MISSILE TRAJECTORIES.) -

269 505 0256 DEVELOPMENT OF 2400 DEGREE F FORGING DIE SYSTEM.

269 505 0256 EFFORTS WERE CONTINUED ON EXTENDING HOT FORGING DIE TECHNOLOGY TO REFRACTORY METALS. A HOT DIE SYSTEM TO EVALUATE THE UPPER OPERATING TEMPERATURE LIMIT OF INCONEL 713 C FORGING DIES IS READY FOR FORGING. REDESIGNED DIES ARE PARTIALLY PREPARED TO USE A HOT DIE EXTRUSION - FORGING PROCESS TO MINIMIZE THE FORGING SEQUENCE. HIGHTEMPERATURE PROPERTIES OF METALLIC, INTERMETALLIC AND NONMETALLIC MATERIALS ARE BEING DETERMINED TO ASSESS THEIR UTILITY AS 2400 F FORGING DIES. (AUTHOR) AD-269 5059N6

269 505 0253 (*FORGING, *DIES FOR MOLYBDENUM ALLOYS, REFRACTORY MATERIALS, METALS, CERAMIC MATERIALS, INTERMETALLIC COMPOUNDS, CERMETS, DESIGN.) (MANUFACTURING METHODS, *EXTRUSION, HIGH TEMPERATURE RESEARCH, PLASTIC FLOW, 9 PRODUCTION, AIRFRAMES, GUIDED MISSILES.) (DIES, MATERIALS, HEAT RESISTANT ALLOYS, COATINGS, METAL COATINGS.) -

269 514 0257 DETERMINATION AND ANALYSIS OF THE POTENTIALITIES OF THERMAL ENERGY STORAGE MATERIALS.

269 514 0257 EXTENSIVE TESTS WERE CONDUCTED TO FIND A METAL SUITABLE AS A CONTAINER FOR MOLTEN LiBO₂ AT 1600 F. TEST RESULTS INDICATED AN INCREASING CORROSION RESISTANCE WITH INCREASING CR CONTENT WITH ALLOYS CONTAINING A HIGH PERCENTAGE OF CR. DROP-CALORIMETRIC MEASUREMENTS ON CASI₂ PRODUCED HEAT CONTENT DATA TO 470 C. THE THERMAL CONDUCTIVITY APPARATUS WAS MODIFIED. MEASUREMENTS MADE THERMAL CONDUCTIVITY VALUE OF 5.7 BTU/HR SQ FT F/FT WAS OBTAINED. CONSTRUCTION OF THE FURNACE-CALORIMETER APPARATUS FOR MEASUREMENT OF HEAT RELEASE RATES WAS COMPLETED EXCEPT FOR THE NI CALORIMETER BLOCK.

269 514 0254 (*MATERIALS, HIGH TEMPERATURE RESEARCH, STORAGE, THERMO DYNAMICS, HEAT OF FUSION, THERMAL CONDUCTIVITY, ENERGY, SPECIFIC HEAT, ANALYSIS.) (*CONTAINERS, *CRUCIBLES, ALLOYS, ADDITIVES, CHROMIUM, LIQUID S, MELTING, *LITHIUM COMPOUNDS, *BORATES, CORROSION INHIBITION.) (*CALCIUM COMPOUNDS, SILICIDES, *SODIUM COMPOUNDS, FLUORIDES.) (LABORATORY EQUIPMENT, *CALORIMETERS, *LABORATORY FURNACES, TESTS.) -

NO TITLE AVAILABLE

NO ABSTRACT AVAILABLE

269 517 0256 (*RE-ENTRY VEHICLES, *ATMOSPHERE ENTRY, RE-ENTRY AERODYNAMICS, STABILITY, SIMULATION BY JET PLANES, JET TRAINING PLANES.) (PILOTS, HUMAN ENGINEERING, HANDLING, CONTROL SYSTEMS, FLIGHT TESTING.) -

269 526 0260 GRAPHIC DETERMINATION OF COEFFICIENTS OF PART AND MULTIPLE CORRELATION IN THREE-VARIABLE PROBLEMS,

269 526 0260 ON MANY OCCASIONS IT IS CONVENIENT TO SOLVE EQUATIONS GRAPHICALLY RATHER THAN ALGEBRAICALLY. A CONVENIENT MEANS FOR GRAPHICALLY DETERMINING THE VALUES OF COEFFICIENTS OF PART CORRELATION, COEFFICIENTS OF MULTIPLE CORRELATION, AND BETA WEIGHTS FOR THREE-VARIABLE PROBLEMS IS PRESENTED. .

269 526 0258 (ALGEBRA, *PROJECTIVE GEOMETRY, *NUMERICAL ANALYSIS.)

269 527 0261 DEVELOPMENT OF THE AIR FORCE PRECOMMISSION SCREENING TEST-62,

269 527 0261 THE 1962 REVISION OF THE AIR FORCE PRECOMMISSION SCREENING TEST REPLACES AN EARLIER FORM FOR SCREENING OF APPLICANTS FOR NAVIGATOR TRAINING AND SELECTION OF AIRMEN FOR THE AIR FORCE ACADEMY PREPARATORY SCHOOL. SECTIONS OF THE TEST WERE CONSTRUCTED AS SHORT EQUIVALENT FORMS OF FIVE PARTS OF THE AIR FORCE OFFICER QUALIFYING TEST VERBAL, QUANTITATIVE, GENERAL SCIENCE, MECHANICAL, AND SCALE READING. RESULTS OF A TRYOUT OF THE NEW TEST WITH A HIGH-APTITUDE SAMPLE OF BASIC AIRMEN DEMONSTRATED A SUITABLE DISTRIBUTION OF SCORES AND HIGH CORRELATIONS BETWEEN CORRESPONDING PARTS OF THE NEW TEST AND AFOQT.

269 527 0259 (*AVIATION PERSONNEL, *NAVIGATORS, SELECTION, TRAINING .) (*APTITUDE TESTS, DESIGN.) STATISTICAL ANALYSIS. -

269 541 0262 ANALYSIS OF STRUCTURAL LAMINATES.

269 541 0262 A GENERAL SMALL-DEFLECTION THEORY GOVERNING THE ELASTOSTATIC EXTENSION AND FLEXURE OF THIN LAMINATED ANISOTROPIC SHELLS AND PLATES IS FORMULATED. THE PLATE OR SHELL STRUCTURE MAY HAVE LAYERS, EACH OF WHICH MAY POSSESS DIFFERENT THICKNESS, ORIENTATION, AND/OR ORTHOTROPIC ELASTIC PROPERTIES. DONNELL-TYPE EQUATIONS FOR CYLINDRICAL SHELLS AND POISSON-KIRCHHOFF PLATE EQUATIONS ARE EXPLICITLY DISCUSSED, ALONG WITH PROCEDURES FOR DETERMINING STRESSES IN AN INDIVIDUAL LAMINA. SEVERAL METHODS OF SOLUTION OF THE SYSTEM OF EQUATIONS GOVERNING EXTENSION AND FLEXURE OF PLATES ARE DISCUSSED AND ILLUSTRATED WITH EXAMPLES. OPTIMIZATION OF LAMINATE CONFIGURATION IS TREATED BRIEFLY. THE RESULTS OF A LIMITED NUMBER OF CRACK PROPAGATION TESTS OF FLAT PLATE ALUMINUM FOIL LAMINATES IN UNIAXIAL TENSION ARE PRESENTED.

269 541 0260 (STRUCTURAL SHELLS, *ELASTIC SHELLS, DEFORMATION, DEFLECTION, STRESSES.) SHELLS, MECHANICAL PROPERTIES.) (*LAMINATES, ALUMINUM.)

269 542 0263 FERRIELECTRICS AS A POSSIBLE COMPUTER ELEMENT,

269 542 0263 RESEARCH ON HIGH TEMPERATURE FERROELECTRIC STORAGE MEDIA LED TO THE DISCOVERY OF A CLASS OF FERROELECTRIC MATERIALS WHICH REQUIRE A MINIMUM THRESHOLD FIELD FOR SWITCHING. THIS PROPERTY WAS COMPARED AND COMPARED WITH SIMILAR PROPERTIES FOUND TO EXPLOIT THE PHENOMENON OF FERRIELECTRICITY FOR APPLICATION IN COMPUTER LOGICAL DEVICES. THE FEASIBILITY OF PREPARING CAPACITORS HAVING A LIMITING ELECTRICAL PARAMETERS OF THE DEVICE WERE DETERMINED. FINALLY, A NOVEL NON-DESTRUCTIVE READOUT METHOD WAS INVESTIGATED USING ELECTROMAGNETIC INTERFEROMETER TECHNIQUES. WITH THE SNR-RATIO OBTAINED WAS 61. IT IS POSSIBLE TO OBTAIN MILLIONS OF READOUTS FROM A FERROELECTRIC POLARIZATION OF THE FERROELECTRIC CAPACITOR.

269 542 0261 (*FERROELECTRIC MATERIALS, ELECTRICAL PROPERTIES, HIGH TEMPERATURE RE-SEARCH, SWITCHING CIRCUITS.) (COMPUTER LOGIC, TESTS, NON-DESTRUCTIVE TESTING, POLARIZATION, *DIGITAL COMPUTERS, *MEMORY DEVICES.)

269 543 0264 NO TITLE AVAILABLE

269 543 0264 THE MACROSCOPIC EQUATIONS OF TRANSPORT ARE SPECIALIZED TO AN IDEAL, INVISCID, NON-DIFFUSING GAS. THESE EQUATIONS ARE USED AS A MODEL FOR DESCRIBING PLANE OR AXIALLY SYMMETRIC, CHEMICALLY REACTING HYPERSONIC FLOW FIELDS. DETAILED NUMERICAL SOLUTIONS ARE OBTAINED BY USING FINITE DIFFERENCE PROCEDURES AND THE IBM-704 AND -7090 DIGITAL COMPUTERS. A DESCRIPTION OF THE COMPUTER CODE, THE RESULTS OF A TRIAL RUN, AND SOME EXPERIENCES WITH THE USE OF THE PROGRAM, ARE PRESENTED.

269 543 0262 (*HYPERSONIC FLOW, *CHEMICAL REACTIONS, TRANSPORT PROPERTIES, GAS FLOW) (THERMODYNAMICS, HYDRODYNAMICS, DISSOCIATION.) (*EQUATIONS OF STATE, PARTIAL DIFFERENTIAL EQUATIONS, COMPLEX VARIABLES.) (COMPUTERS.)

269 547 0265 KINEMATIC AND TESSELLATION MODELS OF SELF-REPAIR,

269 547 0265 KINEMATIC MODELS, SELF-REPAIR, TESSELLATION. THE CONCEPT OF SELF-REPAIR IS STUDIED IN TERMS OF AUTOMATA THEORY. DIFFERENT CLASSES OF AUTOLOCALIZED AUTOMATA, ARE CONSIDERED. THE PARTS (COMPONENTS) OF THE AUTOMATA ARE UNIFORMLY EXPOSED TO ERRORS. IT IS SHOWN THAT IF AN AUTOMATON OF A CERTAIN CLASS HAS A LIFE-SPAN, NOT

EXCEEDED BY ANY OTHER AUTOMATON OF THE CLASS, THEN IT MUST CONTAIN A REPAIRING MECHANISM. SUCH AUTOMATA CAN BE SAID TO BE SELF-REPAIRING WITH RESPECT TO THE CLASS. A DEFINITION OF SELFREPAIR IS SUGGESTED. IT IS FOUND THAT A SELFREPAIRING SYSTEM, WHICH IS WELL-LOCALIZED WITH RESPECT TO ITS INPUTS AND OUTPUTS, HAS A FINITE SPAN WE OBSERVE IN NATURE FOR ANY ANIMAL OR FOR ANY WELL-LOCALIZED MACHINE. ON THE OTHER HAND, IF WE RELAX THE CONDITION THAT THE AUTOMATON BE WELL-LOCALIZED, THEN INFINITE LIFE-SPANS CAN BE OBTAINED. SUCH AUTOMATA HAVE ALSO SELF-REPRODUCING PROPERTIES AND WE OBTAIN HERE A CONNECTION BETWEEN THE CONCEPTS OF SELF-REPAIR AND SELFREPRODUCTION. THESE SELF-REPAIRING AUTOMATA ARE IN A WAY SIMILAR TO GROWING BIOLOGICAL SOCIETIES WITH LOOSELY SPECIFIED INTERNAL STRUCTURES.

269 547 0263 (*AUTOMATION, THEORY, *META-MATHEMATICS.) (ELECTRICAL NETWORKS, *CYBERNET-ICS, ERRORS, LIFE EXPECTANCY, RELIABILITY.) (COMBINATORIAL ANALYSIS, SAMPLING, PROBABILITY, STATISTICAL PROCESSES, TAYLOR S SERIES, MATRIX ALGEBRA, INTEGRAL EQUATIONS.) PROBABILITY, QUANTUM MECHANICS. -

269 228 0288 BIBLIOGRAPHY OF RESEARCH AND DEVELOPMENT REPORTS (REVISION NO. 5).

269 228 0288 NO ABSTRACT AVAILABLE

269 228 0286 (*GUIDED MISSILES, SURFACE TO SURFACE, *BIBLIOGRAPHY.) (*GUIDED MISSILE RESEARCH, SCIENTIFIC REPORTS.) -

269 229 0289 HIG-4 SPIN-MOTOR ROTATION DETECTOR DEVELOPMENT AND QUALIFICATION PROGRAM. VOLUME 1.

269 229 0289 THE RESULTS ARE SUMMARIZED OF THE MODIFICATION AND SUBSEQUENT TEST PROGRAM DIRECTED TOWARD THE INCORPORATION OF A SPIN-MOTOR ROTATION MONITORING DEVICE IN THE HIG-4 GYRO. THE MODIFICATION CONSISTS PRIMARILY OF INCLUSION OF A VARIABLE RELUCTANCE SIGNAL PICKOFF WITHIN THE GYRO GIMBAL (OR FLOAT). THE PICKOFF IS DESIGNED TO DEVELOP TWO VOLTAGE PULSES PER REVOLUTION OF THE MOTOR WHEEL. THUS, AT A MOTOR SPEED OF 400 REVOLUTIONS PER SECOND, A SIGNAL OF 800 PULSES PER SECOND IS GENERATED. THE DURATION AND PEAK-TO-PEAK AMPLITUDE OF EACH PULSE ARE APPROXIMATELY 0.4 MILLISECOND AND 0.2 VOLT, RESPECTIVELY, ACROSS A 600-OHM LOAD RESISTANCE. GYROS INCORPORATING THESE DESIGN CHANGES WERE EXPOSED TO HIGH AND LOW TEMPERATURE, SHOCK, VIBRATION, AND ACCELERATION QUALIFICATION TESTS. PICKOFF PERFORMANCE WAS UNAFFECTED BY THESE ENVIRONMENTS.

269 229 0287 (*GYROSCOPES, *SIGNAL GENERATORS, MONITORS, ROTATION, SPIN, DETECTORS, MAGNETS, DESIGN, TEMPERATURE, SHOCK RESISTANCE, VIBRATION, ACCELERATION, TESTS, RELIABILITY.) -

269 231 0290 NUTRITION AND CIRRHOSIS OF THE LIVER.

269 231 0290 REGENERATION OF THE LIVER AND IRON DISEASES OF THE LIVER WERE STUDIED, PRINCIPALLY USING RADIOISOTOPE AND AUTORADIOGRAPHIC TECHNIQUES. (1) A SEARCH WAS MADE FOR A POSSIBLE HUMORAL FACTOR IN THE BLOOD OF RATS THAT CONTROLS REGENERATION OF THE LIVER AFTER PARTIAL HEPATECTOMY. (2) OBSTRUCTION OF THE COMMON BILE DUCT OF THE RAT WAS FOUND TO RESULT IN REGENERATION OF LIVER CELLS COMPARABLE IN NUMBER TO THAT SEEN APPROXIMATELY 48 HOURS AFTER PARTIAL HEPATECTOMY IN ADDITION TO WELL KNOWN CHANGES IN BILE DUCTS. (3) IN EXPERIMENTAL CARCINOMA OF THE LIVER PRODUCED BY FEEDING A BUTTER YELLOW DERIVATIVE, AN INCREASED REGENERATION OF LIVER CELLS DID NOT PRECEDE THE OCCURRENCE OF TUMORS.

(4) REGENERATION OF THE CIRRHOTIC LIVER PRODUCED BY DIETARY MEANS WAS COMPARED WITH REGENERATION OF NORMAL RAT LIVER, IN BOTH CASES FOLLOWING PARTIAL HEPATECTOMY. CIRRHOTIC LIVER RESPONDED AT THE SAME TIMES AND TO THE SAME EXTENT AS NORMAL LIVER.

269 231 0288 (*LIVER, PATHOLOGY, *NUTRITION, *DISEASES, REGENERATION, SURGERY.) RADIOACTIVE ISOTOPES, AUTORADIOGRAPHY, *MEDICAL RESEARCH.

269 234 0291 THEORETICAL PREDICTION OF PLASTIC STRAINS OF POLYCRYSTALS,

269 234 0291 PLASTIC STRAIN IS CONSIDERED A CONSEQUENCE OF SLIPPING ON SOME OF THE 12 SLIP SYSTEMS OF FACECENTERED-CUBIC SINGLE CRYSTALS. THE POLYCRYSTAL IS ASSUMED TO BE MACROSCOPICALLY HOMOGENEOUS AND INITIALLY ISOTROPIC -- THAT IS, THE CRYSTAL ORIENTATIONS, SIZES, SHAPES AND LOCATIONS ARE RANDOM AND UNCORRELATED. THE ROTATIONS OF THE GRAINS DURING DEFORMATION ARE NEGLECTED, AND THE AVERAGE PLASTIC STRAIN IN GRAINS OF A GIVEN ORIENTATION IS CALCULATED ON THE BASIS OF THE ASSUMPTION THAT THE GRAINS UNDER CONSIDERATION ARE SPHERICAL AND ELASTICALLY ISOTROPIC.

269 234 0289 (STRESSES, DEFORMATION, CRYSTALS, ELASTICITY, *PLASTICITY, CRYSTAL STRUCTURE, *SHEAR STRESSES, GRAINS (METALLURGY).) (TENSILE PROPERTIES, TENSOR ANALYSIS, TRANSFORMATIONS (MATHEMATICS), INTEGRALS, INTEGRAL EQUATIONS, THEORY.) *TABLES. -

269 237 0292 STRAIN AGING IN MOLYBDENUM.

269 237 0292 A STUDY OF THE CHARACTERISTICS OF STRAIN AGING IN COMMERCIAL-PURITY MO BY THE METHODS OF DYNAMIC MODULUS RECOVERY AND YIELD POINT RETURN, AND A DETERMINATION OF THE ACTIVATION ENERGY OF STRAIN AGING WAS MADE. MODULUS SPECIMENS, FROM ARC-CAST, RECRYSTALLIZED MO, IN THE SHAPE OF RECTANGULAR BARS WERE DEFORMED 3% IN COMPRESSION. THE RETURN OF YOUNG'S MODULUS WAS INVESTIGATED AS A FUNCTION OF AGING TIME AND TEMPERATURE. MEASUREMENTS OF RESONANT FREQUENCY WERE MADE AT ROOM TEMPERATURE. THE RATE OF INCREASE OF THE SQUARE OF RESONANT FREQUENCY, RATHER THAN MODULUS RECOVERY WAS USED TO PLOT THE DATA FOR DETERMINING AN ACTIVATION ENERGY. TENSILE SPECIMENS FROM POWDER-METALLURGY MO SHEET WERE GIVEN 2% PLASTIC DEFORMATION BY STRAINING TO THE END OF THE LOWER YIELD STRESS. THE RATE OF RETURN OF YIELD POINT WITH AGING TIME AND TEMPERATURE WAS PLOTTED. THE RATE OF YOUNG'S MODULUS RECOVERY GAVE VALUES OF ACTIVATION ENERGY FROM 24,000 TO 28,000 CAL/MOL. THE RATE OF YIELD POINT RETURN GAVE A SINGLE VALUE OF 24,000 CAL/MOL.

269 237 0290 (*MOLYBDENUM, CRYSTALS, CRYSTAL STRUCTURE, AGING IN LIQUID METALS, DEFORMATION, MEASUREMENT, TENSILE PROPERTIES, ELASTICITY, TEST METHODS.) -

269 238 0293 SURVEY AND ANALYSIS OF HYPERSONIC AND RE-ENTRY VEHICLES.

269 238 0293 A SURVEY AND ANALYSIS WAS MADE OF THE AEROTHERMODYNAMIC PROBLEM AREAS IN THE FLIGHT SPECTRUM OF HYPERSONIC GLIDE AND RE-ENTRY VEHICLES. THIS FLIGHT SPECTRUM WAS DEFINED BY SPEEDS BETWEEN 5000 FT/SEC AND ORBITAL SPEED AND BY ALTITUDES BETWEEN 100,000 AND 400,000 FEET. MAJOR PROBLEM AREAS OF FLIGHT WITHIN THIS SPECTRUM WERE ANALYZED TO DETERMINE THE COVERAGE OF EXISTING DATA AND TO RECOMMEND AREAS WHERE FURTHER RESEARCH IS NEEDED.

269 238 0291 (*RE-ENTRY VEHICLES, *HYPER-VELOCITY VEHICLES, FLIGHT PATHS, SHOCK WAVES, RE-ENTRY AERODYNAMICS, SUPERAERODYNAMICS, *HYPERSONIC S, ABLATION, BOUNDARY LAYER, *AERODYNAMIC HEATING, FRICTION, HEAT TRANSFER, LIFT, DRAG, PRESSURE, THEORY, MATHEMATICAL ANALYSIS.) *BIBLIOGRAPHY

269 241 0294 HIGH-CAPACITY TELEMETRY DIGITIZER AND VIBRATION ANALYZER. SUB-SYSTEM B.

269 241 0294 A TELEMETRY DIGITIZING SYSTEM IS DESCRIBED WHICH ACCEPTS POSTFLIGHT ANALOG DATA AND CONVERTS THE INFORMATION INTO DIGITAL FORM COMPATIBLE WITH EXISTING DATA-HANDLING EQUIPMENT. THE DIGITAL DATA IS THEN STORED ON MAGNETIC TAPE, ALONG WITH TIMING INFORMATION, MULTIPLEXER CHANNEL NUMBER, AND AN IDENTIFICATION CODE NUMBER. CONTROL AND PROGRAMMING CIRCUITRY, IN CONJUNCTION WITH PATCH PANEL, PROVIDES THE LOGIC ELEMENTS WHICH INTEGRATE TIMING, ANALOG, AND DIGITAL SECTIONS INTO A FUNCTIONAL SYSTEM.

269 241 0292 (*ANALOG TO DIGITAL CONVERTERS, *DATA PROCESSING SYSTEMS, DIGITAL COMPUTERS, *TELEMETERING DATA, MULTIPLEX TRANSMISSION, ELECTRONIC CIRCUITS, PROGRAMMING, MAINTENANCE, INSTRUCTION MANUALS.) (GUIDED MISSILE TRACKING SYSTEMS, TELEMETER SYSTEMS, MATHEMATICAL COMPUTER DATA, DIGITAL SYSTEMS, DATA STORAGE SYSTEMS, COMPUTER LOGIC, DESIGN.) -

269 242 0295 HOT GAS SERVOMECHANISM THEORY AND TECHNOLOGY AN ANNOTATED BIBLIOGRAPHY,

269 242 0295 A SELECTED LIST OF ANNOTATED REFERENCES IS PRESENTED ON HOT GAS SERVOMECHANISMS INCLUDING DESIGN, ANALYSIS, COMPONENTS, AND EXPERIENCE. SOME REFERENCES ARE TO CLASSIFIED REPORTS WITH UNCLASSIFIED TITLES, AND THESE ARE NOT ANNOTATED SO THAT THIS BIBLIOGRAPHY MAY BE MORE WIDELY CIRCULATED. SELECTED ITEMS IN RELATED AREAS, SUCH AS PNEUMATICS, ARE INCLUDED.

269 242 0293 (*BIBLIOGRAPHY, *SERVOMECHANISMS, SERVO SYSTEMS, *PNEUMATIC SERVO-MECHANISMS, PNEUMATIC SYSTEMS, GAS GENERATING SYSTEMS.) -

269 246 0296 MOBILITY ENVIRONMENT INVESTIGATION PROGRAM, VOLUME 9.

269 246 0296 THIS REPORT INCLUDES DETAILED TEST PLAN FOR THE VIBRATION TEST OF A SECOND-STAGE MINUTEMAN ENGINE, APPENDIX. 10 MAY 61, 19P. TABLE. A CRITICAL FACTOR IN THE MOBILE MINUTEMAN PROGRAM IS THE ABILITY OF THE MISSILE AND ITS SEPARATE STAGES TO WITHSTAND IN-TRANSIT VIBRATION AND SHOCK. DURING TESTS, THE ENGINE AND INDIVIDUAL COMPONENTS WILL BE SUBJECTED TO SIMULATED ENVIRONMENTAL CONDITIONS OF VIBRATION AND SHOCK. ANALYTICAL STUDIES WILL BE MADE OF GRAIN INTEGRITY AND THE EFFECTS OF LONGITUDINAL, TRANSVERSE, AND RADIAL DYNAMIC LOADS ON THE ENGINE. THE TESTING PROGRAM WILL PROVIDE DATA FOR ENSURING THE DURABILITY OF THE ENGINE DURING TRANSPORT.

269 246 0294 (*GUIDED MISSILES, SURFACE TO SURFACE, CARGO VEHICLES, RAILROADS, *TRANSPORTATION, ROCKET MOTORS, MOBILE, SOLID ROCKET PROPELLANTS, VIBRATION, SHOCK RESISTANCE, STRESSES, TENSILE PROPERTIES, TESTS, TEST METHODS.) PROPELLANT GRAINS, MECHANICAL PROPERTIES. -

269 248 0297 ADEPT - AN AUTOMATIC DATA EXTRACTOR AND PLOTTING
TABLE FOR HIGH SPEED REPETITIVE ANALOG COMPUTATION,

269 248 0297 AN INSTRUMENT CALLED ADEPT, AN AUTOMATIC DATA
EXTRACTOR AND PLOTTING TABLE, IS DESCRIBED. THE

269 248 0295 (*ANALOG COMPUTERS, ELECTRONIC CIRCUITS, *DATA PROCESSI
NG SYSTEMS, DESIGN, OPERATION.) -

269 253 0298 AN ANALYTICAL INVESTIGATION OF FLIGHT CONTROL
PROBLEMS AND STATIC AND DYNAMIC RESPONSE REQUIREMENTS OF A HIGH-SPEED,
LOW-ALTITUDE MISSILE.

269 253 0298 THE RESULTS OF A STUDY OF THE FLIGHT CONTROL
PROBLEMS OF A HIGH-SPEED, LOW-ALTITUDE MISSILE ARE PRESENTED.
INVESTIGATIONS WERE ALSO MADE IN THE AREAS OF GUST ANALYSIS REACTOR,
INLET, AND CONTROL SYSTEM COUPLING AND BASIC VEHICLE STABILITY AND
CONTROL. THE EFFECTS OF SAMPLING FREQUENCY (DATA RATE), COMPUTATION
TIME DELAY, AND TRANSPORT LAGS ON OVER-ALL SYSTEM PERFORMANCE ARE
PRESENTED.

269 253 0296 (*DIGITAL SYSTEMS FOR FLIGHT, *CONTROL OF *GUIDED MISSI
LES.) (SYNTHESIS, CIRCUITS, *DIGITAL SYSTEMS.) (DIGITAL COM-PUTERS, AN
ALOG COMPUTERS, OPERATION.) (SIMULATION OF EQUATIONS OF MOTION ON ANAL
OG COMPUTERS.) (MATHEMATICAL ANALYSIS OF AERO-DYNAMIC DATA FOR LAUNCHIN
G OF GUIDED MISSILES.) (*CONTROL SYSTEMS, GUIDANCE, RELIABILITY.) (NUCL
EAR PROPULSION, GUIDED MISSILES.) -

269 254 0299 A VARIATIONAL PRINCIPLE SIMPLIFIED,

269 254 0299 THIS REPORT COMPILES EXISTING MATERIAL ON THE
VARIATIONAL METHOD IN ELECTROMAGNETIC SCATTERING PROBLEMS, TO PRESENT
IT IN A FORM READILY DIGESTED BY THOSE HAVING REASONABLY GOOD TRAINING
IN ADVANCED CALCULUS AND AN ELEMENTARY KNOWLEDGE OF MAXWELL'S
EQUATIONS. THE FIRST PART OF THE REPORT DISCUSSES THE MATHEMATICAL
TOOLS NEEDED TO DEVELOP THE VARIATIONAL FORMULA. THESE ARE CALCULUS OF
VARIATIONS, GREEN'S FUNCTION FOR THE SCALAR HELMHOLTZ EQUATION, AND
TENSOR ANALYSIS. THE SECOND PART APPLIES THESE IDEAS TO DERIVE THE
DYADIC GREEN'S FUNCTION AND AN INTEGRAL EQUATION FOR THE SCATTERED
FIELD. FROM THE INTEGRAL EQUATION, A STATIONARY EXPRESSION FOR THE
SCATTERED FIELD IS DERIVED, AND THE VARIATIONAL FORMULA FOR THE
BACKSCATTERING CROSS SECTION IS THEN OBTAINED.

269 254 0297 (ELECTROMAGNETIC WAVES, PROPAGATION, *SCATTERING, MATH
EMATICAL ANALY-SIS.) (*CALCULUS OF VARIATIONS, GREEN S FUNCTION, INTEG
RAL EQUATIONS.) TENSOR ANALYSIS. -

269 256 0300 PRODUCTION ENGINEERING OF PLASTIC COMPONENTS FOR
CARTRIDGE, 81MM, ILLUMINATING, T214E2.

269 256 0300 NO ABSTRACT AVAILABLE

269 256 0298 (*ILLUMINATING PROJECTILES, *CARTRIDGES, ROCKET ASSIST
ED PROJECTILES, PLASTICS, PRODUCTION, MANUFACTURING METHODS.) (ROCKET MO
TORS, PROPELLANTS, SPECIFIC IMPULSE.) -

269 259 0301 TRANSIENTS IN CERTAIN AUTONOMOUS MULTIPLE DEGREE OF
FREEDOM NONLINEAR VIBRATING SYSTEMS.

269 259 0301 OSCILLATIONS OF WEAKLY NONLINEAR AUTONOMOUS MULTIPLE DEGREE OF FREEDOM DYNAMICAL SYSTEMS ARE STUDIED. THE ANALYSIS INCLUDES NONLINEAR EFFECTS ARISING FROM THE POTENTIAL AS WELL AS THE KINETIC ENERGIES OF THE SYSTEMS AND THE SYSTEMS INCLUDE ELEMENTS THAT PRODUCE NONLINEAR DISSIPATIVE FORCES. THE METHOD OF AVERAGING IS APPLIED TO A SUITABLY TRANSFORMED SET OF EQUATIONS. IN SEVERAL IMPORTANT CASES NONPERIODIC SOLUTIONS FOR ARBITRARY INITIAL CONDITIONS ARE OBTAINED BY QUADRATURES.

269 259 0299 (DYNAMICS, OSCILLATION, *VIBRATION, ANALYSIS.) (POTENTIAL THEORY, RESONANCE, FREQUENCY, DAMPING, THEORY.) (*HARMONIC ANALYSIS, POLYNOMIALS, *MATRIX ALGEBRA, FOURIER ANALYSIS, DIFFERENTIAL EQUATIONS, INTEGRATION, FUNCTIONS, *NON-LINEAR DIFFERENTIAL EQUATIONS.) -

269 260 0302 EXPERIMENTAL STUDIES OF CAVITATION NOISE IN A FREE-JET TUNNEL.

269 260 0302 THE RESULTS OF EXPERIMENTAL STUDIES ON CAVITATION NOISE GENERATED IN THE FREE-JET TUNNEL AT ST. ANTHONY FALLS HYDRAULIC LABORATORY IN THE PERIOD OCTOBER 1960 TO JUNE 1961 ARE SUMMARIZED. TWO-DIMENSIONAL TEST BODIES OF DIFFERENT SHAPES, SUCH AS A CIRCULAR CYLINDER, WEDGE, AND A TULIN-BURKHART HYDROFOIL WERE TESTED. VARIOUS TYPES OF CAVITATING FLOWS, NAMELY, TRANSIENT CAVITIES, STEADY-STATE CAVITIES, AND NON-STATIONARY CAVITIES WERE COVERED. SPECIAL ATTENTION WAS GIVEN TO THE EFFECT OF VENTILATION ON THE INTENSITY OF CAVITATION NOISE. EFFECTS OF BODY SIZE AND THE PRESENCE OF A SOLID BOUNDARY WERE ALSO INVESTIGATED.

269 260 0300 (*CAVITATION NOISE, ACOUSTICS, *CAVITATION, JETS, *WATER TUNNELS, GASES.) (TEST EQUIPMENT, CYLINDRICAL BODIES, CRYSTALS, BARIUM COMPOUNDS, TITANATES, TRANSDUCERS, OSCILLOGRAPHS, ULTRASONIC SPECTRUM ANALYZERS, CATHODE RAY TUBE SCREENS.) (PHYSICAL PROPERTIES, VELOCITY, PRESSURE, TEMPERATURE.) (HARMONIC ANALYSIS, EXPERIMENTAL DATA.) -

269 262 0303 REPORT OF THE SUBPANEL ON CONSOLIDATION AND FABRICATION REFRACTORY METALS SHEET ROLLING PANEL.

269 262 0303 THE REPORT RECAPITULATES THE HIGHLIGHTS FROM THREE MEETINGS CONCERNED WITH CONSOLIDATION, HOT WORKING, AND WARM-COLD FINISHING. DISCUSSIONS WERE NOT CONFINED TO ANY ONE REFRACTORY METAL, NOR DID THEY IN EACH CASE EXTEND TO ALL OF THE MATERIALS BEING PRODUCED. IT IS APPARENT THAT SOME PROBLEM AREAS ARE PECULIAR TO ONE OR OTHER REFRACTORY ALLOY WHILE OTHER PROBLEM AREAS ARE COMMON IN VARYING DEGREE TO ALL. AN ATTEMPT WAS MADE TO CATALOGUE THE FACTORS WHICH BEAR UPON THE INITIAL HOT WORKABILITY OF SINTERED W SHEET BAR WITH PHYSICAL ATTRIBUTES INCLUDING (1) A MINIMUM SINTERED DENSITY OF 90%. (2) A MEDIUM GRAIN SIZE, ASTM 6 TO 8 (TOO FINE A GRAIN SIZE REQUIRES HIGH FLOW PRESSURE AND HAS A LIKELIHOOD OF BRITTLINESS A COARSE GRAIN LEADS TO A HIGH UNIT GRAIN BOUNDARY AREA SEGREGATION OF IMPURITIES), (3) A PORE DISTRIBUTION AND SIZE ADEQUATE TO INHIBIT GRAIN COARSENING, AND (4) A REDUCED LEVEL OF INTERSTITIAL IMPURITIES. (AUTHOR) AD-269 2629N6

269 262 0301 (*REFRACTORY MATERIALS, *METAL PLATES, SHEETS, MANUFACTURING METHODS, PROCESSING, POWDER METALLURGY, *TUNGSTEN, IMPURITIES, MELTING, ELECTRIC ARCS, ELECTRON BEAMS, CASTING, ROLLING MILLS, MACHINING, LATHES.) CONFERENCES. -

269 266 0304 A MEDIATION MODEL FOR PAIRED-ASSOCIATE LEARNING,

269 266 0304 A MODEL TO EXPLAIN HOW PAIRED-ASSOCIATES GET LEARNED HAS BEEN PRESENTED. IT WAS PROPOSED THAT PAIRED-ASSOCIATE LEARNING MAY INVOLVE AS MANY AS FIVE INTERDEPENDENT PROCESSES CORRESPONDING TO STIMULUS-TERM DISCRIMINATION, RESPONSE-TERM DISCRIMINATION, RESPONSE LEARNING (FOR STIMULUS TERMS AS WELL AS FOR RESPONSE TERMS), AND AN ASSOCIATION STAGE. THE MODEL APPEARS TO BE USEFUL IN INTERPRETING DATA FROM STUDIES DEALING WITH THE EFFECTS OF CONTEXT ELEMENTS, OF STIMULUS-TERM AND RESPONSE-TERM FAMILIARIZATION, OF STIMULUS-TERM AND RESPONSE-TERM PRONUNCIABILITY, OF TERMS WITH DOUBLE FUNCTION, AND OF THE GREATER S-R THAN R-S STRENGTH FOLLOWING PAIRED-ASSOCIATE LEARNING. SOME FURTHER IMPLICATIONS OF THE MODEL FOR PAIRED-ASSOCIATE LEARNING, SERIAL LEARNING, AND TRANSFER EXPERIMENTS WERE DISCUSSED AND THE NEED FOR ADDITIONAL STUDY OF MEDIATING RESPONSES WAS EMPHASIZED.

269 266 0302 (*LEARNING, CONDITIONED REFLEX, TRANSFER OF TRAINING.)
(*VERBAL BEHAVIOR, REACTION (PSYCHOLOGY).) -

269 268 0305 ATOLL RESEARCH BULLETIN NOS. 76-84.

NO ABSTRACT AVAILABLE

269 268 0303 (*PACIFIC ISLANDS, MICRONESIA, HAWAII.): -(PLANTS, SOILS , *CORAL REEFS, ANIMALS, ROCK, CLIMATE, ALGAE.) -

269 269 0306 GAMMA-RAY PENETRATION EXPERIMENTS FOR A LIGHT AIRCRAFT CARRIER USING DISTANT SOURCES AND SOURCES SIMULATING CONTAMINATION OF THE HULL,

269 269 0306 THE PENETRATION OF GAMMA RAYS INTO COMPARTMENTS OF AN AIRCRAFT CARRIER FROM TWO DIFFERENT RADIOISOTOPES WAS MEASURED IN 2 EXPERIMENTS. IN 1 EXPERIMENT, COBALT-60 AND CESIUM-137 POINT ISOTROPIC SOURCES WERE EXPOSED NEAR THE HULL OF THE SHIP TO SIMULATE HULL CONTAMINATION. MEASUREMENTS OF DOSE WERE MADE IN THE FORWARD PART OF THE SHIP AT 4 DIFFERENT DECK LEVELS. DOSE DISTRIBUTION DATA ARE PRESENTED FOR THE 2 SOURCES USED AND FOR THE DIFFERENT SOURCE POINTS CONSIDERED. IN THE 2ND EXPERIMENT, A NOMINAL 500CURIE COLLIMATED COBALT-60 SOURCE WAS EXPOSED AT A DISTANCE OF ROUGHLY 100 FEET FROM DESIGNATED POINTS TO IRRADIATE 2 GENERAL REGIONS OF THE SHIP. DOSE DISTRIBUTIONS ARE PRESENTED FOR EACH OF 18 SOURCE POSITIONS USED. FIVE DECKS WERE INSTRUMENTED IN EACH OF THE 2 GENERAL REGIONS CONSIDERED. DIAGRAMS INDICATING SOURCE POSITIONS, DETECTOR POSITIONS, AND HULL-PLATING THICKNESSES ARE PRESENTED.

269 269 0304 (*AIRCRAFT CARRIERS, NAVAL VESSELS, SHIP HULLS, SHIP PLATES, FLIGHT DECKS, *SHIELDING, GAMMA RAYS, RADIOACTIVITY, *RADIO-LOGICAL CONTAMINATION, CONTAMINATION, RADIATION EFFECTS, MEASUREMENT, TESTS, EFFECTIVENESS.) (RADIOACTIVE ISOTOPES, TEST EQUIPMENT, TEST METHODS.)

269 271 0307 TABLES OF INTERFERENCE FACTORS FOR USE IN WINDTUNNEL AND GROUND-EFFECT CALCULATIONS FOR VTOLSTOL AIRCRAFT, PART III. WIND TUNNELS HAVING WIDTH-HEIGHT RATIO OF 1.0,

269 271 0307 TABLES OF INTERFERENCE FACTORS FOR USE IN WINDTUNNEL AND GROUND-EFFECT CALCULATIONS FOR VTOLSTOL AIRCRAFT ARE PRESENTED FOR WIND TUNNELS HAVING A WIDTH-HEIGHT RATIO OF 1.0. THESE TABLES WERE MACHINE-CALCULATED AND ARE INTENDED FOR USE WITH THE PROCEDURES OF NASA TECHNICAL REPORT R-124. THESE TABLES ARE PRESENTED WITHOUT COMMENT.

269 271 0305 (*VERTICAL TAKE-OFF PLANES, *SHORT TAKE-OFF PLANES, WIND TUNNEL MODELS, AERODYNAMICS, GROUND EFFECT, WIND TUNNELS, CONFIGURATION, INTERFERENCE, MATHEMATICAL ANALYSIS, TABLES.) -

269 276 0308 REPORT OF THE SUBPANEL ON ANALYTICAL TECHNIQUES FOR REFRACTORY METALS SHEET ROLLING PANEL MATERIALS ADVISORY BOARD.

269 276 0308 ANALYTICAL TECHNIQUES FOR MAJOR ALLOYING CONSTITUENTS IN THE REFRACTORY METALS WERE FOUND TO BE ADEQUATE. THE MAIN PROBLEM AREA IN ANALYSIS CONTINUES TO BE DETERMINATION OF THE INTERSTITIAL ELEMENTS, O, N, C, AND H, AT LOW LEVELS. NEW METHODS OF ANALYSIS INCLUDED, MASS SPECTROGRAPHIC, EMISSION SPECTROSCOPIC, X-RAY FLUORESCENCE, INCLUDING THE MICROPROBE, INTERNAL FRICTION, AND LOW-TEMPERATURE ELECTRICAL RESISTIVITY. METHODS FOR ANALYSIS OF TRACE ELEMENTS OTHER THAN INTERSTITIALS SEEMED ADEQUATE. THE RESULTS OF A SURVEY OF THE STATUS OF ANALYTICAL TECHNIQUES FOR THE REFRACTORY METALS AND THEIR ALLOYS ARE REPORTED.

269 276 0306 (*REFRACTORY MATERIALS, HEAT RESISTANT ALLOYS, *ANALYSIS, *METALS, CHEMICAL IMPURITIES, TESTS, TABLES.) (NIOBIUM ALLOYS, MOLYBDENUM ALLOYS, TANTALUM ALLOYS, TUNGSTEN ALLOYS.) (TEST METHODS, OPTICS, CHEMICAL ANALYSIS.) -

269 278 0309 HEXADIENES BY DEHYDRATION OF C6 CYCLIC ETHERS.

269 278 0309 ATTEMPTS WERE MADE TO CATALYTICALLY DEHYDRATE, 6-C-ATOM CYCLIC ETHERS SUCH AS 2,5-DIMETHYLTETRAHYDROFURAN AND TO STUDY THE COMPOSITION AND COMPLEXITY OF THE PRODUCTS, AS WELL AS THE EXTENT OF ISOMERIZATION ACCOMPANYING THE DEHYDRATIONS. THE IDENTIFICATION WAS AIDED BY THE USE OF A FLAME IONIZATION GAS CHROMATOGRAPH. THE PRODUCTS CONSISTED OF (1) A LOW-BOILING END REPRESENTING FROM 1 TO 8% OF THE DISTILLATE, CONSISTING PRIMARILY OF CARBONYL COMPOUNDS AND UNIDENTIFIED HYDROCARBONS (2) A MAJOR INTERMEDIATE FRACTION, BOILING BETWEEN 50 AND 82 C WHICH CONTAINED A MIXTURE OF HEXADIENES AS WELL AS OTHER 6-C-ATOM HYDROCARBONS SUCH AS 1- AND 2-HEXENE AND BENZENE (3) A HIGH BOILING END, WHICH CONSISTED PRIMARILY OF SOME UNREACTED STARTING MATERIAL, DIMERS, AND OTHER UNIDENTIFIED CONSTITUENTS. THE 1,5-, 1,4-, 1,3- AND 2,4-HEXADIENES WERE IDENTIFIED. A STUDY WAS MADE OF THE EFFECT OF CHANGING THE ACIDITY OF THE ALUMINA CATALYST ON THE PRODUCTS OF DEHYDRATION. BY IMPREGNATING THE CATALYST WITH NA IONS THE ACIDITY OF THE CATALYST WAS DECREASED. WHEN USED TO DEHYDRATE THE 6-C-ATOM CYCLIC ETHERS THE DEACTIVATED CATALYST EFFECTED LESS ISOMERIZATION.

269 278 0307 (*DIENES, *DIENE SYNTHESIS, DEHYDRATION, ISOMERS, ETHERS, *FURAN, SEPARATION, FRACTIONATION, CHROMATOGRAPHIC ANALYSIS, PHYSICAL PROPERTIES, INFRARED SPECTROSCOPY.) (HYDROCARBONS, CYCLOHEXENES, BENZENES, MONO-CYCLIC COMPOUNDS, ISOPRENE, BUTADIENES.) (CATALYSTS, ALUMINUM COMPOUNDS, OXIDES.) (CATALYSIS, CHEMICAL REACTIONS, CARBOXYLIC ACIDS, POLYMERIZATION.) -

269 899 0310 EVALUATION OF EMPIRE DEVICES NF-105 NOISE AND FIELD INTENSITY METER.

269 899 0310 A NOISE AND FIELD INTENSITY METER WAS EVALUATED TO DETERMINE ITS SUITABILITY FOR MAKING RADIO INTERFERENCE MEASUREMENTS IN ACCORDANCE WITH MILITARY REQUIREMENTS. THE RESULTS INDICATED THAT THE METER IS ACCEPTABLE FOR MEASURING THE PARAMETERS OF INTERFERENCE

SIGNALS REQUIRED BY THE SPECIFICATIONS AT FREQUENCIES BETWEEN 0.15 AND 1000 MC. THE PERFORMANCE OF THE METER COMPARES FAVORABLY WITH THE PERFORMANCE OF THE AN/PRM-1, TS-587/U, AND AN/URM-17 INTERFERENCE MEASUREMENT DEVICES.

269 899 0308 (TESTS OF RADIO FIELDS, INTENSITY, *METERS FOR MEASUREMENT OF *RADIO INTERFERENCE.) -
269 847 0311 F-415A CAMERA SYSTEM.

269 847 0311 A DESCRIPTION IS GIVEN OF THE F-415A ROTARY PRISM PANORAMIC CAMERA. THE F-415A HAS BEEN OPTIMIZED FOR ACHIEVING PHOTOGRAPHIC COVERAGE, HORIZON TO HORIZON, OF AN AREA WHILE OPERATING AT A MINIMUM OF 500 FEET ABOVE THE TERRAIN AT AN AIRSPEED OF 600 KNOTS. THE STEREO VIEWING CAPABILITY IS MAINTAINED BY OBTAINING A SIXTY PERCENT OVERLAP OF SUCCEEDING FRAMES OF PHOTOGRAPHY. THE F-415A HAS, AS A DESIGN OBJECTIVE, A DYNAMIC RESOLUTION OF 20 LINES PER MILLIMETER.

269 847 0309 (*WIDE FIELD CAMERAS, *AERIAL CAMERAS, PRISMS (OPTICS), PANORAMIC SCANNERS FOR AERIAL RECONNAISSANCE, DESIGN, EFFECTIVENESS.)

269 787 0312 CAVES IN SOUTHEASTERN TURKMENISTAN AND IN THE IRKUTSKAYA OBLAST.

269 787 0312 NO ABSTRACT AVAILABLE

269 787 0310 (*UNDERGROUND STRUCTURES, *GEOL-OGY, ARCHAEOLOGY, USSR.)
269 666 0313 SINGLE-VOWEL INTELLIGIBILITY TESTS,

269 666 0313 INTELLIGIBILITY STUDIES WERE MADE ON (1) AN EXPANDED SINGLE-VOWEL WORD LIST COMPOSED OF DIFFERENT BEGINNING AND ENDING CONSONANTS AND CONSONANTAL COMBINATIONS PRESENT IN THE LANGUAGE (2) SYLLABIC LISTS DERIVED FROM WORD-HALVES OF THE SAME VOWEL LIST AND (3) PB WORDS IN WHICH THE MOST FREQUENTLY OCCURRING CONSONANTS AND VOWELS IN THE LANGUAGE ARE REPRESENTED. RESULTS OF THE STUDY INDICATED THAT (1) AN EXPANDED SINGLE-VOWEL LIST OF 52 ITEMS CAN BE CONSTRUCTED TO REPRESENT 90 PER CENT OF THE TOTAL POPULATION OF ENGLISH MONOSYLLABLES (1159 ITEMS) FORMED WITH THIS VOWEL (2) THE EXPANDED SINGLE-VOWEL LIST IS MUCH MORE DIFFICULT THAN THE PB LIST (3) SYLLABIC LISTS AND THE PB LIST ARE NOT HIGHLY RELATED AS INDICES OF INTELLIGIBILITY AND (4) SYLLABIC LISTS ARE REASONABLY ACCURATE PREDICTORS OF CONSONANTAL ERRORS IN WORDS OF WHICH THEY ARE A PART.

269 666 0311 (*VERBAL BEHAVIOR, *INTELLI-GIBILITY, TESTS.) (*VOCABULARY, *LANGUAGE, ANALYSIS.) -
269 647 0314 ACCELERATING THE BUILDING OF NEW MACHINES,

269 647 0314

269 647 0312 (*INDUSTRY, *MACHINES, *INDUS-TRIAL RESEARCH, *USSR, SCIENTIFIC RESEARCH, MANUFACTURING METHODS, ANALYSIS.) -

269 777 0316 BRITTLE FRACTURE TRANSITION-TEMPERATURE CORRELATIONS IN CONSTRUCTIONAL ALLOY STEELS.

269 777 0316 A CORRELATION WAS SOUGHT BETWEEN THE LOW-BLOW TRANSITION TEMPERATURE (LBTT) AND THE TEMPERATURES AT WHICH BRITTLE FRACTURE OCCURRED IN 4 SERVICE CASUALTIES. COMPARISONS WERE MADE BETWEEN THE LBTT AND THE NAVAL RESEARCH LABORATORY DROP-WEIGHT NIL-DUCTILITY TRANSITION (NDT) TEMPERATURE, WIDE-PLATE CRACK-ARREST TEMPERATURE, AND THE MAXIMUM TEMPERATURE AT WHICH BRITTLE FRACTURE WOULD PROPAGATE IN SPECIAL WIDE-PLATE CRACK PROPAGATION TESTS. LOW-BLOW TRANSITION TEMPERATURE TESTS WERE MADE USING LARGE (1.2 SQ-IN. CROSS SECTION) CHARPY SPECIMENS IN 2 STEELS ON WHICH SIMILAR TESTS WERE MADE WITH SPECIMEN SIZES RANGING FROM ONE-HALF TO DOUBLE STANDARD SIZE. IN SERVICE-CASUALTY MATERIALS, THE LBTT AND NDT CORRELATED WITHIN 20 C. COMPARISON BETWEEN LBTT AND WIDE-PLATE CRACK-ARREST TEMPERATURES INDICATED NEAR ONE-TO-ONE CORRELATION. IN SPECIAL CRACK-PROPAGATION TESTS WITH SELF-STRESSED SPECIMENS, THE MAXIMUM TEMPERATURE AT WHICH BRITTLE FRACTURE WOULD PROPAGATE WAS BELOW THE LBTT, PROBABLY BECAUSE OF THE LOW STRESSES INVOLVED. THE LBTT DETERMINED FROM THE OVERSIZED CHARPY SPECIMENS CONFIRMED EARLIER OBSERVATION THAT THE LBTT IS INDEPENDENT OF SPECIMEN SIZE.

269 777 0314 (METAL PLATES, *STEEL, FAILURE (MECHANICS), *FRACTURE (MECHANICS), BRITTLE MATERIALS, *TRANSITION TEMPERATURE, PROPAGATION, TEST METHODS, THEORY, IMPACT SHOCK, STRESSES, PLASTICITY, DEFORMATION.)

269 728 0317 MAGNETIC SHIELDING FACTORS OF A SYSTEM OF CONCENTRIC SPHERICAL SHELLS,

269 728 0317 GENERAL EXPRESSIONS ARE DEVELOPED FOR THE SHIELDING FACTORS OF CONCENTRIC SPHERICAL SHELLS OF LINEAR ISOTROPIC MAGNETIC MATERIAL. APPROXIMATE RESULTS ARE GIVEN FOR SHELLS OF HIGHLY PERMEABLE MATERIAL WHICH ARE THIN COMPARED TO THEIR RADII.

269 728 0315 (MAGNETIC MATERIALS, *SHIELDING, MAGNETIC FIELDS, SPHERES, METALS, *STRUCTURAL SHELLS, MAGNETIC SUSCEPTIBILITY.) (NUMERICAL ANALYSIS, TRANSFORMATIONS (MATHEMATICS), HARMONIC ANALYSIS, MATRIX ALGEBRA.)

269 773 0318 OXIDATION OF TUNGSTEN AND TUNGSTEN BASED ALLOYS.

269 773 0318 THE RESULTS OF STUDIES RELATED TO THE OXIDATION OF W AND ITS ALLOYS ARE STUDIED. THE PRESSURE OF WO₃ POLYMERS OVER WO₂ WAS MEASURED IN A W KNUDSEN CELL AND FOUND TO AGREE WITH MEASUREMENTS IN A PT CELL. LITERATURE DATA FOR WO₂ WO₃ WERE COMBINED WITH VAPOR PRESSURES DETERMINED IN THIS PROJECT TO GIVE THERMODYNAMIC VALUES FOR W₁₈O₄₉ AND W₂₀O₅₈. W OXIDATION RATES WERE MEASURED FROM 800 TO 1700 C AND IN O PRESSURES BETWEEN 0.2 AND 0.02 ATMOSPHERES. THE EFFECTS OF O PRESSURE INDICATE THAT THE RATE MAY BE GOVERNED BY O DISSOCIATING TO ATOMS AT THE REACTING SURFACE. THE OXIDATION RATE IS DEMONSTRATED TO BE INDEPENDENT OF THE OXIDE EVAPORATION RATE. ALL OF THE EVIDENCE INDICATES THAT IF AN OXIDE BARRIER LAYER IS PRESENT AT TEMPERATURES ABOVE 800 C IT MUST BE VERY THIN. STUDIES ON THE OXIDATION OF TA - W ALLOYS BETWEEN 800 AND 1200 C INDICATE THAT THE 50-50 ALLOY HAS THE GREATEST OXIDATION RESISTANCE, OXIDIZING AT A RATE AS MUCH AS 10 TIMES SLOWER THAN W ALONE.

269 773 0316 (REFRACTORY MATERIALS, *TUNGSTEN, *TUNGSTEN ALLOYS, TANTALUM ALLOYS, *OXIDATION, CHEMICAL REACTIONS, REACTION KINETICS, HIGH TEMPERATURE RESEARCH, TUNGSTEN COMPOUNDS, OXIDES, VAPOR PRESSURE, THERMODYNAMICS, HEAT OF FORMATION.) (TEST EQUIPMENT, VACUUM FURNACES, TEMPERATURE, PRESSURE, X-RAY DIFFRACTION ANALYSIS, MICROPHOTOGRAPHY, HEATING, INDUCTION HEATING.) -

269 555 0319 THE PERFORMANCE OF INFORMATION PROCESSING EQUIPMENT OR AN INDUSTRIAL APPLICATION OF THE ANALYSIS OF VARIANCE TO DATA ON THE PERFORMANCE OF THREE BRANDS OF LONG-WEAR MAGNETIC TAPE AND TWO CHANNELS AND FOUR TAPE DRIVES OF THE I. B. M. 7090,

269 555 0319 THREE BRANDS OF LONG-WEAR MAGNETIC TAPE WERE TESTED. THE CRITERION FOR EVALUATING PERFORMANCE WAS THE NUMBER OF ERROR STOPS ENCOUNTERED IN TESTING THE ENTIRE TAPE ON EACH REEL DURING THE FIRST RUN. THE ANALYSIS OF VARIANCE WITH FOUR CRITERIA OF CLASSIFICATION AND EQUAL FREQUENCIES WITHIN CELLS REVEALED THAT THERE IS A SIGNIFICANT DIFFERENCE IN PERFORMANCE AMONG BRANDS. ALTHOUGH THE EVIDENCE OF THIS DIFFERENCE IS RELIABLE, THE CLASSIFICATION OF REELS BY BRANDS IS THE LEAST IMPORTANT BY THE FOUR USED. THE USE OF A GUARANTEED REEL RATHER THAN A STANDARD STOCK REEL ACCOUNTED FOR THE GREATEST AMOUNT OF VARIANCE, APPROXIMATELY 13 TIMES AS MUCH VARIANCE AS THE BRANDS. THE TWO TYPES OF ERROR STOPS ACCOUNTED FOR OVER 7 TIMES AS MUCH VARIANCE AS THE BRANDS. TWO GROUPS OF TAPE DRIVES ACCOUNTED FOR ALMOST 3 TIMES AS MUCH VARIANCE AS THE BRANDS. THE STATISTICAL ANALYSIS OF VARIANCE REVEALED THAT THE RANKING OF THE BRAND DEPENDS HEAVILY UPON THE OTHER FACTORS. THE SIGNIFICANT TWO-WAY AND THREE-WAY INTERACTIONS WERE INTERPRETED, AND THREE-DIMENSIONAL ILLUSTRATIONS WERE PRESENTED TO GIVE A VISUAL, GEOMETRICAL INTERPRETATION OF THESE INTERACTIONS OR JOINT EFFECTS OF TWO AND THREE FACTORS IN THE ANALYSIS OF VARIANCE.

269 555 0317 (*TESTS, *DATA PROCESSING SYSTEMS, MAGNETIC TAPE, *FEASIBILITY STUDIES, RELIABILITY, QUALITY CONTROL.) (RESEARCH PROGRAM ADMINISTRATION, DESIGN.) (NUMERICAL ANALYSIS, ANALYSIS OF VARIANCE.) -

269 730 0320 SOLID-STATE AND MOLECULAR THEORY GROUP.

NO ABSTRACT AVAILABLE

269 730 0318 (*SOLID STATE PHYSICS, *MOLECULAR STRUCTURE, THEORY.) (*WAVE TRANSMISSION, ELECTRONS, ATOMIC ORBITALS, MOLECULAR ROTATION, METALS, GALLIUM, WATER, MOLECULES, ENERGY, SCATTERING, AMPLITUDE MODULATION, BRILLOUIN ZONES, HYPERFINE STRUCTURE, QUADRUPOLE MOMENTS, TABLES, PERTURBATION THEORY.) (EQUATIONS, INTEGRAL EQUATIONS, INTEGRATION, INTEGRALS, MATRIX ALGEBRA, BESSEL FUNCTIONS, GREEN'S FUNCTION, POLYNOMIALS, OPERATORS (MATHEMATICS), PARTIAL DIFFERENTIAL EQUATIONS, NUMERICAL METHODS AND PROCEDURES.) -

269 724 0321 A STUDY OF THE HALOGENATION OF ALIPHATIC HYDROCARBONS AND DERIVATIVES THEREOF.

269 724 0321 FLUORINATION, CHLORINATION AND BROMINATION OF THE 1- AND 2-HALOALKANES AND RELATED COMPOUNDS WERE INVESTIGATED IN THE GAS PHASE. FLUORINATION PROVED TO BE THE LEAST SELECTIVE PROCESS, BROMINATION THE MOST. A SUBSTITUENT HALOGEN ACCELERATES BROMINATION AT THE C ATOM TO WHICH SUBSTITUENT IS ATTACHED, BUT CHLORINATION IS SLIGHTLY AND FLUORINATION STRONGLY RETARDED AT THIS POSITION. ALL 3 MODES OF HALOGENATION ARE RETARDED AT ADJACENT SITES FLUORINATION BEING RELATIVELY MOST AFFECTED, BROMINATION THE LEAST. EXPERIMENTS WERE CARRIED OUT OVER A RANGE OF TEMPERATURES AND INDICATE THAT CHANGES

IN REACTIVITY OBSERVED ARE DUE PRINCIPALLY TO CHANGES IN ACTIVATION ENERGY FOR H ABSTRACTION. THESE RESULTS THROW LIGHT ON THE FACTORS CONTROLLING H ABSTRACTION BY FREE RADICALS. RADICALS OF THE TYPE -CHXCH- WHERE X IS A HALOGEN ATOM ARE RELATIVELY UNSTABLE.

269 724 0319 (*HALOCARBONS, *BROMOCARBONS, *CHLOROCARBONS, *FLUOROCARBONS, SYNTHESIS, *HALOGENATION, GASES, LIQUIDS, ORGANIC SOLVENTS.) (ALKYL RADICALS, BUTYL RADICALS, ALLYL RADICALS, BROMIDES, CHLORIDES, FLUORIDES, BUTANES, HEXANES, *BROMINATION, *CHLORINATION, *FLUORINATION.) (HYDROGEN, IONS, FREE RADICALS, CHEMICAL REACTIONS, SUBSTITUTION REACTIONS, REACTION KINETICS, STEREOCHEMISTRY, TEMPERATURE, STABILITY.) (INFRA-RED SPECTROSCOPY, CHROMATOGRAPHIC ANALYSIS.) -

269 659 0322 THE FOUR MODES OF PROPAGATION OF ADIABATIC WAVES IN A PLASMA. RESEARCH ON A THEORY OF MAGNETOGAS DYNAMICS,

269 659 0322 A STUDY OF WAVE PROPAGATION IN AN INFINITE UNIFORM PLASMA IS PRESENTED. IN MOST EXPERIMENTAL APPLICATIONS, THE PLASMA IS LIMITED. THE MANY PROBLEMS THAT THIS SITUATION INTRODUCES ARE NOT DISCUSSED. ONLY THE STRUCTURE OF DIFFERENT WAVES IN THE SIMPLEST CASE OF PLANE WAVE IN AN INFINITE MEDIUM IS EXAMINED.

269 659 0320 (ELECTROMAGNETIC WAVES, WAVE TRANSMISSION, *WAVE ANALYSIS.) (*PLASMA PHYSICS, PLASMA OSCILLATIONS, IONS, ELECTRONS, ACOUSTICS.) (*MAGNETOHYDRODYNAMICS, HYDRODYNAMICS, *RESONANCE, DAMPING, POLARIZATION.) (EXPERIMENTAL DATA, TABLES.) -

269 877 0323 SHORT-RANGE ORDER STRENGTHENING IN A LONG-RANGE ORDERED PHASE,

269 877 0323 THE SHORT-RANGE ORDER SHEAR STRESS CONTRIBUTION IS CALCULATED FOR BCC STRUCTURES USING FIRST APPROXIMATION QUASI-CHEMICAL THEORY. A MAXIMUM EFFECT IS OBTAINED AT THE CRITICAL TEMPERATURE. THE SHORT-RANGE ORDER CONTRIBUTION IS COMPARED WITH THE CONTRIBUTIONS OF MECHANISMS DUE TO SUMINO AND TO BROWN. THE SEPARATION OF THE SHORT-RANGE ORDER AND THE SUMINO CONTRIBUTIONS THROUGH THEIR DIFFERENT TEMPERATURE DEPENDENCIES IS DISCUSSED.

269 877 0321 (*SOLID STATE PHYSICS, IRON, ALUMINUM, BRASS, ALLOYS, SOLIDS, SOLUTIONS, ATOMS, MICROSTRUCTURE, PHYSICAL PROPERTIES, *SHEAR STRESSES, DEFORMATION.) (FLUID FLOW, TEMPERATURE, MEASUREMENT, CHEMICAL BONDING, CRYSTAL STRUCTURE, LATTICES, PROBABILITY.) -

269 793 0324 SOVIET LITERATURE ON PROTECTIVE STRUCTURES AND COMPONENTS.

269 793 0324 NO ABSTRACT AVAILABLE

269 793 0322 (*SCIENTIFIC REPORTS, *USSR, PROTECTIVE COVERINGS, *SHELTERS, RAILROADS, CONSTRUCTION, GEOPHYSICS, MINING ENGINEERING, INDUSTRIAL PLANTS, PROPELLANTS, HANDLING, LIQUEFIED GASES, OXYGEN.) -

269 716 0325 OPERATIONS AND SUPPORT SCHEDULING METHODS DERIVED FROM LABORATORY PROBLEM II 9LP-II0 - A MANNED ICBM SIMULATION,

269 716 0325 PROBLEM II WAS A MANNED SIMULATION ENCOMPASSING BOTH OPERATIONS AND SUPPORT ACTIVITIES OF A FUTURE ICBM FORCE. A NUMBER OF OPERATIONAL AND SUPPORT SCHEDULING TECHNIQUES THAT APPEAR USEFUL FOR ACTUAL AIR FORCE MISSILE SYSTEMS ARE PRESENTED. SOME RESULTS SUGGESTED BY THE EXPERIMENT ARE (1) AVOID TAKING MISSILES OFF ALERT FOR

SCHEDULED MAINTENANCE. WHEN POSSIBLE, DELAY SCHEDULED MAINTENANCE UNTIL THE MISSILE HAS A MALFUNCTION AND DO BOTH SCHEDULED AND UNSCHEDULED MAINTENANCE SIMULTANEOUSLY (2) AVOID DOING SCHEDULED MAINTENANCE ON A ONE-AT-A-TIME BASIS (3) WHERE MALFUNCTION CORRECTIONS ARE FOLLOWED BY POST-REPAIR CHECKOUTS, THESE CHECKOUTS SHOULD BE SUBSTITUTED (AS MUCH AS POSSIBLE) FOR REGULAR CHECKOUTS. THIS IS PARTICULARLY TRUE FOR CHECKOUTS THAT TAKE THE MISSILE OFF ALERT AND (4) THERE SHOULD BE CLOSE AND CONTINUOUS COOPERATION BETWEEN OPERATIONS AND SUPPORT TO ACHIEVE AN OBJECTIVE OF MAXIMUM ALERT STATUS.

269 716 0323 (SIMULATION OF *GUIDED MISSILES, OPERATIONS BY MILITARY PERSONNEL.) (*SCHEDUL-ING OF MAINTENANCE FOR GUIDED MISSILES.) (AIR FORCE OPERATIONS, OPERATIONS RESEARCH, LOGIS-TICS, AIR FORCE LOGISTICS.)

269 711 0326 COMPILATION OF UNPUBLISHED MATERIALS INFORMATION.

269 711 0326 MECHANICAL PROPERTY DATA, NOT HERETOFORE PUBLISHED, ARE PRESENTED FOR 16 MATERIALS. THESE DATA WERE OBTAINED FROM MATERIALS PROGRAMS CONDUCTED BY THE REPUBLIC AVIATION CORPORATION DURING THE PAST 5 YR. THE FOLLOWING MATERIALS ARE CONTAINED IN THE DATA COMPILATION AL ALLOYS 7075, 2024, X2219 TI ALLOYS - TI-6AL-4V, TI-8MN LOW ALLOY STEELS (90\$ FE, OR GREATER) - AISI4330 MOD HIGH ALLOY STEELS (LESS THAN 90\$ FE) - PH157MO, AM-355, 17-7PH, AM-357 NI ALLOYS - INCONEL X, INCONEL 700, RENE' 41 ADHESIVES - LOCKTITE, STRUCTURAL ADHESIVES AND MISCELLANEOUS SPECIAL PURPOSE MATERIALS - PLASTER PARTING AGENTS.

269 711 0324 (*ALLOYS, *MATERIALS, *METALS, METALLIC COMPOUNDS, *ELASTOMERS, FLUIDS, *LUBRICANTS, *ADHESIVES, *PLASTICS.) (MECHAN-ICAL PROPERTIES, TENSILE PROPERTIES, DEFOR-MATION, HARDNESS, HEAT TREATMENT, ELASTICITY, FATIGUE (MECHANICS), FAILURE (MECHANICS), TEST METHODS.) (ALUMINUM ALLOYS, TITANIUM ALLOYS, STEEL, NICKEL ALLOYS, CHROMIUM ALLOYS, MANGANESE ALLOYS, IRON ALLOYS, VANADIUM ALLOYS.) (WELDING, WELDED JOINTS, BRAZING, EXTRUSION, BONDING, PROCESSING, PRODUCTION.) TABLES. -

269 767 0327 CESIUM ION PROPELLANT SYSTEM.

269 767 0327 THE CESIUM ION PROPELLANT SYSTEM CONSISTS OF THE HARDWARE NECESSARY TO STORE, METER, VAPORIZE, AND SUPERHEAT CESIUM TO ALLOW DELIVERY OF THIS VAPOR AT THE FLOW RATE, PRESSURE, AND TEMPERATURE CONSISTENT WITH THE REQUIREMENTS OF CONTACT ION PROPULSION DEVICES NOW UNDER INVESTIGATION. PRESENTED ARE THE RESULTS OF COMPATIBILITY AND HANDLING STUDIES FOR CESIUM, DESIGN, AND DEVELOPMENT OF SEPARATE SYSTEM COMPONENTS, AND INTEGRATION OF THE COMPONENTS INTO A LABORATORY SYSTEM INCLUDING THE RESULTS OF A ONE WEEK ENDURANCE TEST.

269 767 0325 (ROCKET MOTORS FOR *ELECTRIC PROPULSION, *ION ROCKETS, GASES, IONS, MAGNETOHYDRODYNAMICS, DESIGN, MILITARY REQUIREMENTS, MATERIALS, TESTS.) (*CESIUM, STORAGE, HANDLING, VAPORIZATION, HEATING, TEMPERATURE CONTROL, PRESSURE.) -

269 679 0328 RESEARCH AND DEVELOPMENT OF TITANIUM ROCKET MOTOR CASE.

269 679 0328 THE SUSTAINED NOTCHED TENSILE STRENGTH OF COLDROLLED AND AGED SHEET STOCK AT THE 180,000 PSI YIELD STRENGTH LEVEL WAS LOWER IN THE -35 F TO 200 F TEMPERATURE RANGE FOR A H CONTENT OF 70 THAN FOR 200 PPM STRENGTHS WERE EQUIVALENT AT 400 F. PRESS-FORGED PANCAKES WITH A 0.15%-0 CONTENT WERE CAPABLE OF ATTAINING THE 200,000 PSI YIELD STRENGTH LEVEL BY DIRECT AGING AT 900 F. MULTIPLE-PASS TUNGSTEN INERT GAS (TIG) WELDING PRODUCED NO IMPROVEMENT IN NOTCHED TENSILE STRENGTH OR TOUGHNESS AS COMPARED WITH THE SINGLE-PASS METHOD DESPITE REDUCED GRAIN SIZE AND INCREASED BEND DUCTILITY ELECTRON-BEAM WELDING YIELDED SLIGHT IMPROVEMENTS AS COMPARED WITH TIG WELDING. CLOSED-DIE PRESS FORGING OF SUBSCALE 14-IN.-DIAM DOMES BY THE PANCAKE AND PREFORM TECHNIQUE AT 1650 F AND 1700 F PRODUCES SUPERIOR TENSILE DUCTILITY AT THE 180,000 PSI YIELD STRENGTH LEVEL AS COMPARED WITH SIMILAR FORGING AT 1850 AND 2000 F.

269 679 0326 (*ROCKET CASES, *TITANIUM ALLOYS, VANADIUM ALLOYS, CHROMIUM ALLOYS, ALUMINUM ALLOYS.) (MECHANICAL PROPERTIES, MANUFACTURING METHODS, SHEETS, ROLLING MILLS, AGING, FORGING, WELDING, ELECTRON BEAMS, HEAT TREATMENT, MACHINING.) (CRYSTAL STRUCTURE, GRAINS (METAL-LURGY), IMPURITIES, HYDROGEN, OXYGEN, X-RAY DIFFRACTION ANALYSIS.) TENSILE PROPERTIES.

269 681 0329 TASK SIROCCO. COMMUNITY REACTION TO AN ACCIDENTAL CHLORINE EXPOSURE.

269 681 0329 INDIVIDUAL AND COMMUNITY RESPONSES TO AN ACCIDENTAL CHLORINE GAS EXPOSURE IN RURAL LOUISIANA ARE EXAMINED. THE ACCIDENT IS DESCRIBED, AND AN ANALYSIS IS MADE OF THE INFORMALLY-ORGANIZED RESCUE OPERATIONS AND OF THE TREATMENT OF VICTIMS, PATTERNS OF COMMUNICATION, ASSISTANCE PROVIDED BY ORGANIZED AGENCIES, AND POST-EMERGENCY REACTIONS. THE RELATIONSHIP OF BEHAVIORAL RESPONSES TO THE SOCIAL AND POLITICAL STRUCTURES OF THE COMMUNITY IS STUDIED. THE PATTERN OF REACTION TO THIS EMERGENCY CAN BEST BE DESCRIBED AS COOPERATIVE, RATHER THAN DIRECTED. CIVIL DEFENSE IS GENERALLY VIEWED BY RESIDENTS OF THIS AREA AS SOMETHING CONNECTED WITH NUCLEAR WARFARE. VICTIMS OF THE GAS EXPERIENCED STRONG PSYCHOLOGICAL REACTIONS. EVEN THOUGH MANY VICTIMS WERE EXPOSED TO THE GAS FOR THIRTY MINUTES OR MORE, THERE WAS ONLY ONE HUMAN DEATH. DATA WERE ASSEMBLED FOR A FUTURE COMPARATIVE STUDY DESIGNED TO IDENTIFY, FOR FURTHER INVESTIGATION, FACTORS WHICH MIGHT PROVE TO BE OF VALUE IN EXTRAPOLATING FROM VARIOUS DISASTER STUDIES TO BOTH OFFENSIVE AND DEFENSIVE SITUATIONS INVOLVING THE OPERATIONAL TABLES, 8 REFS. (REPT. NO. 563) (CONTRACT AF 49(638)465, PROJ. 9781) (AFOSR-1592) UNCLASSIFIED REPORT DESCRIPTORS (*VISCOSITY, *FLUID FLOW, LIQUIDS, *BOUNDARY LAYERS, SHOCK WAVES, WAVE TRANSMISSION, RE-ENTRY AERODYNAMICS.) (DENSITY, VELOCITY, GRAVITY, TEMPERATURE, PRESSURE, HEAT TRANSFER, THERMAL DIFFUSION, SHEAR STRESSES.) (PERTURBATION THEORY, COMPLEX VARIABLES, DIFFERENTIAL EQUATIONS, INTEGRAL TRANSFORMS.) *TABLES. THE VISCOUS FLOW NEAR THE STAGNATION POINT ON AN INTERFACE BETWEEN TWO LIQUIDS WITH DIFFERENT DENSITIES IS STUDIED. THE USE OF A MODEL ALLOWS SOME FAIRLY GENERAL RESULTS TO BE READILY OBTAINED AS A RESULT OF A MATHEMATICAL ANALYSIS. MOREOVER, ALTHOUGH THE MODEL IS OBVIOUSLY NOT IN FULL ACCORDANCE WITH RE-ENTRY PHENOMENA, IT IS BELIEVED THAT IT IS NOT OVER-SIMPLIFIED, AND THAT SOLUTIONS OF REAL PROBLEMS OBTAINED ON

THE BASIS OF THE RESULTS OF THE PRESENT STUDY WILL BE AT LEAST QUALITATIVELY CORRECT. EQUATIONS GOVERNING THE STATED PROBLEM CAN BE TRANSFORMED TO THOSE DESCRIBING THE STAGNATION POINT FLOW AT A RIGID WALL, BUT THE BOUNDARY CONDITIONS ARE DIFFERENT. RESULTS CONCERNING THE VELOCITY AND TEMPERATURE FIELDS BASED ON A NUMERICAL INTEGRATION OF THESE EQUATIONS ARE GIVEN. ALSO PRESENTED APPROXIMATE FORMULAS FOR HEAT TRANSFER, DISPLACEMENT THICKNESS, MOMENTUM THICKNESS, BOUNDARY LAYER THICKNESS, AND TEMPERATURE LAYER THICKNESS.

269 681 0327 (*POISONOUS GASES, *ACCIDENTS, *CHLORINE, CHEMICALS, RE ACTION (PSYCHOLOGY), SOCIAL COMMUNICATION, SOCIOLOGY.) -
269 389 0330 TURBO-ELECTRIC MAIN PROPULSION AND AUXILIARY POWER PLANT, APPENDIX 2.

269 389 0330 A NEWLY DEVELOPED GENERATOR CALLED THE ACYCLIC GENERATOR IS DISCUSSED. IT IS A LOW VOLTAGEHIGH CURRENT DC GENERATOR. A TURBO-GENERATOR POWER PLANT USING THIS ACYCLIC GENERATOR AND INCLUDING A 4000 KW AUXILIARY GENERATOR IS SHOWN. IT IS POINTED OUT THAT AN ACYCLIC GENERATOR CAN BE USED IN A SUBMARINE FOR MAIN PROPULSION POWER, BUT TO FULFILL THE REQUIREMENTS OF THE LOW MAINTENANCE MACHINERY PROJECT, A DESIGN STUDY SHOULD BE INITIATED TO UNEARTH EVERY FACT OF ITS DESIGN, CONSTRUCTION, APPLICATION AND OPERATION.

269 389 0328 (*SUBMARINES, MAIN PROPULSION PLANTS, SHIP TURBINES, ST EAM POWER PLANTS, AUXILIARY POWER PLANTS, *SUBMARINE ENGINES, DIRECT CU RRENT, *GENERATORS, DESIGN.) -
269 391 0331 POWER CONTROL OF THE DOUBLE-ACTING STEAMOTOR. APPENDIX 4.

269 391 0331 CONSIDERATION WAS GIVEN TO STEAMOTOR CONTROL BY (1) VARIABLE CUT-OFF, AND (2) THROTTLING.

269 391 0329 (*EXTERNAL COMBUSTION ENGINES, POWER, CONTROL, *CONTROL SYSTEMS.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDER-WATER PROP ULSION, *NUCLEAR PROPULSION, SUBMARINES.) -
269 392 0332 FORCE AND TORQUE VARIATIONS OF THE DOUBLEACTING STEAMOTOR, APPENDIX 5.

269 392 0332 NO ABSTRACT AVAILABLE

269 392 0330 (*EXTERNAL COMBUSTION ENGINES, TORQUE, MOMENTS, *DYNAMI CS.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDERWATER PROPULSION , *NUCLEAR PROPULSION, SUBMARINES.) -
269 394 0333 HYDRAULIC TORQUE CONVERTER, APPENDIX 7.

269 394 0333 THE USE OF THE TORQUE CONVERTER PRINCIPLE IN MARINE PROPULSION TRANSMISSION WAS INVESTIGATED. THIS INCLUDED SCALING AN EXISTING DESIGN BY LAWS OF SIMILITUDE (WITH TWO UNIT COMPOUNDING FOR HIGH SPEED RATIO), TORQUE CONVERTER COMPOUNDED WITH GEARING, AND SINGLE UNIT TORQUE CONVERTER DESIGN WITH AXIAL FLOW COMPONENTS FOR HIGH SPEED RATIO. CONCLUSIONS (1) NO EXISTING SINGLE UNIT TORQUE CONVERTER DESIGN WILL MEET THE REDUCTION RATIO REQUIREMENTS OF 15 OR 25 TO 1 AT PRACTICAL EFFICIENCY LEVELS (2) TO MEET REQUIRED SPEED RATIO, IT IS NECESSARY TO COMPOUND TWO UNITS OF EXISTING DESIGN, COMPOUND ONE TORQUE CONVERTER UNIT WITH SINGLE GEAR REDUCTION, AND DESIGN A NEW TORQUE CONVERTER UNIT WITH PUMP AND TURBINE ELEMENTS ADAPTED TO HIGH SPEED

RATIO AND (3) HIGH SPEED RATIO TORQUE CONVERTER DESIGNS INVOLVE HIGH FLOW, LOW HEAD, AND HIGH RELATIVE FLOW VELOCITIES, LEADING TO HIGH FLUID FRICTION LOSSES AND TENDENCY TO CAVITATE.

269 394 0331 (TRANSMISSION, *AUTOMATIC TRANS-MISSIONS, DESIGN, FEASIBILITY STUDIES.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDERWATER PROPULSION, *NUCLEAR PROPULSION, SUBMARINES.) -

269 395 0334 HYDROKINETIC TRANSMISSION, APPENDIX 8.

269 395 0334 THIS REPORT IS AN EXTENSION OF INTERIM REPORT II 9DF61AT711) AND IT INVESTIGATES METHODS OF VARYING THE POWER OUTPUT OF A HYDROKINETIC TRANSMISSION AT CONSTANT SPEED INPUT WITH MINIMUM LOSS IN EFFICIENCY. THE REPORT ALSO PRESENTS METHODS OF OBTAINING ASTERN POWER BY THE USE OF THRUST REVERSERS IN THE PROPELLER SYSTEM. CONCLUSIONS THE TORQUE CONVERTER TRANSMISSION WITH A VARIABLE GEOMETRY PUMP ROTOR IS THE MOST SATISFACTORY TRANSMISSION FOR OBTAINING POWER CONTROL WITH CONSTANT INPUT SPEED FROM THE POINT OF VIEW OF EFFICIENCY. THIS TYPE OF TRANSMISSION REQUIRES SOME INNOVATIONS FOR PROVIDING RELIABLE METHODS FOR ATTACHMENT AND ADJUSTMENT OF THE PUMP ROTOR BLADES. THRUST REVERSERS IN THE PROPELLER STREAM HAVE THE GREATEST PROMISE FOR A RELIABLE METHOD OF PRODUCING REVERSING POWER.

269 395 0332 (TRANSMISSIONS, *AUTOMATIC TRANSMISSIONS, CONFIGURATION, POWER, CONTROL, CONTROL SYSTEMS, DESIGN.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDERWATER PROPULSION, *NUCLEAR PROPULSION, SUBMARINES.) -

269 396 0335 LIQUID SHEAR TRANSMISSION, APPENDIX 9.

269 396 0335 IT APPEARS THAT A LIQUID SHEAR TRANSMISSION CAN BE DEVELOPED, HOWEVER, ITS RELIABILITY IS QUESTIONABLE IN THE 15,000 HP RANGE. THE MINIMUM FILM THICKNESS IS OF THE ORDER OF 10 TIMES 10 TO THE-6TH POWER INCHES. ANY DIRT, THERMAL OR PRESSURE DISTORTIONS WOULD EFFECT THE PERFORMANCE OF THIS TRANSMISSION. FLUID SHEAR TRANSMISSIONS IN THE ORDER OF HUNDREDS OF HORSEPOWER ARE QUITE FEASIBLE AND RELIABLE. THE WEIGHT OF THIS TYPE OF TRANSMISSION IS QUITE LOW.

269 396 0333 (*TRANSMISSIONS, *TORQUE COUPLINGS FROM SHEAR STRESSES, TORQUE OF LIQUIDS, HYDRAULIC FLUIDS, HYDRAULIC GEAR FLUIDS, ELASTICITY, HYDRODYNAMICS.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDERWATER PROPULSION, *NUCLEAR PROPULSION, SUBMARINES.) -

269 399 0336 FLUID TRANSMISSIONS, APPENDIX 12.

269 399 0336 NO ABSTRACT AVAILABLE

269 399 0334 (*TRANSMISSIONS, *AUTOMATIC TRANSMISSIONS, DESIGN, FEASIBILITY STUDIES.) (MAIN PROPULSION PLANTS, SUBMARINE ENGINES, UNDERWATER PROPULSION, *NUCLEAR PROPULSION, SUBMARINES.) -

269 291 0337 THEORY OF GRAVITATION AND ELECTROMAGNETISM.

269 291 0337 A REDERIVATION OF THE RAINICH THEORY BY USE OF FOUR-COMPONENT SPINORS, A SPINOR CLASSIFICATION OF EMPTY SPACE-TIMES, A STUDY OF STATIC CYLINDRICALLY SYMMETRIC SOLUTIONS OF THE RAINICH EQUATIONS, AND INVESTIGATIONS CONCERNING THE INITIAL VALUE PROBLEM ARE PRESENTED. ALSO INCLUDED WAS AN ATTEMPT TO WRITE A SET OF EQUATIONS INVOLVING ONLY GEOMETRIC QUANTITIES WHICH WOULD BE EQUIVALENT TO THE GRAVITATIONAL-NEUTRINO EQUATIONS AND A STUDY OF THE GRAVITATIONAL

FIELD OF A FASTMOVING MASS. THE IMCOMPLETENESS OF THE RAINICH THEORY AS A PHYSICAL THEORY IS DISCUSSED AND THE IMPLIFICATIONS FOR FUTURE WORK IS GIVEN.

269 291 0335 (*ELECTROMAGNETIC THEORY, *GRAVITY, ELECTROMAGNETIC FIELDS, NEUTRINOS, ENERGY, WAVE TRANSMISSION, *RELATIVITY THEORY.) (TENSOR ANALYSIS, DIFFERENTIAL GEOMETRY, DIFFERENTIAL EQUATIONS.) -
269 292 0338 HIGH TEMPERATURE SEMICONDUCTOR RESEARCH.

269 292 0338 A STUDY WAS MADE OF THE CAUSE OF EXPLOSIONS IN THE HIGH PRESSURE MAGNETIC CZOCHRALSKI APPARATUS FOR THE GROWTH OF GAP. ALL EXPLOSIONS WERE ASCRIBED TO EITHER A DISCHARGE FROM THE R. F. COIL, A MECHANICAL FAILURE OF QUARTZ MEMBERS, OR AN OVERHEATING OF THE P RESERVOIR. THE STOICHIOMETRIC MELTING POINT FOR GAP IS 1467 OR -10 C AT A DISSOCIATION PRESSURE OF 30 OR -10 ATM. THE GAS PHASE TRANSPORT OF GAAS WITH I₂ WAS STUDIED BY MEASURING THE OPTICAL ABSORPTION IN THE VAPOR NO FREE I₂ IS PRESENT IN THE SYSTEM. THE HEAT OF REACTION WAS 41 KCAL/MOLE GA₁. A STUDY WAS MADE OF FACTORS AFFECTING THE CRYSTALLINITY OF GAAS INGOTS GROWN IN QUARTZ BOATS ABRASIVE BLASTING THE BOAT INSTEAD OF ETCHING WITH HF ACID, REDUCES THE WETTING OF THE BOAT BY THE MELT, AND RESULTS IN A MARKEDLY IMPROVED CRYSTALLINITY. A GA RICH MELT CAUSES INCREASED SUPERCOOLING AND POORER CRYSTALLINITY. THE HIGHER THE AS PRESSURE, THE BETTER IS THE CRYSTALLINITY, EXCEPT THAT ABOVE ABOUT 2 ATM THE CRYSTALS ARE EXCESSIVELY POROUS.

269 292 0336 (*SEMICONDUCTORS, *SEMICONDUCTING FILMS, GALLIUM COMPOUNDS, ARSENIDES, PHOSPHIDES, INTERMETALLIC COMPOUNDS, SINGLE CRYSTALS, CHEMICAL IMPURITIES, PHASE TRANSITIONS, *HIGH TEMPERATURE RESEARCH.) (CRYSTALS, GROWTH, CRYSTALLIZATION, PRESSURE, PREPARATION, HIGH PRESSURE RESEARCH, HAZARDS.) (ELECTRICAL PROPERTIES, RESISTANCE, HEAT OF REACTION, THERMODYNAMICS, MEASUREMENT, TEST METHODS, TEST EQUIPMENT.) (VAPORS, IODINE, TRANSPORT PROPERTIES.) -

269 289 0339 PRODUCTION AND INVESTIGATION OF WELDABILITY OF ONE-INCH THICK TITANIUM 6AL-4V PLATE.

269 289 0339 ONE-IN-THICK TI-6AL-4V PLATE WAS PRODUCED HAVING GOOD STRENGTH AND A SURFACE CASE OF FINE GRAINED METAL. FIVE GROUPS OF WELDED PLATES WERE EVALUATED BY TENSILE AND IMPACT TESTS. THE WELDS WERE DEPOSITED WITH TI-6AL-4V FILLER WIRE, TI5AL-2.5SN FILLER WIRE, MST 55 FILLER WIRE, MST 40 FILLER FOR ROOT PASSES, TI-6AL-4V FILLER FOR CENTRAL AND COVER PASSES, MST 40 FILLER FOR ROOT AND COVER PASSES, AND TI-6AL-4V FILLER FOR CENTRAL PASSES. TEST RESULTS INDICATED THAT WELDS MADE WITH TI-5AL-2.5SN FILLER WIRE HAD THE BEST COMBINATION OF STRENGTH AND DUCTILITY. THREE WELDED PLATES FOR EACH OF THE 5 GROUPS AND 3 UNWELDED PLATES WILL BE TESTED BY EXPLOSION CRACK-STARTER AND DROP-WEIGHT TESTS.

269 289 0337 (*TITANIUM ALLOYS, ALUMINUM ALLOYS, VANADIUM ALLOYS, *SHEETS, *WELDING, WELDS, PROCESSING, PRODUCTION.) (TESTS, TERMINAL BALLISTICS, FRACTURE (MECHANICS), IMPACT SHOCK, TENSILE PROPERTIES, HARDNESS, MICROSTRUCTURE.) MECHANICAL PROPERTIES. -

269 298 0340 ACCELERATION OF BONE REPAIR BY CHONDROITIN SULFATE
TREATMENT OF IMPLANTS,

269 298 0340 A HISTOLOGIC AND ROENTGENOGRAPHIC STUDY WAS MADE OF
THE REPAIR OF BONY DEFECTS IN THE CALVARIA OF ALBINO RATS. AN
ACCELERATED RATE OF BONE REPAIR WAS OBSERVED IN WOUNDS INTO WHICH
CHONDROITIN SULFATE-TREATED DEMINERALIZED BONE WAS IMPLANTED, AS
EVIDENCED BY MAXIMUM REPAIR OF THE DEFECT IN 6 WEEKS, WHILE 9 WEEKS
WERE REQUIRED FOR MAXIMUM HEALING WHEN UNTREATED DEMINERALIZED BONE WAS
USED. IN ADDITION, ACID-SOLUBLE COLLAGEN PRECIPITATED WITH CHONDROITIN
SULFATE WAS MORE EFFECTIVE IN THE HEALING OF THE BONY DEFECT THAN WAS
ACID-SOLUBLE COLLAGEN PRECIPITATED WITH NaCl. IN NO CASE, HOWEVER,
WERE ANY OF THE MATERIALS USED AS EFFECTIVE AS DEMINERALIZED BONE
TREATED WITH CHONDROITIN SULFATE IN CAUSING THE RAPID REPAIR OF THE
BONE. THE POSSIBILITY EXISTS THAT CHONDROITIN SULFATE, OR A COMPLEX OF
CHONDROITIN SULFATE WITH A PROTEIN, HAS, IN THESE INSTANCES, ACTED AS
AN 'INDUCTION' FACTOR FOR THE FORMATION OF THE NEW BONE NECESSARY TO
REPAIR THE BONY DEFECT.

269 298 0338 (*BONE, *TRANSPLANTATION, CHONDROITIN SULFATE, THERAPY.
) (HISTOLOGICAL SECTIONS, *CALCIFICATION, TISSUES (BIOLOGY), REGENERATIO
N.) SCIENTIFIC RESEARCH, *MEDICAL RESEARCH. -

269 299 0341 DYNAMIC LOADS IN THE ATLAS-ABLE 5 DURING TRANSONIC
BUFFETING,

269 299 0341 DYNAMIC LOADS ARE DETERMINED FOR THE ATLAS-ABLE 5
VEHICLE DURING TRANSONIC FLIGHT DUE TO UNSTEADY AERODYNAMIC PRESSURES
ACTING ON THE NOSE FAIRING. THESE PRESSURES OCCUR AS RANDOM VARIABLES
AND APPEAR TO BE ASSOCIATED WITH SHOCK FRONT OSCILLATIONS AND VORTEX
SHEDDING PHENOMENA. SUCH PHENOMENA MAY OCCUR DUE TO NOSE FAIRING
SHAPE, MACH NUMBER OF FLOW, AND ANGLE OF ATTACK.

269 299 0339 (*SPACE PROBES, *GUIDED MISSILE NOSES, LOAD DISTRIBUTIO
N, TRANSONIC FLIGHT, TRANSONICS, SHOCK WAVES, PRESSURE, OSCILLA-TIONS, T
HEORY, MATHEMATICAL ANALYSIS.) -

269 301 0342 EQUIPMENT DESIGN CONSIDERATIONS FOR SPACE
ENVIRONMENT,

269 301 0342 A REVIEW IS PRESENTED ON THE EFFECT OF SPACE
CONDITIONS ON MATERIALS AND ELECTRONIC PARTS USED SUCCESSFULLY IN THOSE
SPACE VEHICLES WHICH HAVE ACCOMPLISHED THEIR OBJECTIVES. INFORMATION
IS GIVEN ON THE SELECTION OF MATERIALS AND ELECTRONIC PARTS FOR SPACE
APPLICATIONS BASED ON KNOWLEDGE OF BOTH THE KNOWN AND THE CALCULATED OR
ESTIMATED CHARACTERISTICS OF SPACE ENVIRONMENT.

269 301 0340 (*SPACE ENVIRONMENTAL CONDI-TIONS ON SPACESHIPS, SPACE
FLIGHT, AIRFRAMES, ELECTRICAL EQUIPMENT, ELECTRONIC EQUIPMENT, ELECTROME
CHANICAL CONVERTERS, MATERIALS, PLASTICS, METALS, ALLOYS, CERAMIC MATERI
ALS, ELASTOMERS, RADIATION DAMAGE, RADIATION EFFECTS, ELECTROMAGNETIC EF
FECTS, THERMAL RADIATION, METEORITES, VACUUM SYSTEMS, TEM-PERATURE CONTR
OL.) -

269 302 0343 TEMPERATURE CONTROL SYSTEM FOR THE ATLAS ABLE-4 LUNAR SATELLITE,

269 302 0343 THE NEED TO CONTROL THE MEAN INTERNAL TEMPERATURE OF THE ABLE-4 ATLAS LUNAR SATELLITE WITHIN THE RANGE OF 45 TO 70 F LED TO THE DEVELOPMENT OF AN ACTIVE, LIGHTWEIGHT CLOSED LOOP TEMPERATURE CONTROL SYSTEM. THE SYSTEM SENSES INTERNAL TEMPERATURES AND ALTERS THE EFFECTIVE RADIATION PROPERTIES OF THE SATELLITE SO AS TO MAINTAIN THE INTERNAL TEMPERATURE WITH THE SPECIFIED RANGE, EVEN IN THE EVENT OF SOME ADVERSE EFFECTS OF THE SPACE ENVIRONMENT ON THE RADIATION PROPERTIES. THE SYSTEM CONSISTS OF 50 ROTATABLE FOUR-BLADED MASKS, EACH ACTUATED BY A SPIRALLY WOUND BIMETAL STRIP. THE ROTATION OF THE MASKS (WHICH CONTROL 20% OF THE SATELLITE SURFACE) EXPOSES SURFACE AREAS HAVING DIFFERING ABSORBING AND EMITTING CHARACTERISTICS. BOTH THE PROBLEMS ENCOUNTERED AND THE METHODS DEVELOPED TO MEET THESE PROBLEMS ARE DISCUSSED.

269 302 0341 (*LUNAR PROBES, SATELLITE VEHICLES, TEMPERATURE, CONTROL, *TEMPERATURE CONTROL, DESIGN.) -

269 601 0344 STATISTICS OF CYCLONIC ACTIVITY IN THE WESTERN MEDITERRANEAN,

269 601 0344 NO ABSTRACT AVAILABLE

269 601 0342 (*CYCLONES, *MEDITERRANEAN SEA, STATISTICAL ANALYSIS.) (NAVAL OPERATIONS, CLIMATIC FACTORS.) -

269 603 0345 HIGH TEMPERATURE RESISTANT TRANSPARENT PLASTICS.

269 603 0345 PURIFICATION OF THE DIGLYCIDYL ETHER OF BISPHENOL A (DEBA) BY VACUUM DISTILLATION AND DECOLORIZATION OF THE TRIMETHOXYBOROXINE (TMB) CATALYST PRODUCED COLORLESS STARTING MATERIALS. REACTION OF THESE MATERIALS PRODUCED A WATER-WHITE RESIN. AFTER CURING IN VACUUM, THE 0.25 IN. THICK CASTINGS HAD A LUMINOUS TRANSMISSION OF 88%. SMALL QUANTITIES OF LOW COLOR EPOXY NOVOLAC RESIN WERE OBTAINED BY MOLECULAR DISTILLATION OF A COMMERCIAL PRODUCT. THE DISTILLATE REACTED RAPIDLY WITH TMB TO FORM A HARD SOLID WITH MUCH LOWER COLOR THAN OBTAINED FROM ANY PREVIOUS RESIN OF THIS TYPE. CAST RESINS OBTAINED FROM HEXAHYDROPHTHALIC ANHYDRIDE AND VINYL CYCLOHEXENE DIOXIDE WERE EXTREMELY NOTCH SENSITIVE AND BRITTLE.

269 603 0343 (*TRANSPARENT PANELS, *OPTICAL MATERIALS, *OPTICAL PLASTICS, *OPTICAL COATINGS, *HEAT RESISTANT POLYMERS, *EPOXY RESINS, ACRYLIC RESINS, RESINS, PLASTICS.) (PHTHALIC ACIDS, ANHYDRIDES, VINYL RADICALS, CYCLO-HEXENES, DIOXIDES.) (EPOXIDES, HETEROCYCLIC COMPOUNDS, PROCESSING, AGING, SYNTHESIS.) (ULTRAVIOLET RADIATION, RADIATION DAMAGE, LIGHT TRANSMISSION, MECHANICAL PROPERTIES, AIRCRAFT FINISHES, SUPERSONIC PLANS.) HIGH TEMPERATURE RESEARCH. -

269 612 0346 PROBLEMS OF INFORMATION TRANSMISSION NO. 5

269 612 0346 THE RESULTS OF EXPERIMENTAL STUDIES PERFORMED IN THE LAST TWO YEARS IN THE LABORATORY OF INFORMATION TRANSMISSION SYSTEMS ARE PRESENTED. THIS ARTICLE DESCRIBES THE METHOD OF MEASURING THE FREQUENCY DISTRIBUTION OF MESSAGE ELEMENTS FROM VARIOUS SOURCES AND ADDUCES THE RESULTS OF MEASUREMENT OF FREQUENCY DISTRIBUTION WHICH, IN THE CASE OF CERTAIN SOURCES, IS CARRIED TO THE LEVEL OF 4TH-ORDER

DISTRIBUTIONS. IN APPENDICES TO THIS COLLECTION OF ARTICLES THERE ARE PROVIDED TABLES OF THE FUNCTIONS NECESSARY TO COMPUTE THE ENTROPY OF DISCRETE DISTRIBUTION.

269 612 0344 (*CODING, DATA TRANSMISSION SYSTEMS, STATISTICAL ANALYSIS, *SEQUENTIAL ANALYSIS.) (*INFORMATION THEORY, STATISTICAL DISTRIBUTIONS, *COMMUNICATIONS THEORY, SEQUENCES.) USSR. -
269 617 0347 NO TITLE AVAILABLE

269 617 0347 BASIC PROPERTIES AND METHODS OF PRODUCING TI AND ITS ALLOYS ARE PRESENTED. THE EFFECT OF COMPOSITION OF ALLOYS AND HARMFUL IMPURITIES UPON WELDABILITY IS SHOWN, FEATURES OF HEAT PROCESSES DURING WELDING ARE EXAMINED, AS WELL AS THE CONTROL OF STRUCTURE AND PROPERTIES OF WELDED JOINTS AND THE PRINCIPLES OF CHOOSING THE CONDITIONS OF WELDING AND HEAT TREATMENT. ARC WELDING IN INERT GASES AND UNDER FLUX, ELECTRIC SLAG WELDING, RESISTANCE WELDING AND SOLDERING ARE DESCRIBED. BASIC AREAS OF THE USE OF WELDED CONSTRUCTIONS ARE INDICATED. (AUTHOR) (TISTA/VGW) OTS PRICE \$2.60 FOREIGN TECH. DIV., AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AIR FORCE BASE, OHIO. THE UPPER ATMOSPHERE AND INTERPLANETARY MEDIUM, BY V. G. KURT. 7 AUG 61, 23P. (TRANS. NO. MCL- 1047/1 OF PRIODA 223-30, 1961) UNCLASSIFIED REPORT DESCRIPTORS (*ASTROPHYSICS, ATMOSPHERE MODELS, *UPPER ATMOSPHERE, PLANETARY ATMOSPHERES, ATMOSPHERE, IONOSPHERE, EXOSPHERE, ELECTRICAL CORONA, ATMOSPHERICS, INTERSTELLAR MATTER, ELECTRONS, IONS, DENSITY, ATMOSPHERIC SOUNDING, MANOMETERS, SOUNDING ROCKETS, SATELLITE VEHICLES, USSR.)

269 617 0345 (*TITANIUM, *TITANIUM ALLOYS, *WELDING, WELDS, ARC WELDING, ARC WELDS, ELECTRIC WELDING, SPOT WELDING, WELDED JOINTS, PROCESSING, PRODUCTION, MANUFACTURING METHODS.) (HEAT TREATMENT, IMPURITIES, WELDING FLUXES, SOLDERING, CONTROLLED ATMOSPHERES.) (MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, PHASE TRANSITIONS.) USSR. -
269 637 0348 DUAL CONTROL THEORY, IV.,

269 637 0348 A GENERALIZED ALGORITHM IS DERIVED FOR THE OPTIMAL DUAL CONTROL STRATEGY FOR AN OBJECT WITH SEVERAL INPUTS AND OUTPUTS, HAVING MEMORY. AN EXAMPLE OF THE APPLICATION OF THIS ALGORITHM IS GIVEN. METHODS ARE EXAMINED FOR FURTHER DEVELOPMENT IN THE FIELD OF DUAL CONTROL THEORY.

269 637 0346 (*CONTROL SYSTEMS, SYNTHESIS, MEMORY DEVICES, THEORY, VECTOR ANALYSIS.) USSR. -

269 643 0349 DETERMINING THE DENSITY OF LIQUID OXYGEN WITHIN A WIDE RANGE OF TEMPERATURES AND PRESSURES,

269 643 0349 THE THERMAL PROPERTIES OF LIQUID O (LOX) WERE STUDIED WITH A LOADED PIEZOMETER. THE AMOUNT OF O DISCHARGED FROM THE PIEZOMETER DURING THE EXPERIMENT WAS MEASURED (IN GASEOUS FORM) VOLUMETRICALLY. A PRECISION EXPERIMENTAL DEVICE WAS DEVELOPED TO STUDY THE DENSITY OF LOX WITHIN THE TEMPERATURE RANGE -190 TO 120 DEGREES TO PRESSURES OF 200 KG/SQ CM, AND ALSO THE DENSITY OF LOX ALONG THE SATURATION CURVE IN THIS SAME TEMPERATURE RANGE. THE EXPERIMENTAL DATA WERE PROCESSED ANALYTICALLY FOR PRESENTATION OF THE THERMAL PROPERTIES OF LOX IN TABULAR FORM. NOTE THIS ABSTRACT COMPRISES THE ENTIRE DOCUMENT.

269 643 0347 (*LIQUEFIED GASES, *OXYGEN, DENSITY, MEASUREMENT, TEMPERATURE, PRESSURE, HIGH PRESSURE RESEARCH, THERMODYNAMICS, CRYOGENICS.) USSR. -

269 650 0350 LOGISTICS. AN ASTIA REPORT BIBLIOGRAPHY,

269 650 0350 THIS BIBLIOGRAPHY WAS PREPARED BY ASTIA IN RESPONSE TO FREQUENT REQUESTS FOR INFORMATION ON LOGISTICS, AND BECAUSE OF THE DEFENSE DEPARTMENT'S CONTINUING INTEREST IN THE EFFECTIVE PROCUREMENT, MANAGEMENT, AND DISTRIBUTION OF SUPPLIES. CITATIONS ARE INCLUDED FOR DOCUMENTS CATALOGED BY ASTIA FROM 1953 THROUGH 1 DECEMBER 1961. REFERENCES ARE ALPHABETICALLY ARRANGED BY SUBJECT AREAS CONCERNING LOGISTICS MANAGEMENT, MATERIALS HANDLING, PROCUREMENT, STRATEGIC MATERIALS, AND TRANSPORTATION. WITHIN EACH SUBJECT AREA, REPORTS PUBLISHED BY MILITARY AGENCIES ARE LISTED ALPHABETICALLY BY SOURCE AND TITLE. REPORTS PUBLISHED BY DEPARTMENT OF DEFENSE CONTRACTORS ARE CITED BY SOURCE, CONTRACT AND DATE.

269 650 0348 *LOGISTICS, *SUPPLIES, *STRATEGIC MATERIALS, SUPPLY DEPOTS, MILITARY MOBILIZATION, MILITARY OPERATIONS, PROCUREMENT, CONTROL, *MANAGEMENT ENGINEERING, TRANSPORTATION, *BIBLIOGRAPHY. -

269 651 0351 BEFORE A MANNED FLIGHT,

269 651 0351 THE EFFECT OF G-FORCES (ACCELERATION AND DECELERATION) AND OF WEIGHTLESSNESS ARE DISCUSSED. TEST EQUIPMENT ARE ALSO MENTIONED.

269 651 0349 (SPACE FLIGHTS, SPACESHIPS, MANNED, PHYSIOLOGY, GRAVITY, *ACCELERATION, *DECELERATION, WEIGHTLESSNESS, SIMULATION, ROCKET PROPELLED SLEDS, CENTRIFUGES.) USSR. -

269 662 0352 HAZARD CLASSIFICATION TEST OF CARTRIDGE ENGINE STARTER, MC-1, MC-2, MXU-4/A (AMOCO) AND MXU-4/A (OLIN MATHIESON),

269 662 0352 FIVE DETONATION TESTS WERE CONDUCTED ON EACH OF THE 4 TYPES OF CARTRIDGES TO DETERMINE IF A DETONATION WOULD OCCUR AND IF SO, WOULD THE DETONATION PROPAGATE FROM CARTRIDGE TO CARTRIDGE. ONE CARTRIDGE IN A SHIPPING CONTAINER (CARDBOARD BOX) WAS PRIMED WITH 30 GRAINS OF TETRYL AND INITIATED WITH AN ENGINEER SPECIAL BLASTING CAP. EACH TYPE OF CARTRIDGE WAS ALSO SUBJECT TO A COOK-OFF TEST. NO DETONATIONS OCCURRED IN ANY OF THE TESTS. THE MC-1 AND MC-2 PRIMED CARTRIDGES WERE RUPTURED AND THREW BURNING PROPELLANT WITHIN A 10-FT RADIUS. THE REMAINS OF THE CARTRIDGE CASES ALSO REMAINED IN THIS AREA. THE MXU-4/A CARTRIDGES DID NOT IGNITE AS THE PRIMER CHARGE COULD NOT BE PLACED ON THE PROPELLANT GRAIN. ALL OF THE CARTRIDGES COOKED-OFF BETWEEN 10 AND 15 MIN AFTER THE SCRAP LUMBER WAS IGNITED. IT WAS CONCLUDED THAT ALL OF THE CARTRIDGES TESTED WERE QUANTITY DISTANCE CLASS 2, STORAGE COMPATIBILITY GROUP J AND ICC SHIPPING CLASS C.

269 662 0350 *JET ENGINES, *AIRPLANE ENGINE STARTERS, *STARTER CARTRIDGES, AMMONIUM NITRATES, NITRATES, PROPELLANTS, EXPLOSIVES, DETONATION, HAZARDS, COMBUSTION, STORAGE, SHIPPING, CLASSIFICATION, TESTS. -

269 674 0353 CHARACTERISTICS OF EXTRUDING METAL BY HIGH PRESSURE LIQUID AT ELEVATED TEMPERATURES,

269 674 0353 INVESTIGATIONS OF THE PROCESS OF EXTRUDING METALS BY A LIQUID UNDER HIGH PRESSURE WERE MADE. THE PROCESS OF HYDRAULIC EXTRUSION OF METALS AT ELEVATED TEMPERATURES IS DESCRIBED. THIS METHOD REDUCED THE FORCE REQUIRED TO DEFORM METALS AND INDICATED A POSSIBLE METHOD OF SOLVING THE PROBLEM OF WORKING HARD-TO-DEFORM METALS BY HIGH-PRESSURE LIQUID.

269 674 0351 (*EXTRUSION, *METALS, *HYDRAULIC SYSTEMS, LIQUIDS, *PRESSURE, HEAT TREATMENT, DEFORMATION.) (FATTY ACIDS, MINERAL OILS, OILS, KEROSENE, ETHANOLS, GRAPHITE, ADDITIVES, CHLORINE, PHOSPHOROUS, SULFUR.) USSR, HIGH TEMPERATURE RESEARCH, HIGH PRESSURE RESEARCH, LUBRICANTS.

269 675 0354 METEOROLOGICAL SUPPORT FOR BALLOON OPERATIONS.

269 675 0354 SAFETY AND INTERNATIONAL CONSIDERATIONS HAVE LED THE AIR FORCE TO RECOGNIZE THE NEED FOR PREDETERMINED TRAJECTORIES TO PROGRAM BALLOON OPERATIONS FOR PERIODS WHEN WEATHER CONDITIONS EXCEED CERTAIN SPECIFIED MINIMUMS. THIS PAMPHLET PRESENTS A DESCRIPTION OF BALLOON OPERATIONS AND STRATOSPHERIC FORECASTING TECHNIQUES AS THEY HAVE EVOLVED AT VERNALIS, CALIFORNIA. IT SHOULD ASSIST THOSE METEOROLOGISTS WHO REQUIRE FAMILIARIZATION IN THE COMPLEX ART OF BALLOON TRAJECTORY FORECASTING.

269 675 0352 (*METEOROLOGICAL BALLOONS, FLIGHT PATHS, METEOROLOGICAL DATA, MILITARY REQUIREMENTS, STRATOSPHERE, WEATHER FORECASTING, MATHEMATICAL PREDICTION, TABLES.) -

269 676 0355 SERVICE TEST OF BULLDOZER, EARTHMOVING, TANK MOUNTING, M9.

269 676 0355 TESTS WERE CONDUCTED TO DETERMINE THE SUITABILITY OF THE M9 BULLDOZER AND ITS MAINTENANCE PACKAGE FOR USE WITH THE M60 TANK. IT WAS CONCLUDED THAT THE TEST ITEM IS SUITABLE FOR USE WITH THE M60 TANK WHEN CERTAIN DEFICIENCIES ARE CORRECTED.

269 676 0353 (INSTALLATION OF *EARTH MOVING EQUIPMENT, *BULLDOZERS ON TANKS.) (BULLDOZERS, OPERATION, MAINTENANCE, RELIABILITY, TESTS.)

269 682 0356 ON UTILITY. I. THE VALIDITY OF THE EXPECTED UTILITY HYPOTHESIS. II. ON BERNOULLIAN UTILITY FOR GOODS AND MONEY,

269 682 0356 A MODEL OF BEHAVIOR IN CIRCUMSTANCES OF UNCERTAINTY IS NOW REPRESENTED BY A PREFERENCE ORDER BETWEEN CERTAIN DISTRIBUTIONS WHICH DETERMINES A BEST DISTRIBUTION AMONG ANY THAT ARE ATTAINABLE ON ANY OCCASION, AND HENCE AN ACT WHICH IS POSSIBLE AND WHICH HAS THAT DISTRIBUTION AS OUTCOME. BUT SINCE CERTAINTY APPEARS AS A SPECIAL INSTANCE OF UNCERTAINTY, THE PREFERENCE ORDER BETWEEN OBJECTS X WHICH GIVES A MODEL FOR BEHAVIOR WITH CERTAINTY, INDUCES A CORRESPONDING ORDER BETWEEN SPECIAL DISTRIBUTIONS WHICH MUST BE CONTAINED IN THIS PREFERENCE ORDER BETWEEN OTHER DISTRIBUTIONS. THE EXPECTED UTILITY HYPOTHESIS FOR UNCERTAIN CHOICE IS THE HYPOTHESIS THAT EVERY OBJECT XR HAS A CERTAIN UTILITY U(XR) DETERMINING THE EXPECTED UTILITY FOR AN ACT WHICH GIVES OUTCOME X WITH A PROBABILITY DISTRIBUTION AND THAT PREFERENCE BETWEEN DISTRIBUTIONS CORRESPONDS TO RELATIVE MAGNITUDE OF EXPECTED UTILITY, SO CHOICE IS DETERMINED BY THE MAXIMUM OF POSSIBLE EXPECTED UTILITY.

269 682 0354 (STATISTICAL ANALYSIS, *STATISTICAL DISTRIBUTION, PROBABILITY, *GAMES THEORY.) (ECONOMICS, COSTS, *MONEY.) -

269 685 0357 THE MEASUREMENT OF AERODYNAMIC FORCES AND MOMENTS IN THE NOL 4-IN. HYPERSONIC SHOCK TUNNEL NO. 3,

269 685 0357 TWO LIGHT-WEIGHT MODELS OF MISSILES ARE SUSPENDED BY FINE THREADS. ALONGSIDE, A LIGHT-WEIGHT SPHERE IS SUSPENDED. A HIGH-SPEED CAMERA IS FOCUSED ON THE MODELS THROUGH A WINDOW AND ILLUMINATION IS BY A SHORT-DURATION, HIGH-INTENSITY LIGHT SOURCE. WHEN THE SHOCK TUNNEL IS FIRED, THE LIGHT SOURCE IS ACTUATED, THE FINE THREADS ARE SNAPPED, AND THE MODELS ARE PHOTOGRAPHED FOR 2-1/4 MILLISECONDS AS THEY MOVE FREELY IN THE SHOCK TUNNEL FLOW. FROM HIGHSPEED FILM, DATA OF THE HORIZONTAL, VERTICAL, AND ANGULAR MOTIONS OF THE MODELS AND THE SPHERE AS FUNCTIONS OF TIME ARE OBTAINED.

269 685 0355 (*SHOCK TUBES, *HYPERSONIC WIND TUNNELS, TEST FACILITIES, HIGH SPEED PHOTOGRAPHY, TEST METHODS, OPERATION, DESIGN.) (WIND TUNNEL MODELS, SPHERES, RE-ENTRY VEHICLES, AERODYNAMICS, RE-ENTRY AERODYNAMICS, GUIDED MISSILES, LIFT, DRAG, MOMENTS, STABILITY, MEASUREMENT, MODEL TESTS.) (SHOCK TUBES, EXPERIMENTAL DATA, MATHEMATICAL ANALYSIS.) -

269 686 0358 PRODUCTION ENGINEERING STUDY OF THE T28E2 CLUSTER, BOMB, FRAGMENTATION,

269 686 0358 IN THIS STUDY, NO ATTEMPT WAS MADE TO IMPROVE THE MILITARY CHARACTERISTICS NOR TO ATTEMPT A MAJOR REDESIGN OF THE FRAGMENTATION BOMB CLUSTER. THE EFFORT WAS CONCENTRATED IN PRODUCT IMPROVEMENT, COST REDUCTION, AND THE PREPARATION OF A DESCRIPTION OF MANUFACTURE. THE M38 (T28E2) CLUSTER CONSISTS OF (A) AN M32 (T39E2) CLUSTER ADAPTER EQUIPPED WITH AN M144 (T172) FIN ASSEMBLY WITH A MECHANICAL TIME FUZE AN-M146A1 OR M198 AND AN M31 (T39) ARMING WIRE ASSEMBLY AND (B) TWENTYFOUR CLUSTERED M128 (T17E2) 20-LB FRAGMENTATION BOMBS ARRANGED IN 2 TIERS, WITH EXTENSIBLE BOOM M145) TAIL ASSEMBLIES ON THE BOMBS IN THE FORWARD TIER AND FIXED BOOM (M146) TAIL ASSEMBLIES ON THE BOMBS IN THE AFT TIER.

269 686 0356 (*BOMBS, *FRAGMENTATION AMMUNITION, *BOMB CLUSTERS, 80 MB FUZES, COSTS, DESIGN, PRODUCTION.) -

269 695 0359 MECHANISMS OF THE OXIDATION OF ORGANIC AMINES BY OXYGEN AND BY FREE RADICAL OXIDIZING AGENTS.

269 695 0359 OXIDATION OF AMINES BY OZONE AND OTHER REAGENTS A STUDY OF THE OXIDATION OF TRIBUTYLAMINE BY O₃ AND MnO₂ WAS MADE. THE OXIDATION PRODUCTS DEPENDED ON THE REACTION CONDITIONS. THE N-OXIDE WAS THE MAIN PRODUCT IN SOME SOLVENTS WHEREAS ATTACK OF O₃ AT THE C NEXT TO N OCCURRED IN OTHERS. OXIDATION OF TRIBUTYLAMINE WITH MnO₂ GAVE N-FORMYLDIBUTYLAMINE SIMILAR OXIDATION OCCURS WITH OTHER TRIALKYLAMINES. OXIDATION OF AMINES BY MONOVALENT RADICALS EXAMPLES OF THE FORMATION OF SUBSTITUTED ETHYLENE DIAMINES BY REACTION OF TERTIARY AMINES WITH T-BUTOXY RADICALS ARE GIVEN. DEHYDROGENATIVE COUPLING DID NOT OCCUR WHEN T-BUTOXY-RADICALS REACTED WITH DIMETHYLANILINE IN ACETIC ACID SOLUTION. THE AMINE WAS DEMETHYLATED, THE EJECTED C LINKING 2, THEN 3 AROMATIC RINGS TOGETHER. EVIDENCE FOR INTERMEDIATE STEPS IN THE OVER-ALL REACTION WAS OBTAINED. REACTIONS OF AMINES IN AQUEOUS SOLUTION WITH POLYVALENT METAL OXIDANTS ARGENTIC

COMPOUNDS ARE UNIQUELY EFFECTIVE FOR ALIPHATIC AMINE OXIDATIONS IN AQUEOUS MEDIA. WITH AQUEOUS SOLUTIONS OF PRIMARY AMINES, ARGENTIC PICOLINATE GAVE ALDEHYDES OR KETONES IN 10-40% YIELD, WHILE SECONDARY AMINES GAVE YIELDS OF 20-90%.

269 695 0357 (BUTYL RADICALS, ALKYL RADICALS, *AMINES, *ANILINES, *OXIDATION, CHEMICAL REACTIONS WITH OXYGEN, OZONE, MANGANESE COMPOUNDS, DIOXIDES, CUMENES, PEROXIDES.) (METALORGANIC COMPOUNDS, SILVER COMPOUNDS.) (PYRIDINES, CARBOXYLIC ACIDS, ESTERS, FREE RADICALS, ALKOXY RADICALS, ORGANIC SOLVENTS.) (OXIDIZERS, STEREOCHEMISTRY, MOLECULAR STRUCTURE, CHROMATOGRAPHIC ANALYSIS, SPECTROGRAPHIC ANALYSIS.) -

269 696 0360 PROJECT LIGHTNING.

269 696 0360 WORK WAS DIRECTED TOWARD SETTING THE STAGE FOR THE CONSTRUCTION OF A SUBSYSTEM WHICH WILL DEMONSTRATE THE FEASIBILITY OF THE TECHNIQUES DEVELOPED DURING THE PREVIOUS PERIODS. IT WAS DECIDED THAT THE BEST CHOICE FOR LOGIC CIRCUITRY LAY IN THE D-C DRIVEN CLASSIFICATION. THE BROAD GROUNDWORK FOR ALL CONSTRUCTION DECISIONS WAS MADE AND MANY DETAILED ONES HAVE BEEN FIRMED UP. INDIVIDUAL MONOSTABLE AMPLIFIERS OF THE TYPE CONSIDERED TO BE THE BACKBONE OF THE D-C APPROACH HAVE BEEN OPERATED AT REPETITION RATES AS HIGH AS 940 MC. ALL THE CIRCUIT TYPES TO BE USED IN THE MEMORY WORK HAVE BEEN OPERATED INDIVIDUALLY AND MANY HAVE BEEN PROVED BY USE IN THE NINE-WORD TEST MEMORY.

269 696 0358 (*DATA PROCESSING SYSTEMS, *COMPUTERS.) (*ELECTRONIC CIRCUITS, COMPUTER LOGIC, MEMORY DEVICES, DIODES.) RESEARCH PROGRAM ADMINISTRATION. -

269 700 0361 MANAGEMENT OF SCIENTIFIC RESEARCH. AN ASTIA REPORT BIBLIOGRAPHY,

269 700 0361 THIS BIBLIOGRAPHY WAS PREPARED BY ASTIA IN RESPONSE TO FREQUENT REQUESTS FOR INFORMATION CONCERNING SCIENTIFIC MANAGEMENT, AND BECAUSE OF THE SUBJECT'S RELEVANCY TO THE DEFENSE DEPARTMENT'S RESEARCH AND DEVELOPMENT EFFORT. REFERENCES ARE ARRANGED ALPHABETICALLY BY SUBJECT AREAS, AND INCLUDE ENTRIES ON COST ADMINISTRATION, COMMUNICATION OF R + D DATA, ECONOMICS, INDUSTRIAL MOBILIZATION, PRODUCTION AND PROCUREMENT. REFERENCES ARE INCLUDED ON THE EVALUATION AND PLANNING OF RESEARCH PROGRAMS, AS WELL AS A SECTION ON SCIENTIFIC MANPOWER, AND A LISTING OF FOREIGN AND DOMESTIC RESEARCH PROGRAMS. WITHIN EACH SUBJECT AREA, REFERENCES TO MILITARY REPORTS ARE ARRANGED ALPHABETICALLY BY SOURCE AND TITLE. REPORTS PUBLISHED BY DEPARTMENT OF DEFENSE CONTRACTORS ARE CITED BY SOURCE, CONTRACT, AND DATE. ALL CITATIONS INCLUDED ARE FOR DOCUMENTS CATALOGED BY ASTIA FROM 1953 THRU 1 JANUARY 1962.

269 700 0359 *SCIENTIFIC RESEARCH, *INDUSTRIAL RESEARCH, *MILITARY RESEARCH, *RESEARCH PROGRAM ADMINISTRATION, *MANAGEMENT ENGINEERING, ECONOMICS, PROCUREMENT, COSTS, INDUSTRIAL PRODUCTION, INDUSTRIAL MOBILIZATION, SCIENTIFIC PERSONNEL, INDUSTRIAL RELATIONS, LABOR UNIONS, SYMPOSIA, CONFERENCES, DOCUMENTATION, BIBLIOGRAPHY. -

269 715 0362 COCKPIT CONTROL-DISPLAY SUBSYSTEM ENGINEERING,

269 715 0362 COCKPIT CONTROL-DISPLAY SUBSYSTEMS ENABLE THE HUMAN OPERATORS TO PROVIDE THEIR REQUIRED CONTROL INPUTS TO WEAPON SYSTEMS ACCURATELY AND AT THE RIGHT TIME. THESE SUBSYSTEMS MUST BE DESIGNED AS AN INTEGRAL PART OF THE TOTAL SYSTEMS. THIS REPORT PRESENTS THE CONTROL-DISPLAY SCHEDULE AS A SEQUENCE OF DESIGN ACTIVITIES. THE RELATIONSHIPS BETWEEN ACTIVITIES WITHIN CONTROL-DISPLAY DESIGN AND THE REST OF THE SYSTEM ARE SHOWN.

269 715 0360 (DESIGN OF COCKPITS, *FLIGHT INSTRUMENTS, CONTROL PANELS, *INSTRUMENT PANELS, DISPLAY SYSTEMS FOR AIRCRAFT, SPACE CAPSULES, MANNED, SATELLITE VEHICLES.) -

269 720 0363 GROUP AND ORGANIZATIONAL FACTORS INFLUENCING CREATIVITY.

269 720 0363 NO ABSTRACT AVAILABLE

269 720 0361 (*GROUP DYNAMICS, PERSONALITY, BEHAVIOR, *LEADERSHIP, ATTITUDES, EFFECTIVENESS, TESTS.) (*STRESS (PSYCHOLOGY), TRAINING.) -

269 726 0364 A SERIES EXPANSION OF THE TRUE ANOMALY,

269 726 0364 A SERIES EXPANSION OF THE TRUE ANOMALY AS A FOURIER SERIES IN THE MEAN ANOMALY IS DERIVED. THE COEFFICIENTS ARE IN A FORM DIFFERENT FROM BESSEL'S REPRESENTATION. HOWEVER, IT APPEARS THAT FOR PRACTICAL APPLICATION THERE IS NO SPECIAL ADVANTAGE TO EITHER FORM. (AUTHOR) AD-269 7269N6

269 726 0362 (*SERIES, FOURIER ANALYSIS, *CELESTIAL MECHANICS, BESSEL FUNCTIONS, SATELLITE VEHICLES, ORBITAL FLIGHT PATHS, FUNCTIONS, THEORY.) -

269 750 0365 OPERATIONS RESEARCH. AN ASTIA REPORT BIBLIOGRAPHY,

269 750 0365 THIS BIBLIOGRAPHY WAS PREPARED BY ASTIA IN RESPONSE TO FREQUENT INQUIRIES CONCERNING OPERATIONS RESEARCH AND RELATED TECHNIQUES EMPLOYED IN THE SOLUTION OF MANAGEMENT AND SCIENTIFIC PROBLEMS. CITATIONS ARE INCLUDED FOR DOCUMENTS CATALOGED BY ASTIA FROM 1953 THROUGH 1 FEBRUARY 1962. ENTRIES ARE ARRANGED BY SUBJECT ACCORDING TO A SPECIFIC TECHNIQUE OR METHOD OF OPERATIONS RESEARCH, RATHER THAN A GIVEN APPLICATION OR CASE STUDY. SUBJECT AREAS INCLUDE REFERENCES PERTINENT TO DYNAMIC PROGRAMMING, GAMES THEORY, INVENTORY THEORY, LINEAR PROGRAMMING, MATHEMATICAL MODELS, REPLACEMENT THEORY, SIMULATION TECHNIQUES, AND QUEUING THEORY. REFERENCES CONCERNING MANAGEMENT ENGINEERING, PROBABILITY THEORY, AND SYSTEMS ANALYSIS ARE ALSO INCLUDED AS RELATED TECHNIQUES. WITHIN EACH SUBJECT AREA, CITATIONS TO REPORTS PUBLISHED BY DEPARTMENT OF DEFENSE CONTRACTORS ARE ARRANGED ALPHABETICALLY BY SOURCE, CONTRACT NUMBER, AND DATE. REFERENCES TO MILITARY REPORTS ARE GROUPED BY SOURCE AND TITLE. A SECTION ENTITLED GENERAL REFERENCES, INCLUDES CITATIONS ON THE USE OF COMPUTERS IN SOLVING OPERATIONS RESEARCH PROBLEMS, AS WELL AS A LIST OF BIBLIOGRAPHIES, SYMPOSIA, FOREIGN REPORTS, AND MISCELLANEOUS STUDIES.

269 750 0363 *OPERATIONS RESEARCH, *GAMES THEORY, *LINEAR PROGRAMMING, MANAGEMENT ENGINEERING, *BIBLIOGRAPHY, SYMPOSIA, LOGISTICS. -

269 753 0366 DEVELOPMENT AND EVALUATION OF HIGH TEMPERATURE PROTECTIVE COATINGS FOR COLUMBIUM ALLOYS. PART II. COATING EVALUATION.

269 753 0366 A COMPARATIVE EVALUATION WAS MADE OF 18 COATINGBASE METAL SYSTEMS, SIX DIFFERENT COATINGS APPLIED TO 3 NB BASE MATERIALS (D-31 ALLOY, F-48 ALLOY AND UNALLOYED NB). THE 18 COATING-BASE METAL SYSTEMS WERE TESTED UNDER THE SAME CONDITIONS IN CYCLIC OXIDATION (2300 AND 2500 F), THERMAL SHOCK (2500 TO 250 F), BEND-OXIDATION (2500 F) AND STRESS-OXIDATION (2500 F) PLUS TENSILE TESTS. THE TESTS PRODUCED DIRECTLY COMPARABLE DATA BETWEEN THE COATING-BASE METAL SYSTEMS RELATING TO THE PROTECTIVE NATURE OF EACH COATING AND THE EFFECT OF THE COATING AND THE COATING TREATMENT ON THE MECHANICAL PROPERTIES OF THE SUBSTRATE.

269 753 0364 (*REFRACTORY COATINGS, *NIOBIUM ALLOYS, TITANIUM ALLOYS, MOLYBDENUM ALLOYS, TUNGSTEN ALLOYS, ZIRCONIUM ALLOYS, *NIOBIUM, HIGH TEMPERATURE RESEARCH, *HEAT RESISTANT ALLOYS.) (OXIDATION, EROSION, THERMAL STRESSES, MECHANICAL PROPERTIES.) *OXIDATION INHIBITORS. -

269 759 0367 RESEARCH ON ELECTRONICALLY EXCITED STATES AND THEIR REACTIONS.

269 759 0367 SEVERAL BRIDGED-RING KETONES HAVE BEEN SYNTHESISED HAVING DOUBLE BONDS OR AROMATIC RINGS WITH THEIR PI-ELECTRONS NEAR THE C OF THE C O GROUP. THEY ALL SHOW INTRAMOLECULAR CHARGE TRANSFER SPECTRA. MOLECULES CONTAINING VERY STRAINED CYCLOBUTANE RINGS HAVE BEEN MADE BY PHOTOCHEMICAL ISOMERISATION.

269 759 0365 (*BENZENES, QUINONES, *POLY-CYCLIC COMPOUNDS, CYCLOBUTANES, *KETONES, *ELECTRON TRANSITIONS, EXCITATION, STEREO-CHEMISTRY, ISOMERS, SYNTHESIS, PHOTOCHEMICAL REACTIONS, DIENES.) -

269 769 0368 INVESTIGATION OF HIGH VELOCITY IMPACT AND SOME HIGH EXPLOSIVES PHENOMENA.

269 769 0368 A SUMMARY OF THE IMPORTANT RESULTS OBTAINED IN THIS RESEARCH IS GIVEN. THE SUBJECT MATTER INCLUDED (1) HIGH EXPLOSIVE GENERATORS FOR FAST PARTICLES (2) MECHANISM OF CRATERING IN ULTRA HIGH VELOCITY IMPACT (3) OBSERVATIONS OF VAPORIZATION ACCOMPANYING ULTRA HIGH VELOCITY IMPACT (4) MECHANISM FOR CRATER EXPANSION IN SHAPED CHARGE PENETRATION (5) IONIZATION AND ELECTRON DENSITIES IN DETONATING SOLID EXPLOSIVES (6) ELECTRICAL FIELDS AND ELECTROMAGNETIC RADIATION FROM CHEMICAL DETONATIONS (7) EXTERNAL DETONATION GENERATED PLASMAS (8) THE EFFECT OF PRESSURE ON THE DEGREE OF IONIZATION IN GASEOUS DETONATIONS (9) IONIZATION AND ELECTRICAL CONDUCTIVITY AND ITS RELATIONSHIP TO THE DEFLAGRATION TO DETONATION TRANSITION IN SOLID EXPLOSIVES AND (10) TRANSITION TO DETONATION IN LIQUID EXPLOSIVES.

269 769 0366 (*HYPERVELOCITY PROJECTILES, *PARTICLES, *CRATERING, IONIZATION, IMPACT SHOCK, SHAPED CHARGES, PENETRATION, *EXPLOSIVES, *DETONATION, EXPLOSIONS, GASES, ELECTRONS, DENSITY, ELECTRICAL PROPERTIES, ELECTROMAGNETIC PROPERTIES, PRESSURE, PLASMA JETS, PLASMA PHYSICS.) (METALS, PENETRATION.) -

269 779 0369 RELATIONSHIPS BETWEEN ENERGY, FIBROSITY AND TEMPERATURE IN CHARPY IMPACT TESTS ON AISI 4340 STEEL.

269 779 0369 A STUDY WAS CONDUCTED ON THE RELATIONSHIPS BETWEEN IMPACT ENERGY, PERCENT FIBROSITY AND TEST TEMPERATURE IN THE CHARPY TESTS FOR AISI 4340 STEEL. IT IS SHOWN THAT A LINEAR FUNCTION OF PERCENT FIBROSITY VERSUS ENERGY EXISTS. ALSO AN ENERGY VALUE ($U_{SUB F}$) DERIVED FROM THIS FUNCTION IS SHOWN TO BE RELATED TO BASIC STRAINHARDENING PROPERTIES. A RELATIONSHIP, BASED UPON THE RATE OF CHANGE IN $U_{SUB F}$ WITH RESPECT TO TEMPERATURE, WAS ESTABLISHED. IT WAS POSSIBLE TO DESCRIBE THE APPEARANCE OF THE FRACTURE BY IDENTIFYING THREE REGIONS OF BEHAVIOR, NAMELY, SHEAR LIP, CENTER FIBROUS AND FLAT. THE FLAT REGION CAN BE CONSIDERED REPRESENTATIVE OF RAPID FRACTURE WHILE THE CENTER FIBROUS WOULD INDICATE SLOW DUCTILE FRACTURE, RAPID AND SLOW BEING DEFINED IN THIS STUDY BY UNSTABLE AND STABLE FRACTURE PROPAGATION.

269 779 0367 (*STEEL, *FRACTURE (MECHANICS), ENERGY, TRANSITION TEMPERATURE, PLASTIC FLOW, TENSILE PROPERTIES, DEFORMATION, HARDENING, MICRO STRUCTURE, TESTS, IMPACT SHOCK.) (MARTENSITE, BAINITE, PEARLITE.) -

269 775 0370 DESIGN OF MODEL OF A THERMOELECTRIC AIR CONDITIONING SYSTEM FOR SUBMARINES.

269 775 0370 A THERMOELECTRIC HEATING AND COOLING MODULE WAS CONSTRUCTED FOR INSTALLATION IN A WATER TO WATER AIR CONDITIONING SYSTEM ABOARD A SUBMARINE. THIS MODULE HAS A COOLING RATING OF 2550 BTU/HR. AT A COEFFICIENT OF PERFORMANCE OF 0.75 AND AN OPERATING CURRENT OF 35 AMPERES DC. THIS RATING WAS BASED ON A 85 F SINK WATER TEMPERATURE AND A CHILL WATER TEMPERATURE OF 55 F. THE UNIT WAS DESIGNED TO WITHSTAND SUBMERGENCE PRESSURES AND THE CORROSIVE EFFECT OF SEA WATER IN ALL WATER PASSAGES. IT OCCUPIES A VOLUME 1 FT. BY 1 FT. BY 3 INCHES AND WAS DESIGNED FOR EASE IN STACKING INTO LARGER CAPACITY UNITS WITHOUT ADDITIONAL SPACE BEING REQUIRED FOR COUPLING BETWEEN UNITS. IT HAS A WEIGHT OF 50 POUNDS.

269 775 0368 (*THERMOELECTRICITY, *AIR CON-DITIONING EQUIPMENT FOR * SUBMARINES, DESIGN, THEORY.) (REFRIGERATION SYSTEMS, HEAT EX-CHANGERS, THERMAL INSULATION, VIBRATION, SHOCK, TESTS.) (HEAT TRANSFER, SEA WATER, WATER, COOLING.) -

269 778 0371 HOT ROLLING OF COMMERCIALLY PURE TITANIUM AND

269 778 0371 ROLLING FORCES AND TORQUE WERE EXPERIMENTALLY DETERMINED IN HOT ROLLING COMMERCIALLY PURE TI AND TI 6AL-4V ALLOY ON A 2-HIGH EXPERIMENTAL ROLLING MILL WITH 5-1/4 IN.-OUTSIDE DIAM ROLLS. ROLLING TEMPERATURES WERE 1400, 1600, 1800, AND 2000 F SPECIMEN WIDTHS 1, 2, AND 4 IN. AND SPECIMEN THICKNESSES 1/32, 1/16, AND 1/8 INCH. RESULTS ARE PRESENTED IN THE FORM OF CURVES SHOWING THE EFFECTS OF REDUCTION, ROLLING TEMPERATURE, SPECIMEN SIZE, AND ALLOY ON ROLL SEPARATING FORCE, SPECIFIC PRESSURE, HORSEPOWER AND WORK, FORWARD SLIP, LEVER ARM RATIO AND SPREAD.

269 778 0369 (*TITANIUM, *TITANIUM ALLOYS, PROCESSING, SHEETS, ROLLING MILLS, TEMPERA-TURE, PRESSURE, TORQUE, THICKNESS, REDUCTION, VELOCITY, MANUFACTURING METHODS.) (STRUC-TURES, MATERIALS.) -

269 780 0372 DEVELOPMENT OF AN E-BAND AMPLIFIER.

269 780 0372 PROGRESS IS REPORTED ON THE ELECTRICALLY-TUNABLE FILTER, THE PERMANENT MAGNET, AND IMPORTANT TEST EQUIPMENT. TWO TUBES ARE UNDER FABRICATION. THE FIRST TUBE REACHED THE FINAL ALIGNMENT STAGE, PRIOR TO GLASSING AND EXHAUST AND THE SECOND TUBE APPROACHED THE MATCHING STAGE. THE PROTOTYPE FILTER HAD MOST ENCOURAGING INITIAL TESTS. PERFORMANCE OVER THE FULL BAND WAS ACHIEVED WITH INSTANTANEOUS BANDWIDTHS OF 30-80 MC AT 6-8 DB RESONANCE INSERTION LOSS. A FLEXIBLE DIELECTRIC WAVEGUIDE WAS FABRICATED AND UTILIZED IN THE FILTER MEASUREMENTS. INITIAL SET-UP ON THE RECEIVER (FOR LOSS AND NOISE FIGURE MEASUREMENTS) IS DISCUSSED.

269 780 0370 (*MICROWAVE AMPLIFIERS, EXTREMELY HIGH FREQUENCY, YTTRIUM COMPOUNDS, IRON COMPOUNDS, GARNET, *TRAVELING WAVE TUBES, *BAND-PASS FILTERS, TUNING DEVICES, WAVEGUIDE FILTERS, MAGNETS, TEST EQUIPMENT, NOISE (RADIO), REDUCTION, DESIGN.) -

269 784 0373 THE EMITTANCE OF CHROMIUM, COLUMBIUM, MOLYBDENUM, TANTALUM, AND TUNGSTEN,

269 784 0373 A COMPILATION IS PRESENTED OF ORIGINAL TEST DATA ON EMITTANCE, REFLECTANCE, AND ADSORPTANCE OF CR, NB, MO, TA, AND W. THE DATA WERE TAKEN FROM THE LITERATURE PUBLISHED DURING THE PERIOD 1940-1959 INCLUSIVE, AND AS MUCH OF THE 1960 LITERATURE AS COULD BE OBTAINED. THE FOLLOWING SOURCES WERE SEARCHED CHEMICAL ABSTRACTS, CERAMIC ABSTRACTS, METALLURGICAL ABSTRACTS, NUCLEAR SCIENCE ABSTRACTS, AND THE FILES OF THE DEFENSE METALS INFORMATION CENTER 9DMICO. AN ATTEMPT WAS MADE TO EVALUATE THESE SOURCES OF DATA ACCORDING TO THE APPARENT THOROUGHNESS OF METHODS AND TECHNIQUES AS DESCRIBED BY THE VARIOUS INVESTIGATORS. IN MANY CASES THE DESCRIPTIONS IN THE LITERATURE ARE A SUMMARY OF METHODS AND RESULTS, AND A COMPLETE EVALUATION IS IMPOSSIBLE. CURVES ARE PRESENTED WHICH APPEAR TO INDICATE THE MOST PROBABLE VALUES FOR THE VARIOUS CONDITIONS AND MATERIALS.

269 784 0371 (METALS AND ALLOYS OF *CHROMIUM, *MOLYBDENUM, *NIOBIUM, *TANTALUM, *TUNGSTEN.) (*THERMAL RADIATION, THERMIONIC EMISSION, BLACK BODY RADIATION, HEAT TRANSFER, MONOCHROMATIC LIGHT, ABSORPTION, BRIGHTNESS, REFLECTION.) (TEST EQUIPMENT, THERMOCOUPLES, THERMOPILES, OPTICAL EQUIPMENT, RADIATION PYROMETERS, SPECTROPHOTOMETERS, THERMISTORS.) DATA, TABLES. -

269 786 0374 PROTEIN-PRODUCING MICROORGANISM.

269 786 0374 A PROTEIN-PRODUCING MICROORGANISM WAS RECENTLY DISCOVERED IN THE INTESTINES OF PIGS BY IVAN OROBINSKIY AT THE KRASNOYARSK AGRICULTURAL INSTITUTE. THE MICROORGANISM UTILIZES NITROGEN FROM THE AIR TO PRODUCE PROTEIN. IT ALSO PRODUCES SMALL AMOUNTS OF LACTIC ACID, VITAMINS, GROWTH HORMONES, AND ANTIBIOTICS. THE CHIEF VALUE OF OROBINSKIY'S MICROORGANISM LIES IN ITS ABILITY TO INCREASE THE PROTEIN CONTENT OF POTATOES FROM 1 TO 8%, OF GRAIN HUSKS FROM 1.5 TO 9.5%, OF GROUND-UP STRAW UP TO 4%, AND OF SILAGE UP TO 2%. FEEDING PIGLETS A PROVENDERBACTERIN, PREPARED BY INOCULATION OF POTATO MASH BY A PURE CULTURE OF THE MICROORGANISM, INCREASED THEIR WEIGHT 70 TO 90% OVER THAT OF CONTROL ANIMALS. MASS PRODUCTION OF OROBINSKIY'S PROVENDER-BACTERIN IS BEING ARRANGED IN SIBERIA.

269 786 0372 (*PROTEINS, PRODUCTION, *MICRO-ORGANISMS, ALGAE, FEEDING, GROWTH, NUTRITION.) -

269 788 0375 AIR PURIFICATION IN CONFINED AREAS.

269 788 0375 THE FOLLOWING INFORMATION IS SUMMARIZED FROM LITERATURE SOURCES (1) AN IMPROVED METHOD FOR OBTAINING N_2O_2 AND KO_2 BY DIRECT OXIDATION OF METAL WITH OXYGEN IS REPORTED. THE INTERACTION OF NaO_2 WITH CO_2 WAS STUDIED ALL EXPERIMENTS WERE MADE IN THE PRESENCE OF WATER VAPOR. ABOVE 25 C ALL REACTIONS RESULTED IN COMPLETE DISCHARGE OF O AND THE FORMATION OF Na_2CO_3 OVER AN INTERMEDIATE PHASE OF NaOH . BELOW 10 C ONLY SUPEROXIDE O WAS DISCHARGED PEROXIDE O REMAINED IN THE RESULTANT COMPOUND, $\text{Na}_2\text{C}_2\text{O}_6$. A PRACTICAL METHOD OF OBTAINING $\text{Na}_2\text{C}_2\text{O}_6$ WHICH CAN BE USED AS A MILD OXIDIZER IS DISCUSSED. THE INTERACTION OF NaO_2 OR KO_2 WITH CO IS ALSO DISCUSSED.

269 788 0373 (*AIR, PURIFICATION.) (*ALKALI METAL COMPOUNDS, *SODIUM COMPOUNDS, *POTASSIUM COMPOUNDS, *OXIDES, *PEROXIDES, CARBONATES, SYNTHESIS, CHEMICAL REACTIONS, CARBON DIOXIDES, CARBON COMPOUNDS, MONOXIDES, WATER.) USSR, CLOSED-CYCLE ECOLOGICAL SYSTEMS. -

269 789 0376 JOINING OF SAP (SINTERED ALUMINUM POWDER).

269 789 0376 NO ABSTRACT AVAILABLE

269 789 0374 (POWDER METALS, *ALUMINUM, *SPOT WELDING, *BRAZING, WELDED JOINTS, SOLDERED JOINTS, SHEETS, FILMS, OXIDES, SURFACE PROPERTIES, COATINGS, METAL COATINGS, ALUMINUM ALLOYS, MANGANESE ALLOYS, EFFECTIVENESS AND MECHANICAL PROPERTIES OF METAL JOINTS.) (USSR, POWDER METALLURGY.) (SOLDERING ALLOYS, ZINC ALLOYS.) (TIN COATINGS, MELTING, CONTROLLED ATMOSPHERES, ARGON, ELECTRIC ARCS, ELECTRIC WELDING, RESISTANCE, ZINC ALLOYS, COPPER ALLOYS, ALUMINUM ALLOYS.) -

269 790 0377 CLIMATE CONTROL.

269 790 0377 NO ABSTRACT AVAILABLE

269 790 0375 (CONFERENCES ON *CONTROL OF *CLIMATE.) METEOROLOGY.

269 791 0378 USSR MISSILE AND ROCKET PROGRAM BIBLIOGRAPHY.

269 791 0378

269 791 0376 (*BIBLIOGRAPHY, *USSR, *SPACE FLIGHT, EXTRATERRESTRIAL BASES, GUIDED MISSILES, ROCKETS, PROPULSION, PROPELLANTS.) -

269 792 0379 SOVIET NUCLEAR INSTRUMENTATION AND CONTROL FOR PROPULSION.

NO ABSTRACT AVAILABLE

269 792 0377 (*GAMMA COUNTERS, *SCINTILLATION COUNTERS, DESIGN.) (GAS FLOW, MEASUREMENT, *FLOWMETERS, DESIGN.) (*HETEROGENEOUS REACTORS, NUCLEAR REACTIONS, REACTOR REACTIVITY, CRITICAL ASSEMBLIES, REACTOR THEORY.) (NUCLEAR POWER PLANTS, *FUEL ELEMENTS, RADIOACTIVE WASTE.) (LOW PRESSURE RESEARCH, *PNEUMATIC SERVOMECHANISMS, AUTOMATIC, CONTROL SYSTEMS, DESIGN.) (*LIQUID METALS, HEAT TRANSFER, TURBULENT FLOW, FLUID FLOW IN PIPES.) -

269 794 0380 SOVIET LITERATURE ON LIFE SUPPORT SYSTEMS.

269 794 0380 NO ABSTRACT AVAILABLE

269 794 0378 (*SCIENTIFIC REPORTS, *USSR, *SPACE FLIGHT, MANNED, LAB
ORATORY ANIMALS.) (CLOSED-CYCLE ECOLOGICAL SYSTEMS, STRESS (PHYSIOLOGY),
STRESS (PSYCHOLOGY), WEIGHT-LESSNESS, RADIATION EFFECTS, RADIATION DAMA
GE, TELEMETERING DATA.) -

269 797 0381 BASIC STUDIES IN MAGNETOHYDRODYNAMICS.

269 797 0381 RESEARCH WAS DIRECTED TOWARD OBTAINING A BASIC
UNDERSTANDING OF MAGNETOHYDRODYNAMICS. THE INITIAL STUDIES LED TO
THREE POSSIBLE APPLICATIONS FOR MAGNETOHYDRODYNAMICS WHICH IN TURN LED
TO THREE CATEGORIES OF RESEARCH. THE FIRST APPLICATION APPEARED IN
CONNECTION WITH THE PROBLEM OF HIGH-ALTITUDE, VERY HIGH VELOCITY FLIGHT
WHICH WE CALL FIGHT MAGNETOHYDRODYNAMICS. THE SECOND APPLICATION WAS
PLASMA PROPULSION. THE THIRD CATEGORY WAS THE PRODUCTION OF A VERY
HIGH TEMPERATURE COLLISION-FREE PLASMA.

269 797 0379 (*MAGNETOHYDRODYNAMICS, GAS FLOW, *MAGNETIC FIELDS, *CO
NFIGURATION, DRAG, LIFT, ELECTRON BEAMS, ELECTRON GUNS, HYDROGEN, ARGON
.) (*PLASMA PHYSICS, PROPULSION, GAS IONIZATION, EXHAUST GASES, VELOCIT
Y, ROCKETS, HEATING, SPECIFIC IMPULSE.) (*HIGH TEMPERA-TURE RESEARCH, S
OCK TUBES, THERMONUCLEAR REAC-TIONS, ELECTRIC POWER PRODUCTION, HEAT EX
HOCK TUBES, THERMONUCLEAR REAC-TIONS, ELECTRIC POWER PRODUCTION, HEAT EX
-CHANGERS, INFRARED DETECTORS, MEASUREMENT, HEAT TRANSFER, SHOCK WAVES.
) -

269 815 0382 AERODYNAMIC CRITERIA FOR OPTIMUM DESIGN OF MIXEDFLOW
IMPELLERS-FINAL EVALUATION.

269 815 0382 EFFORT WAS MADE TO ESTABLISH AERODYNAMIC DESIGN
CRITERIA FOR HIGH-PRESSURE-RATIO, TRANSONIC, MIXED-FLOW IMPELLERS.
RESULTS ARE GIVEN ON TWO IMPELLERS. FOR EACH IMPELLER EXTENSIVE
AMOUNTS OF INLET AND EXIT SURVEY DATA, AS WELL AS SHROUD AND OVER-ALL
DATA, ARE PRESENTED AND DISCUSSED. THE BOUNDARY LAYER DEVELOPMENT WAS
STUDIED ALONG THE BLADE SURFACE FOR SEVERAL IMPELLERS AT SEVERAL
SPEEDS. RESULTS ARE COMPARED WITH OVER-ALL IMPELLER MEASURED
PERFORMANCE. THE STUDY PROVIDES QUANTITATIVE MEANS OF EVALUATING BLADE
LOADINGS AND PROVIDES SOME INSIGHT AS TO THE DISTRIBUTION OF THE LOSSES
AND THE MAGNITUDE OF THE VISCOUS CLOGGING ALLOWANCE. AN EVALUATION IS
MADE OF DESIGN PROCEDURE IN THE LIGHT OF TEST RESULTS. A COMPARISON
AND CORRELATION OF THE RESULTS FOR ALL IMPELLERS IS MADE SO AS TO
FORMULATE DESIGN CRITERIA. A RATIONAL APPROACH IS DEVELOPED, AIMED AT
MINIMIZING CENTRIFUGAL IMPELLER AND DIFFUSER LOSSES.

269 815 0380 (*IMPELLERS, *MIXED FLOW COM-PRESSOR, HIGH PRESSURE COM
PRESSOR, HIGH PRES-SURE COMPRESSOR BLADES, PRESSURE, TRANSONICS, CONFIGU
RATION, AERODYNAMICS, DESIGN, THEORY, MATHEMATICAL ANALYSIS, TESTS.) -

269 614 0383 NO TITLE AVAILABLE

269 614 0383 NO ABSTRACT AVAILABLE

269 614 0381 (*ROCKET RESEARCH, *GUIDED MIS-SILE RESEARCH.) (*GUIDE
D MISSILES, *BOOSTER ROCKETS, *ROCKETS, ROCKET ASSISTED PROJECTILES, ANT
IAIRCRAFT AMMUNITION, AIRCRAFT AMMUNITION, AIRCRAFT TORPEDOES, FRAGMENTA
TION AMMUNITION, UNDERWATER ROCKETS, DESIGN, LAUNCHING.) (*ROCKET PROPE
LLANTS, LIQUID ROCKET PROPEL-LANTS, SOLID ROCKET PROPELLANTS, PROPELLANT
GRAINS, COMBUSTION, CHEMICAL PROPERTIES, PHYSI-CAL PROPERTIES, THERMODY
NAMICS.) (ROCKETS, COMBUSTION CHAMBERS, EXHAUST GASES, DISSOCIA-TION.)
(GUIDED MISSILES, ROCKETS, LAUNCHING.) -

269 618 0384 NO TITLE AVAILABLE

NO ABSTRACT AVAILABLE

269 618 0382 (*FORGING, *MACHINES, *FORGE PRESSES, METAL FORMING PRESSES, METAL FORMING BRAKES, PRODUCTION, PROCESSING, MANUFACTURING METHODS, *INDUSTRIAL EQUIPMENT.) (HAMMERS, EXTRUSION, ROLLING MILLS.) USSR.

269 619 0385 SYNTHESIS AND INVESTIGATION OF HIGH-MOLECULARWEIGHT TERTIARY AMINES AND QUATERNARY AMMONIUM COMPOUNDS FROM COPOLYMERS OF 2-METHYL-5-VINYLPYRIDINE AND VARIOUS CROSS-LINKING AGENTS,

269 619 0385 THE MECHANISM AND CONDITIONS OF COPOLYMERIZATION OF 2-METHYL-5-VINYLPYRIDINE WITH DIVINYLBENZENE AND WITH TRIETHYLENEGLYCOL DIMETHACRYLATE WAS INVESTIGATED. FURTHER CHEMICAL CONVERSIONS OF THE SYNTHESIZED HIGH-MOLECULAR-WEIGHT TERTIARY AMINES PRODUCED QUATERNARY AMINE COMPOUNDS INSOLUBLE IN WATER AND ORGANIC SOLVENTS. THE SYNTHESIZED PRODUCTS WERE SUBJECTED TO VARIOUS PHYSICOCHEMICAL TESTS (THE CAPACITY FOR ANIONIC EXCHANGE, CHEMICAL STABILITY, WATER ABSORPTION, SWELLING CAPACITY IN ORGANIC SOLVENTS, ETC.).

269 619 0383 (METHYL RADICALS, VINYL RADICALS, *PYRIDINES, POLYMERIZATION, *COPOLYMERIZATION WITH BENZENES AND ETHYLENES, GLYCOLS, ACRYLIC RESINS, POLYMERS, CHEMICAL REACTIONS, ALKYL RADICALS, *AMINES.) (*ION EXCHANGE RESINS, SYNTHESIS, PHYSICAL PROPERTIES, CHEMICAL PROPERTIES.) USSR.

269 628 0386 HEAT EXCHANGE AT THE FRONTAL POINTS OF BLUNT BODIES WASHED BY A SUPERSONIC GAS FLOW,

269 628 0386

269 628 0384 (*BLUNT BODIES, AERODYNAMICS, SUPERSONICS, AERODYNAMIC HEATING, HEAT TRANSFER, MATHEMATICAL ANALYSIS, USSR.)

269 672 0387 INVESTIGATION OF INSTRUMENTATION AND TECHNIQUES FOR ARMY WEATHER OBSERVATION.

269 672 0387 DURING THE PAST TWO YEARS, THE PRESENCE OF A WEATHER RADAR SET AN/CPS-9 MADE POSSIBLE A PROGRAM OF OBSERVATION OF WEATHER PHENOMENA FROM PEAKS OF THE OREGON COAST RANGE NEAR CORVALLIS. THE RESULTS OF THE PROGRAM AND SOME POSITIVE RECOMMENDATIONS BASED UPON THE EXPERIENCE AND STUDY MADE POSSIBLE WITH THIS EQUIPMENT ARE PRESENTED.

269 672 0385 (*METEOROLOGICAL RADAR, METEOROLOGICAL DATA.) (ARMY OPERATIONS, WEATHER FORECASTING, RADAR ECHO AREAS, METEOROLOGICAL RADAR.)

269 129 0388 PERFORMANCE OF VERTICAL AXIS (CYCLOIDAL) PROPELLERS CALCULATED BY TANIGUCHI'S METHOD,

269 129 0388 A METHOD PROPOSED BY TANIGUCHI WAS USED TO COMPUTE THE PERFORMANCE CHARACTERISTICS OF VERTICAL AXIS PROPELLERS HAVING CYCLOIDAL BLADE MOTION AND SEMI-ELLIPTIC BLADES. NUMERICAL RESULTS OF THRUST AND TORQUE COEFFICIENT AND EFFICIENCY ARE PRESENTED FOR A WIDE RANGE OF ADVANCE COEFFICIENTS, MAXIMUM BLADE ANGLE, AND BLADE SOLIDITY. GOOD AGREEMENT BETWEEN THE EXPERIMENTAL PERFORMANCE AND THE COMPUTED RESULTS IS OBTAINED FOR 2, 3, AND 6-BLADED CYCLOIDAL PROPELLERS.

269 129 0386 (*MARINE PROPELLERS, ROTATION, TESTS, MATHEMATICAL ANALYSIS.) (*PROPELLER BLADES, *CYCLOIDAL PROPELLERS, THEORY.) -
269 161 0389 BEAT AMPLIFIER,

269 161 0389 EFFORTS ARE PRESENTED ON THE STUDY OF A BEAT AMPLIFIER. A LINEAR THEORY FOR A SELECTIVE ACTIVE TRI-POLE WITH COMPLEX PARAMETERS WAS DEVELOPED. THE INTRODUCTION OF THE STABILITY FACTOR K RESULTED IN THE CHARACTERIZATION OF THE GAIN, BAND WIDTH, EFFECT OF GAIN AND BAND WIDTH, THE ZONE OF PERIODIC OSCILLATIONS INDEPENDENT FROM THE CIRCUIT STRUCTURE AND THE OPTIMUM EXTERNAL PARAMETERS. INVESTIGATION OF A BEAT AMPLIFIER IS OF PRIMARY IMPORTANCE IN TELECOMMUNICATIONS PRACTICE SINCE IT CAN AMPLIFY EXTREMELY WEAK PULSED SIGNALS. A FURTHER ADVANTAGE IS THE EVIDENT FREQUENCY REDUCTION IN THE INPUT CIRCUIT. THE LINEAR THEORY OF AN ACTIVE TRI-POLE WITH COMPLEX PARAMETERS SHOWS THAT THE PROBLEM OF IMPEDANCE ACCOMMODATIONS CAN BE QUITE EASILY SOLVED BY EQUAL LINES OF OPERATIONAL GAIN CAUSED BY THE INTRODUCTION OF ORIGINAL ACTIVE QUADRIPOLES WITH REAL PARAMETERS. ON THE BASIS OF DEFINITE SIMPLIFIED ASSUMPTIONS, CONDITIONS WERE DERIVED WHICH ARE USEFUL IN THE REALIZATION OF CONVENTIONAL NEUTRALIZED AND BEAT AMPLIFIERS.

269 161 0387 (*PARAMETRIC AMPLIFIERS, *FEED-BACK AMPLIFIERS, RADIOFREQUENCY OSCILLATIONS, IMPEDANCE, RESISTANCE, INDUCTANCE, THEORY, MATHEMATICAL ANALYSIS.) (*COMMUNICATION EQUIPMENT, ELECTRONIC CIRCUITS, USSR.)

269 163 0390 AN ATLAS OF INFRARED SPECTRA OF FLAMES. PART I. INFRARED SPECTRA OF HYDROCARBON FLAMES IN THE 1-5 MICRON REGION,

269 163 0390 AN EXPERIMENTAL COMBUSTION SYSTEM AND INFRARED INSTRUMENTATION WERE SET UP TO MEASURE INFRARED EMISSION AND ABSORPTION SPECTRA OF FLAMES UNDER CONTROLLED CONDITIONS. INFRARED SPECTRA OF HYDROCARBON-OXYGEN FLAMES WERE MEASURED IN THE 1 - 5 MICRON REGION, AT ATMOSPHERIC PRESSURE. SPECTRAL EMISSIVITIES AND SPECTRAL RADIANT EMITTANCES WERE CALCULATED FROM THE MEASUREMENTS AND PLOTTED AS FUNCTIONS OF WAVELENGTH. TEMPERATURES WERE DETERMINED FROM THE SPECTRAL DATA BY THE INFRARED MONOCHROMATIC RADIATION METHOD, AT VARIOUS WAVELENGTHS. RESULTS SHOW ONLY MODERATE DEPENDENCE OF INFRARED RADIANCE ON FUEL COMPOSITION PER SE, BUT STRONG DEPENDENCE UPON TEMPERATURE AND TEMPERATURE DISTRIBUTION. THESE RESULTS ARE IN ACCORD WITH EXPECTATIONS, BASED ON MEASUREMENTS OF RADIATION FROM HEATED GAS SAMPLES AND ON CALCULATIONS OF MOLECULAR ENERGY DISTRIBUTIONS.

269 163 0388 (*FLAMES, *INFRARED SPECTROSCOPY, EXHAUST GASES, COMBUSTION CHAMBERS, INFRARED RADIATION, ABSORPTION, MEASUREMENT, HYDROCARBONS, OXYGEN.) (ATMOSPHERE, PRESSURE, TEMPERATURE, ATOMIZATION, TESTS.) (INSTRUMENTATION, OPTICAL EQUIPMENT, MONOCHROMATIC LIGHT, COLLIMATORS, INFRARED LAMPS, BLACKBODY RADIATION.) -

269 180 0391 SOLAR THERMOELECTRIC GENERATORS FOR APPLICATION OUTSIDE THE EARTH'S ATMOSPHERE.

269 180 0391 RESULTS ARE PRESENTED OF A BASIC RESEARCH PROJECT IN TWO PHASES TO DETERMINE FEASIBILITY OF SOLAR THERMOELECTRIC GENERATORS OUTSIDE OF THE EARTH'S ATMOSPHERE. IT WAS CONCLUDED THAT SIMULTANEOUS SOLUTIONS OF TWO PROBLEMS ARE REQUIRED (1) SOLAR ENERGY COLLECTION AND HEAT SINK RADIATION EFFICIENCY MUST BE AS HIGH AS POSSIBLE TO OBTAIN THE WIDEST POSSIBLE TEMPERATURE DIFFERENCE BETWEEN THE HOT AND COLD JUNCTIONS OF THE THERMOELECTRIC GENERATOR. USING SELECTIVE ABSORBING AND RADIATING SURFACES ON FLAT-PLATE COLLECTORS, AND 10- TO 20-FOLD CONCENTRATING COLLECTORS, A TEMPERATURE DIFFERENCE OF 200 TO 520 C CAN BE REACHED WITH A COLLECTION EFFICIENCY IN EXCESS OF 50% AND (2) THERMOELECTRIC EFFICIENCY WITH MATERIALS PRESENTLY AVAILABLE CAN REACH 9% EFFICIENCY WITH A FACTOR OF MERIT $Z = 0.002$ PER C. WITH $Z = 0.004$, AN EFFICIENCY OF 19% COULD BE ATTAINED AT 500 C TEMPERATURE DIFFERENCE. FLATPLATE AND ORIENTED CONCENTRATING COLLECTORS ARE ALSO DISCUSSED.

269 180 0389 (*THERMOELECTRICITY, GENERATORS, *POWER SUPPLIES, *ELECTRIC PROPULSION, *SOLAR ENERGY, SPACE ENVIRONMENTAL CONDITIONS, THERMOCOUPLES, ALLOYS, SEMICONDUCTORS, MATERIALS, REFLECTORS, HEAT TRANSFER, ELECTRIC POWER PRODUCTION, AIRBORNE, EFFECTIVENESS, FEASIBILITY STUDIES.)

269 215 0392 NO TITLE AVAILABLE

269 215 0392 NO ABSTRACT AVAILABLE

269 215 0390 (*ELECTRONIC EQUIPMENT, *ELECTRONIC CIRCUITS, TRANSISTORS, AMPLIFIERS.) (OSCILLATORS, DIODES, PARAMETRIC AMPLIFIERS, FREQUENCY MULTIPLIERS, *MICROWAVE EQUIPMENT.) (PLASMA PHYSICS, ELECTRON TUBES, WAVE TRANSMISSION.) (ELECTROMAGNETIC THEORY, ELECTROMAGNETIC WAVES, PROPAGATION, ANTENNAS.) (MASERS, CONTROL SYSTEMS, DATA PROCESSING SYSTEMS.)

269 230 0393 GG87 SPIN-MOTOR ROTATION DETECTOR MECHANIZATION AND EVALUATION.

269 230 0393 THE METHODS ARE DESCRIBED BY WHICH A GG87B WIDEANGLE MINIATURE INTEGRATING GYRO WAS ALTERED TO INCLUDE A SPIN-MOTOR ROTATION MONITORING DEVICE. TEST DATA FROM THE EVALUATION PROGRAM ARE ALSO INCLUDED. THE SPIN-MOTOR RUNNING DETECTOR ADDITION CONSISTS OF 4 PERMANENT MAGNETS EMBEDDED IN THE SPIN-MOTOR MOMENTUM RING AND 2 WIRE-WOUND COILS ON THE GYRO CASE. THE SYSTEM IS DESIGNED TO PRODUCE A SINE WAVE OUTPUT OF 2 CYCLES PER MOTOR REVOLUTION, OR 800 CPS. THE AMPLITUDE OF THE 800-CYCLE SIGNAL PRODUCED BY THIS GYRO WAS 600 MILLIVOLTS RMS INTO A 10,000OHM RESISTIVE LOAD. THE GYRO WAS GIVEN THE CUSTOMARY PERFORMANCE TESTS AND MET ALL THE REQUIREMENTS.

269 230 0391 (*GYROSCOPES, *SIGNAL GENERATORS, MINIATURE ELECTRONIC EQUIPMENT, ROTATION, SPIN, MONITORS, DETECTORS, MAGNETS, DESIGN, SENSITIVITY, RELIABILITY, TESTS.)

269 247 0394 GYRO TEMPERATURE CONTROL WITH A LIQUID SOURCE,

269 247 0394 THE THERMAL AND FLUID CONDITIONS THAT EXIST IN THE TEST GIMBAL AND FLUID JACKET ARE DESCRIBED. FLUID FLOW RATES IN THE FLUID JACKET CLOSELY GOVERN THE GYRO HEAT TRANSFER PERFORMANCE AND IMPROVEMENTS IN THIS FLOW RATE WILL SUBSTANTIALLY RAISE THIS PERFORMANCE. COUPLED TO THIS IS THE CLOSE ATTENTION THAT MUST BE PAID

TO ALL HEAT TRANSFER PARAMETERS ABOUT THE TEST GIMBAL, EVIDENCED BY THE CHANGES IN THE SURROUNDING INSULATION. SEVERAL IMPROVEMENTS ARE NEEDED TO YIELD TEST CONDITIONS THAT FULLY SIMULATE SYSTEM CONDITIONS. NOTABLE AMBIENT SENSITIVITIES ARE STILL PRESENT IN THE TEST UNIT. FLUID TEMPERATURE LOSS-GAIN PROFILES, SHOWS THAT THE THERMAL CONDUCTION LOSSES OF THE GYRO MOUNTINGS ARE GREAT ENOUGH TO PREVENT ANY FLUID TEMPERATURE GAIN WITH POWER ON. THIS SITUATION CAN BE CORRECTED BY INSTALLING SMALL AUXILIARY HEATERS ON THE GYRO MOUNTING BLOCKS TO MAKE UP FOR THESE CONDUCTION LOSSES. THE SECOND CORRECTABLE CONDITION INVOLVES THE TEMPERATURE CONTROLLER SENSITIVITIES AND TIME CONSTANTS. EXPERIENCE HAS SHOWN THAT THESE FACTORS ARE NOT IN LINE WITH SIMILAR TYPES OF CONTROL UNITS. ONLY WITH A PRECISE DESCRIPTION OF ALL THE THERMAL CONDITIONS IN BOTH THE LABORATORY TEST UNIT AND THE SYSTEM CAN THE REQUIRED ACCURACIES OF GYRO INSTRUMENTS BE REALIZED IN OPERATIONAL SYSTEMS.

269 247 0392 (LIQUIDS, HEAT TRANSFER, *GIM-BALS, TEMPERATURE CONTROL, *GYROSCOPES.) (BOUNDARY LAYER, FLUID FLOW, HEAT, HEAT TRANS-FER, TEST METHODS.) -

269 249 0395 COMPENSATION OF A DIGITAL INTEGRATING ACCELEROMETER.

269 249 0395 COMPENSATION OF A DIGITAL INTEGRATING ACCELEROMETER, NECESSITATED BY THE UNUSUAL MODING BEHAVIOR OF A NONLINEAR SAMPLED-DATA SYSTEM, IS PRESENTED. WITH THE SYSTEM COMPENSATED, HIGHEST FREQUENCY LIMIT CYCLES ARE ESTABLISHED AND SYSTEM ERRORS ARE MINIMIZED. A NEW CONFIGURATION IS PROPOSED USING A CONVENTIONAL TORQUE GENERATOR MICROSYN AS BOTH A TORQUING AND SENSING DEVICE. THE MICROSYN IS COMMANDED BY A FLIP-FLOP. THIS PULSED MICROSYN ALSO PRESENTS A CONVENIENT AND EASY METHOD FOR ATTAINING THE COMPENSATION. REAC SIMULATION IS USED TO DEMONSTRATE THE EFFECT OF THE COMPENSATION AND TO ILLUSTRATE THE SYSTEMS' DYNAMIC BEHAVIOR. CROSS-COUPLING ERROR IS INVESTIGATED TO DETERMINE IF ANY APPRECIABLE ERROR IS INTRODUCED. A PURE SAMPLED-DATA APPROACH IS PRESENTED TO SHOW A NEW METHOD OF ANALYSIS. THE NONLINEAR DIFFERENCE EQUATION OF THE COMPENSATED SYSTEM IS DERIVED. ACCELERATION COMMANDS ARE GIVEN TO THE SYSTEM WITH AND WITHOUT COMPENSATION AND THE RESULTANT ERROR IN THE INDICATED VELOCITY IS PLOTTED.

269 249 0393 (*INERTIAL GUIDANCE, ACCELER-OMETERS, DIGITAL SYSTEMS, FEEDBACK, ERRORS.) (MEASUREMENT, VELOCITY, *DIGITAL COMPUTERS.) (*TRANSDUCERS, TORQUE.) THESES. -

269 252 0397 THE STABILITY OF THE PINCH WITH ANISTROPIC PRESSURE,

269 252 0397 A DISPERSION EQUATION IS OBTAINED FOR THE STABILITY OF THE PINCH FROM THE HYDROMAGNETIC EQUATIONS SUPPLEMENTED BY AN EQUATION FOR THE PRESSURE TENSOR OF THE IONS. THE DISPERSION EQUATION IS OBTAINED FOR THE MARGINAL INSTABILITY CASE ONLY. IT IS OBSERVED THAT THIS DISPERSION EQUATION COINCIDES WITH THE DISPERSION EQUATION OBTAINED FROM THE CHEW, GOLDBERGER AND LOW (PRO. ROY. SOC. A236 (1956) 112) EQUATIONS FOR THE MARGINAL INSTABILITY CASE. IT IS CONCLUDED THAT THE REGION OF THE STABILITY PREDICTED FROM THE EQUATIONS THAT WE HAVE USED IS SLIGHTLY MORE THAN THAT GIVEN BY THE KINETIC EQUATION USED BY CHANDRASEKHAR, KAUFMANN AND WATSON (PROC. ROY. SOC. A245 (1958) 435).

269 252 0395 (*MAGNETIC PINCH, *STABILITY, *PLASMA PHYSICS, PRESSURE .) (MAGNETIC FIELDS, VACUUM SYSTEMS, METALS, CYLINDRICAL BODIES, THERMAL CONDUCTIVITY.) (PERTURBATION THEORY, PARTIAL DIFFERENTIAL EQUATIONS, LINEAR SYSTEMS, TENSOR ANALYSIS, SCATTERING.) -

269 255 0398 COMPATIBLE TECHNIQUES FOR INTEGRATED CIRCUITRY.

269 255 0398 INVESTIGATIONS WERE CONTINUED ON THE DEVELOPMENT OF PROCESS TECHNIQUES NECESSARY FOR INTEGRATED CIRCUIT FABRICATION. EFFORT WAS BOTH IN MORPHOLOGICAL AREAS AND THIN FILMS AS APPLIED TO SEMICONDUCTING SUBSTRATE. FURTHER EFFORTS IN PERFECTING EPITAXIAL TECHNIQUES ARE REPORTED. A PROGRAM WAS STARTED TO DEVELOP AND FABRICATE TYPICAL CIRCUITS PRACTICAL FOR A WIDE RANGE OF HIGH AND LOW FREQUENCY AMPLIFIER APPLICATIONS AS WELL AS LOGIC CIRCUITS.

269 255 0396 (*ELECTRONIC CIRCUITS, *THIN CIRCUITS, DESIGN, PROCESSING, *MANUFACTURING METHODS.) (RESISTORS, CAPACITORS, TANTALUM CAPACITORS, INTERMETALLIC COMPOUNDS, CRYSTALS, GROWTH, CIRCUITS.) -

269 257 0399 ANPP CORROSION PROGRAM. LOOP TESTING OF INCONEL, NICKEL, MONEL AND BIMETAL HEAT EXCHANGERS,

269 257 0399 CORROSION TESTS WERE PERFORMED ON 12 TEST VESSELS. TWO SETS OF MODEL HEAT EXCHANGERS (A SET CONSISTS OF A STEAM GENERATOR AND SUPERHEATER) AND EIGHT MINIATURE HEAT EXCHANGERS WERE TESTED DYNAMICALLY IN A PRESSURIZED WATER LOOP. ONE SET OF MODEL HEAT EXCHANGERS HAD BIMETAL TUBES (STAINLESS STEEL IN THE PRIMARY, CARBON STEEL IN THE SECONDARY) AND THE OTHER HAD INCONEL TUBES. THE SET WITH BIMETAL TUBES WAS SERVICE TESTED FOR 4890 AND THAT WITH INCONEL TUBES WAS SERVICE TESTED 4747 HR. THE SECONDARY ENVIRONMENT IN THE BIMETAL VESSELS SIMULATED THE SM-1 WATER CONDITIONS WHILE THE SECONDARY IN THE INCONEL VESSELS SIMULATED REACTOR QUALITY WATER. THE INCONEL, NICKEL AND MONEL TUBING PERFORMED WELL IN BOTH REACTOR GRADE AND HIGH CHLORIDE SECONDARY WATER. THE INCONEL TUBING IN THE MODEL VESSELS EXPOSED TO REACTOR GRADE WATER DID NOT PIT. THE BIMETAL MODEL VESSELS WHICH WERE TESTED USING REACTOR GRADE WATER SHOWED THE DEGREE OF PITTING WAS PROHIBITIVE FOR LONG-LIFE STEAM GENERATORS. TUBING IN ONE OF THE BIMETAL MINIATURE VESSELS WAS DEFECTED TO EXPOSE STAINLESS STEEL TO THE HIGH CHLORIDE SECONDARY ENVIRONMENT NO CRACKING OF THE STAINLESS SUBLAYER OCCURRED. (AUTHOR) AD-269 2579N6

269 257 0397 (*NUCLEAR PROPULSION, *HEAT EXCHANGERS, STEAM, GENERATORS, METALS, PIPES, PRODUCTION, PROCESSING, MODEL TESTS, TEST METHODS, DESIGN.) (*CORROSION, EROSION, PICKLING, DETERIORATION, CRAZING.) (STAINLESS STEEL, *STEEL, *NICKEL ALLOYS, *CHROMIUM ALLOYS, *NICKEL.) (FEED WATER WITH CHLORIDES, SODIUM COMPOUNDS, HYDROXIDES, PHOSPHATES.) -

269 261 0400 INVESTIGATION OF SPOT WELDING CHARACTERISTICS OF TITANIUM ALLOYS,

269 261 0400 THE FATIGUE STRENGTH OF MULTIPLE SPOT WELDED JOINTS IN .060-IN.-THICK SHEET MATERIAL OF THE Ti ALLOYS 4AL-3MO-1V, 16V-2.5AL, AND 6AL-4V WERE DETERMINED. THE FATIGUE STRENGTH OF THE 3 ALLOYS WAS 8-10% OF THE STATIC STRENGTH OF THE SPOT WELDED JOINT. THE ALPHA-BETA ALLOY 4AL3MO-1V HAD THE HIGHEST FATIGUE STRENGTH THE 16V-2.5AL, ALL BETA ALLOY, THE LOWEST. DATA IS ALSO PRESENTED ON THE ELEVATED TEMPERATURE STRENGTH OF SPOT WELDS AND THE EFFECT OF EXPOSURE TO ELEVATED TEMPERATURE ON ROOM TEMPERATURE STRENGTH OF SPOT WELDS IN THE 4AL-3MO-1V ALLOY. A UNIFORM DECREASE IN SHEAR STRENGTH WAS NOTED WITH INCREASE IN TEMPERATURE. AT AN EXPOSURE TEMPERATURE OF 600 F, THE 4AL-3MO-1V ALLOY RETAINED ITS STRENGTH UP TO 250 HR EXPOSURE TIME. A UNIFORM DECREASE IN SHEAR STRENGTH OCCURRED AFTER EXPOSURE AT 900 F FOR 100 HR, BUT AN ANOMALOUS INCREASE IN STRENGTH OCCURRED AFTER EXPOSURE OF 1000 HR.

269 261 0398 (*TITANIUM ALLOYS, ALUMINUM ALLOYS, MOLYBDENUM ALLOYS, VANADIUM ALLOYS, SHEETS, SPOT WELDING, *SPOT WELDS, *WELDED JOINTS, TENSILE PROPERTIES, SHEAR STRESSES, THERMAL STRESSES, HIGH TEMPERATURE RESEARCH, FATIGUE (MECHANICS), TESTS.) -

269 265 0401 THERMODYNAMIC PROPERTIES OF BI-METALLIC POWDERS.

269 265 0401 THE OBJECT OF THE PROGRAM IS TO STUDY THE HEATS OF COMBUSTION OF INTERMETALLIC COMPOUNDS AS COMPARED WITH MECHANICAL MIXTURES OF THE CORRESPONDING METALS. THE PROGRAM WILL CONSIST OF THREE PARTS PREPARATION OF ULTRAFINE POWDERS, BIMETALLIC ALLOY (COMPOUND) SYSTEMS, AL B, ZR AL, ZR SI, AL LI, AND TI SI, AND OF THE CORRESPONDING ELEMENTS DETERMINATION OF THE HEATS OF FORMATION OF THE ABOVE BINARY COMPOUNDS AND THE OXIDES AND RELATED PRODUCTS OF COMBUSTION OF THE ABOVE BINARY ALLOYS THE PREPARATION OF RESEARCH QUANTITIES FOR FURTHER EVALUATION. A PARR SERIES \$1200 ADIABATIC CALORIMETER WAS INSTALLED, AND ITS HEAT EQUIVALENT DETERMINED. A FEW PRELIMINARY RUNS ON THE DETERMINATION OF THE HEAT OF COMBUSTION OF AL METAL POWDER REVEALED THAT THIS REACTION IS VERY VIOLENT. A FEW RUNS WERE MADE TO EXPLORE THE FIELD OF SOLUTION CALORIMETRY. IT WAS FOUND THAT AL POWDERS ARE SLOW TO REACT WITH 1 N HCL AT ROOM TEMPERATURE. ONLY AT TEMPERATURES EXCEEDING 55 C DID REACTION RATES BECOME HIGH ENOUGH TO COMPLETE THE REACTION IN THE COURSE OF MINUTES.

269 265 0399 (*THERMODYNAMICS, THERMOCHEMISTRY, *COMBUSTION, *POWDER METALS, POWDER ALLOYS, *INTERMETALLIC COMPOUNDS, METALS.) (SILICON COMPOUNDS, ALUMINUM COMPOUNDS, BORIDES, ZIRCONIUM COMPOUNDS, LITHIUM COMPOUNDS, TITANIUM COMPOUNDS.) (ALUMINUM, HYDROCHLORIC ACID.) (LABORATORY EQUIPMENT, CALORIMETERS, VAPORIZATION, ELECTRON BEAMS, INDUCTION HEATING, REFRACTORY MATERIALS.) -

269 267 0402 ATOLL RESEARCH BULLETIN NO. 85.

269 267 0402 SINCE LAND TENURE PROBLEMS ARE OF MAGNITUDE AND ARE UBIQUITOUS, IT WAS FELT THAT COMPARATIVE STUDIES FROM SEVERAL PARTS OF THE PACIFIC MIGHT BE USEFUL. WESTERNIZED AREAS SUCH AS HAWAII, NEW ZEALAND, AND AUSTRALIA WERE EXCLUDED FROM CONSIDERATION, AND AN ATTEMPT WAS MADE TO OBTAIN CONTRIBUTIONS FROM THE GILBERT AND MARSHALL ISLANDS IN MICRONESIA, FROM THE SOLOMON AND FIJI ISLANDS IN MELANESIA, AND FROM THE COOK ISLANDS IN POLYNESIA.

269 267 0400 (PACIFIC ISLANDS, MAPS.) (*MELANESIA, *MICRONESIA, *POLYNESIA.) SOCIOLOGY. -

269 521 0403 RESEARCH IN SATELLITE TRACKING TECHNIQUES AND THE DEVELOPMENT OF AN INTEGRAL PARAMETRIC AMPLIFIER ANTENNA.

269 521 0403 A SUMMARY IS PRESENTED OF RESEARCH AND DEVELOPMENT ACTIVITIES IN CONNECTION WITH THE IMPROVEMENT OF RECEPTION OF SIGNALS FROM ORBITING SATELLITES, THE TRACKING OF SATELLITES THROUGH DOPPLER SHIFT MEASUREMENTS, AND INVESTIGATIONS LEADING TO THE INVENTION OF AN INTEGRATED PARAMETRIC AMPLIFIER AND DIPOLE ANTENNA. DESIGN CONDITIONS FOR THE LATTER ARE SUMMARIZED AND THE CONSTRUCTION AND PERFORMANCE OF TYPICAL QUARTER AND HALF DIPOLES ARE REPORTED.

269 521 0401 (*PARAMETRIC AMPLIFIERS, *ANTENNA AMPLIFIERS, *DIPOLE ANTENNAS, RADIO RECEIVERS, RADIO SIGNALS, RADIO RECEPTION, VERY HIGH FREQUENCY, DESIGN.) (*SATELLITE VEHICLES, DOPPLER TRACKING, TRACKING.) ANTENNAS. -

269 530 0404 LABORATORY DESIGN FOR STUDY OF INFECTIOUS DISEASE,

269 530 0404 SOME FUNDAMENTAL CRITERIA AND TYPICAL LAYOUT
 SKETCHES ARE PRESENTED TO ASSIST THOSE INTERESTED IN DESIGNING NEW
 INFECTIOUS-DISEASE LABORATORIES OR IN THE CONVERSION OF EXISTING
 FACILITIES. TYPICAL SAFETY EQUIPMENT DESIRABLE IN THESE LABORATORIES
 IS DESCRIBED. THE BASIC CONCEPTS PRESENTED, AND THE EQUIPMENT
 RECOMMENDED, HAVE BEEN PROVED IN ACTUAL PRACTICE AND FOUND TO BE OF
 VALUE IN PREVENTING LABORATORY INFECTIONS.

269 530 0402 (*BIOLOGICAL LABORATORIES, *TEST FACILITIES, *SAFETY, S
 AFETY DEVICES, COUNTERMEASURES, INFECTIONS, DISEASES, FUNGI, BACTERIA, V
 IRUSES.) -

269 535 0405 A TENSILE TESTING APPARATUS FOR SHORT FINE FILAMENTS
 WITH OPTICAL-MECHANICAL STRAIN MEASUREMENT.

269 535 0405 AN APPARATUS WAS DESIGNED AND BUILT, WHICH WILL
 OBTAIN RELATIVELY ACCURATE STRESS-STRAIN CURVES OF FINE METALLIC
 FILAMENTS AND WHISKERS. THE PRINCIPLE OF OPERATION IS BASED UPON
 EXTENSION OF A CALIBRATED SPRING TO APPLY THE LOAD. THE STRAIN IS
 MEASURED OPTICALLY BY PROJECTING THE GAUGE MARKS ON TWO GROUND-GLASS
 PLATES ATTACHED TO DIAL INDICATORS. THE MAGNITUDE OF ERROR IN LOAD AND
 STRAIN MEASUREMENTS IS VERY SLIGHT. STRESS-STRAIN MEASUREMENTS OF
 ELASTIC MODULI FOR TWO FILAMENT METALS WERE MADE AS A FINAL CHECK.

269 535 0403 (*TEST EQUIPMENT, DESIGN, *TENSILE PROPERTIES, METALS,
 IRON, MAGNESIUM, FILAMENTS, *OPTICS, *MECHANICAL PROPERTIES, STRESSES.)
 (ELASTICITY, CALIBRATION, MEASURE-MENT, TESTS, ERRORS.) -

269 538 0406 NO TITLE AVAILABLE

269 538 0406 A SURVEY OF LITERATURE PERTINENT TO ANALYSIS AND
 BEHAVIOR OF STRUCTURAL LAMINATES IS PRESENTED. THE DISCUSSION IS
 SEPARATED INTO FOUR SECTIONS (1) MECHANICAL PROPERTIES, (2)
 FORMULATION OF THE GOVERNING EQUATIONS, (3) SOLUTION TECHNIQUES, AND
 (4) FAILURE CRITERIA. IN EACH SECTION A SHORT RESUME IS GIVEN, IN
 WHICH THE PRESENT STATE OF KNOWLEDGE IS BRIEFLY SUMMARIZED. REFERENCES
 ARE GIVEN TO ABSTRACTS WHICH APPEAR AT THE END OF THE REPORT.

269 538 0404 (*LAMINATES, *STRUCTURES, *BIB-LIOGRAPHY.) (STATICS, L
 OADING, MECHANICAL PROPERTIES, STRESSES, EQUATIONS, STRUCTURAL SHELLS, E
 LASTICITY, DIFFERENTIAL EQUATIONS, FAILURE (MECHANICS).) -

269 540 0407 NON-GEOSTROPHIC THEORY OF ATMOSPHERIC WAVES.

269 540 0407 THE SYMMETRIC WAVE THEORY IS APPLIED TO A
 TWOISENTROPIC-LAYER MODEL OF THE ATMOSPHERE. THE NON-ROTATING
 TWO-LAYER MODEL IS USED TO EXAMINE THE JUSTIFICATION FOR THE
 QUASI-SOLENOIDAL APPROXIMATION AND THE VERTICAL QUASI-SYMMETRY
 APPROXIMATION WHICH IS INTRODUCED IN THE SUBSEQUENT THEORY. THE
 NON-GEOSTROPHIC THEORY IS DISCUSSED FOR SYMMETRIC WAVES IN AN
 ATMOSPHERE WITH CONSTANT ROTATION (ZERO PLANETARY VORTICITY GRADIENT).
 THE PHYSICAL INTERPRETATION OF THE BEHAVIOR OF THE WAVES IS
 EMPHASIZED.

269 540 0405 (*ATMOSPHERE MODELS, WAVE TRANSMISSION, *HARMONIC ANALY
 SIS, MATHE-MATICAL ANALYSIS.) (ATMOSPHERE, *CYCLONES, *DYNAMICS.) -

269 544 0408 STRATOSPHERIC TEMPERATURES RELATED WITH SOLAR ACTIVITY.

269 544 0408 A STUDY IS REPORTED OF THE RELATIONSHIP BETWEEN STRATOSPHERIC TEMPERATURES AND VARIATIONS IN SOLAR ACTIVITY. MONTHLY MEAN 50 MB. TEMPERATURES AND DEPARTURES FROM THE MEAN WERE DETERMINED FOR SELECTED STATIONS AND STATISTICALLY COMPARED AGAINST SUNSPOT AND GEOMAGNETIC DISTURBANCE DEPARTURES FROM THE MEAN. DATA WERE DIVIDED INTO SUMMER AND WINTER PERIODS AND INTO THREE LATITUDINAL REGIONS TO DETERMINE SEASONAL AND LATITUDINAL VARIATIONS. ONE HUNDRED, 50, AND 30 MB. TEMPERATURES AND 1000 AND 30 MB HEIGHTS OVER SAN JUAN WERE COMPARED AGAINST THE NUMBERS OF SUNSPOTS. RESULTS INDICATE THAT STRATOSPHERIC TEMPERATURES ARE BETTER RELATED WITH SUNSPOT NUMBERS THAN WITH GEOMAGNETIC INDICATOR CI. RESULTS ALSO INDICATE A BETTER RELATIONSHIP IN LOW LATITUDES, A BETTER RELATIONSHIP IN SUMMER, WITH INCREASING HEIGHT. IT IS CONCLUDED THAT INCREASED ELECTROMAGNETIC RADIATION ASSOCIATED WITH SUNSPOTS INCREASES STRATOSPHERIC TEMPERATURES AND HIGH ATMOSPHERIC DENSITIES.

269 544 0406 (RADIOSONDES, METEOROLOGICAL DATA, *STRATOSPHERE, TEMPERATURE, TERRESTRIAL MAGNETISM, AIR MASS ANALYSIS, SOLAR ENERGY, SOLAR FLARES, SOLAR DISTURBANCES, SUNSPOTS, STATISTICAL ANALYSIS.) *THESES.

269 554 0409 ANTENNA AND RADOME MATERIALS AND PROPERTIES FOR SPACE AND SATELLITE USE. AN ANNOTATED BIBLIOGRAPHY.

269 554 0409 THE SCOPE OF THE SEARCH WAS TO PROVIDE INFORMATION ON AIRBORNE ANTENNA SYSTEMS APPLICABLE TO A SPACE ENVIRONMENT. AREAS OF INTEREST INCLUDE ANTENNA AND RADOME DESIGN AND MATERIALS SUITABLE FOR THEIR CONSTRUCTION, DIELECTRIC PROPERTIES OF THE MATERIALS, AND POSSIBLE SPACE ENVIRONMENT EFFECTS ON THE VARIOUS PROPERTIES OF THE MATERIALS.

269 554 0407 (*BIBLIOGRAPHY, *SPACE ENVIRONMENTAL CONDITIONS, *MATERIALS FOR ELECTRONIC EQUIPMENT, *ANTENNAS, *RADOMES, DIELECTRIC PROPERTIES, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, RADIATION DAMAGE.)

269 558 0410 FLASHING LIGHT ENCODERS,

269 558 0410 TRANSMISSION OF DATA FROM SUB-ORBITAL VEHICLES IS ACCOMPLISHED PRIMARILY THROUGH THE USE OF RF TELEMETRY METHODS. ONE SUGGESTED APPROACH TO ASSURE DATA TRANSMISSION DURING A RF BLACKOUT EMPLOYS A SUPPLEMENTARY FLASHING LIGHT TRANSMITTING SYSTEM. IN THIS SYSTEM THE FLASHING LIGHT ENCODER HAS THE ASSIGNMENT OF TRANSFORMING DATA INFORMATION IMPOSED ON A GROUP OF FM SUB-CARRIER CHANNELS INTO A FORM COMPATIBLE WITH A FLASHING LIGHT TRANSMITTER. THE ENCODER SAMPLES THE FREQUENCY IN X-CHANNELS AND CONVERTS EACH FREQUENCY INTO A TIME INTERVAL BETWEEN TWO FLASHES. THE COINCIDENCE OF THE START OF ONE SAMPLE WITH THE TERMINATION OF THE PREVIOUS SAMPLE PROVIDES FOR MAXIMUM EFFICIENCY IN THE UTILIZATION OF TIME AND POWER. (AUTHOR) AD-269 5589N6 (TISTA/SEB) OTS PRICE \$8.60 LOCKHEED AIRCRAFT CORP., BURBANK, CALIF. STUDY ON MINIMIZATION OF FIRE AND EXPLOSION HAZARDS IN ADVANCED FLIGHT VEHICLES. REPT. FOR JUNE 60-AUG 61 ON DESIGN CRITERIA FOR FIRE AND EXPLOSION HAZARDS IN ADVANCED FLIGHT VEHICLES. OCT 61, 186P. INCL. ILLUS. TABLES, 151 REFS. (REPT. NO. 15156) 9CONTRACT 33(616)7387, PROJ. 6075) 9ASD TR 61-288) UNCLASSIFIED REPORT DESCRIPTORS (SUPERSONIC PLANES, SPACESHIPS, SATELLITE VEHICLES,

MANNED, *AIRCRAFT FIRES, *AVIATION SAFETY, ELECTRICAL EQUIPMENT, AVIATION FUELS, ROCKET FUELS, ROCKET OXIDIZERS, LIQUID ROCKET PROPELLANTS, SOLID ROCKET PROPELLANTS, MATERIALS, HAZARDS, FIRES, EXPLOSIONS, SPARK IGNITION, RELIABILITY, SAFETY, PHYSIOLOGY.) (FIRE EXTINGUISHERS, FIRE DETECTORS.) A STUDY IS PRESENTED OF POTENTIAL FIRE AND EXPLOSION HAZARDS IN ADVANCED FLIGHT VEHICLES AND DESIGN CRITERIA FOR ENHANCEMENT OF SAFETY AND RELIABILITY OF THE VEHICLES. THE VEHICLES COVER THE RANGE BETWEEN MACH 3 AIRPLANES AND LONG TIME, LONG RANGE SPACE VEHICLES, HOWEVER THE DESIGN CRITERIA MAY BE APPLIED TO ALL FLIGHT VEHICLES AS THEY ARE CURRENTLY KNOWN TO BE CONCEIVED OR BUILT.

269 558 0408 (LIGHT COMMUNICATION SYSTEMS, DATA TRANSMISSION SYSTEMS, PULSE COMMUNICATION SYSTEMS, *LIGHT PULSES, CODING, FLASH LAMPS, PULSE GENERATORS, OSCILLATORS, DESIGN.) (*RE-ENTRY VEHICLES, TELEMETERING DATA, CODING, ELECTRONIC CIRCUITS.) -

269 560 0411 FIELD ASSESSMENT PROBLEMS. THE DIFFUSION OF POLYDISPERSE PARTICULATE CLOUDS,

269 560 0411 SEPARATION OF PARTICLES RELEASED IN THE ATMOSPHERE IS DUE TO SMALL SCALE TURBULENCE AND VARYING TERMINAL VELOCITY OF THE PARTICLES. THE DISTRIBUTION OF PARTICLES DOWNWIND, WHICH SATISFIES THE DIFFERENTIAL EQUATION OF TURBULENT DIFFUSION, IS OBTAINED BY NUMERICAL INTEGRATION WHEN THE DISTRIBUTION OF TERMINAL VELOCITY IS LOGNORMAL. THE NON-DIMENSIONAL GROUND DEPOSITION DEPENDS ONLY ON THE LOGARITHM OF THE RATIO OF THE MEDIAN TERMINAL VELOCITY TO THE FRICTION VELOCITY, AND ON THE COEFFICIENT OF VARIATION OF THE TERMINAL VELOCITY DISTRIBUTION. AN ANALYTIC APPROXIMATION IS OBTAINED, WHICH IS QUITE GOOD FOR A WIDE RANGE OF BASIC PARAMETERS. ANOTHER APPROXIMATION IS USED WHICH NEGLECTS THE VARIATION OF TERMINAL VELOCITY. THIS PROCEDURE IS REASONABLE FOR A MUCH SMALLER RANGE OF BASIC PARAMETERS. APPLICATION TO A DIABATIC ATMOSPHERE IS ALSO GIVEN.

269 560 0409 (TURBULENT FLOW, *PARTICLES, ATMOSPHERE, DIFFUSION.) (FRICTION, *VELOCITY.) (MATHEMATICAL LOGIC, PROBABILITY.) *MICROMETEOROLOGY. -

269 563 0412 COMPUTER OPTIMIZATION OF NONLINEAR CONTROL SYSTEMS BY MEANS OF DIGITIZED MAXIMUM PRINCIPLE,

269 563 0412 A DIGITIZED VERSION OF THE MAXIMUM PRINCIPLE IS DERIVED BY A SIMPLE AND ELEMENTARY METHOD. IN THE LIMIT OF THE DISCRETE TIME INTERVAL APPROACHING ZERO, THE DIGITIZED MAXIMUM PRINCIPLE IS REDUCED TO PONTRYAGIN'S MAXIMUM PRINCIPLE. THE DIGITIZED VERSION CAN BE READILY PROGRAMMED ON A COMPUTER, AND ALL FOUR TYPES OF OPTIMIZATION PROBLEMS (1) MINIMUM TIME, (2) MAXIMUM RANGE, (3) MINIMUM COST BETWEEN TERMINAL POINTS, AND (4) MAXIMUM GAIN (OR MINIMUM COST) IN A GIVEN INTERVAL, ARE SOLVABLE BY THIS METHOD. THE COMPUTATION OF THE OPTIMUM PROCESS REQUIRES RELATIVELY LITTLE COMPUTER MEMORY, AND IS EXACT FOR SYSTEMS DESCRIBABLE BY A SET OF DIFFERENCE EQUATIONS. THE USE OF A COMPUTER TO IMPLEMENT THE COMPUTED OPTIMUM PROCESS IN VARIOUS WAYS IS DISCUSSED. A MORE GENERAL CONDITION FOR BANG-BANG CONTROL IS ALSO DERIVED.

269 563 0410 (*DIGITAL COMPUTERS, DATA PROC-ESSING SYSTEMS, *LINEAR PROGRAMMING, NONLINEAR SYSTEMS, CALCULUS OF VARIATIONS, DIFFERENCE EQUATIONS.) (MEMORY DEVICES, DIFFERENTIAL EQUATIONS, COMPLEX VARIABLES, (*MATHEMATICAL ANALYSIS, PERTURBATION THEORY, TIME, COSTS, GUIDED MISSILE TRAJECTORIES.) -

269 564 0413 SYNTHESIS OF LINEAR CONTROL SYSTEMS WITH LOW SENSITIVITY TO PLANT VARIATIONS.

269 564 0413 A STUDY OF THE DESIGN OF LINEAR CONTROL SYSTEMS INSENSITIVE TO PLANT VARIATIONS IS PRESENTED. LINEAR FEEDBACK SYSTEMS, CHARACTERIZED BY NO DIRECT TRANSMISSION TO THE OUTPUT AND PLANTS WHICH HAVE ONLY A SINGLE INPUT AND A SINGLE OUTPUT, ARE CONSIDERED. IN SUCH SYSTEMS, THE DEGREE OF INSENSITIVITY, (WITH RESPECT TO PLANT VARIATIONS), THAT CAN BE ACHIEVED IS LIMITED BY THREE FACTORS. THESE ARE THE NOISE GENERATED BY THE MEASURING INSTRUMENT, POSSIBILITY OF PLANT SATURATION, AND NON-MINIMUM PHASE ZEROS OF THE PLANT. METHODS FOR SPECIFYING A SYSTEM'S SENSITIVITY FUNCTION IN THE PRESENCE OF THESE CONFLICTING REQUIREMENTS ARE DERIVED. THE RESULTS ARE ALSO OF VALUE IN ESTABLISHING AND LIMITING THE FUNDAMENTAL CAPABILITY OF A PASSIVE-ADAPTIVE CONTROL SYSTEM TO MINIMIZE THE EFFECTS OF PLANT VARIATIONS. THIS IS OF IMPORTANCE IF THE USE OF ADAPTIVE CONTROL IS CONTEMPLATED. SUCH CONTROL IS OFTEN DIFFICULT TO IMPLEMENT AND IS SLOW IN ADJUSTING TO THE CHANGING ENVIRONMENT. FOR THESE REASONS IT SHOULD NOT BE USED UNLESS A CLEAR SUPERIORITY OVER INSENSITIVE (I.E., PASSIVEADAPTIVE) SYSTEMS CAN BE DEMONSTRATED.

269 564 0411 (*CONTROL SYSTEMS, LINEAR SYSTEMS, SYNTHESIS, *PROCESSING, SENSITIVITY, FEEDBACK, DESIGN.) (*NUMERICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS, POLYNOMIALS, SAMPLING, PROBABILITY.) (*INSTRUMENTATION, NOISE.) (THESES, *BIBLIOGRAPHY.) -

269 565 0414 DYNAMIC PROGRAMMING AND PONTRYAGIN'S MAXIMUM PRINCIPLE,

269 565 0414 BELLMAN'S DYNAMIC PROGRAMMING AND PONTRYAGIN'S MAXIMUM PRINCIPLE ARE GENERALLY REGARDED AS TWO ALTERNATIVE WAYS OF SOLVING THE PROBLEM OF OPTIMUM CONTROL OF A NONLINEAR SYSTEM. A MULTISTAGE DECISION PROCESS IS DESCRIBED AND APPLIED TO AN OPTIMAL TRAJECTORY. THE MAXIMUM PRINCIPLE IS DERIVED WHEN ONE TRIES TO OVERCOME CERTAIN PRACTICAL DIFFICULTIES IN DYNAMIC PROGRAMMING.

269 565 0412 (*ALGEBRAIC TOPOLOGY, FUNCTIONAL ANALYSIS.) (*PROGRAMMING, DIGITAL COMPUTERS, MEMORY DEVICES, ERRORS.) (NONLINEAR SYSTEMS, CONTROL SYSTEMS, *GUIDED MISSILE TRAJECTORIES.) (PERTURBATION THEORY, PARTIAL DIFFERENTIAL EQUATIONS.) -

269 566 0415 OPTIMAL CONTROL IN BOUNDED PHASE SPACE,

269 566 0415 A BOUNDED PHASE SPACE CONDITION IS DERIVED FOR A RESTRICTED CLASS OF PROBLEMS. THE CONDITION IS PROVED TO BE A NECESSARY CONDITION FOR OPTIMAL CONTROL IN A FIXED TIME INTERVAL WITH FREE END POINT. IF THE SYSTEM IS LINEAR, AND THE ALLOWED REGIONS OF PHASE VARIABLES AND CONTROLS ARE CONVEX, THE CONDITION IS BOTH NECESSARY AND SUFFICIENT, FOR OPTIMAL CONTROL IN A FIXED TIME INTERVAL, AS WELL AS MINIMAL TIME CONTROL BETWEEN TWO FIXED POINTS.

269 566 0413 (*CONTROL SYSTEMS, CONTROL, ALGEBRAIC TOPOLOGY, *FUNCTIONAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS, NUMERICAL ANALYSIS, INTEGRATION.) (FLIGHT PATHS, SPACE FLIGHT, EQUATIONS OF MOTION.) -

269 567 0416 NOISE AND RANDOM PROCESSES,

269 567 0416 THE THEORY OF NOISE AND RANDOM PROCESSES IN ELECTRONIC DEVICES WAS DEVELOPED IN TWO STAGES. THE FIRST STAGE SPANNING THE TWO DECADES FOLLOWING 1918 BROUGHT ABOUT THE UNDERSTANDING OF THE NATURE AND EFFECTS OF NOISE IN VACUUM TUBES AND CIRCUITS. THE SECOND STAGE, INITIATED BY WIENER IN THE EARLY 1940'S, ESTABLISHED THE THEORETICAL BASIS FOR SYNTHESIZING SYSTEMS WHICH OPTIMIZED THE TRANSMISSION AND DETECTION OF SIGNALS IN THE PRESENCE OF NOISE. WHILE THE DETAILED DISCUSSION OF THE DETECTION OF WEAK SIGNALS IN THE PRESENCE OF NOISE IS CONTAINED IN A SEPARATE PAPER ON INFORMATION THEORY, THIS SUBJECT IS DISCUSSED BRIEFLY TO DEMONSTRATE THE SIMILARITY IN THE UNDERLYING CONCEPTS OF OPTIMUM TRANSMISSION AND DETECTION. THE LITERATURE ON THE SUBJECT OF NOISE AND RANDOM PROCESSES IS SO EXTENSIVE AS TO MAKE COMPLETE COVERAGE IMPRACTICAL. ONLY HIGHLIGHTS AND SIGNIFICANT STEPPING STONES IN THE DEVELOPMENT OF THE THEORY ARE DESCRIBED.

269 567 0414 (INFORMATION THEORY, NOISE, BIBLIOGRAPHY.) (*NOISE ANALYZERS, FEEDBACK.) (SIGNALS, *STATIC ELIMINATORS, MATHEMATICAL LOGIC.)

269 569 0417 DEVELOPMENT OF PYROLYTIC REFRACTORY MATERIALS FOR SOLID-FUEL ROCKET MOTOR APPLICATIONS.

269 569 0417 INVESTIGATIONS WERE MADE OF THE PREPARATION AND EVALUATION OF REFRACTORY METAL ALLOYS OF PYROLYTIC GRAPHITE AS A FUNCTION OF SOURCE GAS CONCENTRATION, FLOW RATE, AND DEPOSITION TEMPERATURE TO OPTIMIZE THE STRUCTURAL PERFORMANCE OF THE PRODUCTS IN HIGH-TEMPERATURE EROSION ENVIRONMENTS. IN EACH SYSTEM ANALOGOUS REACTION CONDITIONS ARE FOUND TO BE OPERATIVE AND MICROSTRUCTURAL, AND OTHER PHYSICAL ASPECTS SIMILAR TO THOSE OF PYROLYTIC GRAPHITE ARE OBSERVED. CARBIDE FORMATION AND OTHER DISADVANTAGEOUS ASPECTS OF THE VAPOR DEPOSITION PROCESSES ARE CONSIDERED. INITIAL STUDIES OF THE MATERIALS IN OXIDIZING ATMOSPHERES ARE DESCRIBED.

269 569 0415 (ROCKET MOTORS, *ROCKET MOTOR NOZZLES, SOLID ROCKET PROPELLANTS, MATERIALS, *REFRACTORY MATERIALS.) (*GRAPHITE, ALLOYS, BORON ALLOYS, MOLYBDENUM ALLOYS, TUNGSTEN ALLOYS, TANTALUM ALLOYS, CHROMIUM ALLOYS, MANGANESE ALLOYS, TITANIUM ALLOYS, SILICON ALLOYS, MICROSTRUCTURE, PHYSICAL PROPERTIES, DENSITY.) (MANUFACTURING METHODS, VAPORIZATION, METHANES, BENZENES, METALORGANIC COMPOUNDS, METALLIC COMPOUNDS, METALLIC SMOKE DEPOSITS.) TEST METHODS.

269 586 0418 HELICOPTER ROTOR HUB VIBRATORY FORCES SYSTEMATIC VARIATION OF FLEXIBLE ROTOR BLADE PARAMETERS.

269 586 0418 A STUDY WAS MADE OF THE EFFECT ON VIBRATORY HUB LOADS OF SYSTEMATIC VARIATIONS IN BLADE MASS, PLANFORM, TWIST DISTRIBUTION, FLAP AND CHORD BENDING STIFFNESS, PITCH CONTROL STIFFNESS, PITCH AXIS - CHORDWISE CENTER OF GRAVITY AXIS AERODYNAMIC CENTER AXIS LOCATIONS, LAG DAMPER AND LAG SPRING RATES. THE VARIATIONS ARE MADE WITH RESPECT TO THE STANDARD BLADE OF A TYPICAL SINGLE ROTOR HELICOPTER HAVING A GROSS WEIGHT OF 8000 LBS. THE RESULTS ARE BASED ON AN ASSOCIATED MATRIX FLEXIBLE BLADE ANALYSIS USING CLASSICAL LINEARIZED BLADE ELEMENT AERODYNAMIC THEORY FOR THE FIRST FOUR HARMONIC AIRLOADINGS UNIFORM INFLOW IS ASSUMED AND THE EFFECTS OF

COMPRESSIBILITY AND STALL ARE NEGLECTED. RESULTS INDICATE THAT THERE ARE SOME PARAMETER SELECTIONS WHICH REDUCE BOTH VERTICAL AND HORIZONTAL LOADS, OTHERS WHICH REDUCE ONE AND INCREASE THE OTHER, AND SOME WHICH INCREASE BOTH. THE RESULTS CAN THEREFORE BE USED TO SELECT OPTIMUM PARAMETER TRENDS FOR GIVEN HELICOPTER APPLICATIONS WHEREIN LONGITUDINAL AND VERTICAL HUB LOADS MAY BE INDUCING COMPENSATORY RESPONSE AMPLITUDES.

269 586 0416 (*HELICOPTER ROTORS, VIBRATION, REDUCTION, MATHEMATICAL ANALYSIS.) (HELICOPTER BLADES, DESIGN.) -

269 588 0419 EXTENSION OF ELECTRONIC EQUIPMENT LIFE PREDICTION STUDY.

269 588 0419 AN INVESTIGATION IS BEING MADE TO PROVE THE FEASIBILITY OF PROVIDING FIELD INSTRUMENTATION CAPABLE OF MEASURING THE RATE OF DEGRADATION OF PERFORMANCE OF INDIVIDUAL PIECES OF ELECTRONIC EQUIPMENT. THE RATE OF DEGRADATION SHALL BE MEASURED DIRECTLY ON AN INDIVIDUAL ELECTRONIC EQUIPMENT AND EXPRESSED IN TERMS OF OPERATING TIME REMAINING UNTIL FAILURE OCCURS.

269 588 0417 (*TEST SETS, TEST EQUIPMENT, MAINTENANCE EQUIPMENT, INSTRUMENTATION, *RADIO EQUIPMENT, ELECTRONIC EQUIPMENT FAILURE (MECHANICS), LIFE EXPECTANCY, MATHEMATICAL PREDICTION, DESIGN, FEASIBILITY STUDIES.) -

269 597 0420 METEOROLOGICAL WIND-SCALES,

269 597 0420 WIND SCALES DESIGNED FOR USE IN THE ANALYSIS OF ALL TYPES OF METEOROLOGICAL PLOTTING MAPS USED BY THE NAVAL WEATHER SERVICE, BOTH FOR THE SURFACE AND THE UPPER AIR, ARE PRESENTED. ALSO PRESENTED IS A DISCUSSION OF GEOSTROPHIC AND GRADIENT WINDS, AND OF VARIOUS TYPES OF WIND SCALES. ALTHOUGH NONE OF THE WIND SCALES DISCUSSED OR PROVIDED ARE NEW IN CONCEPT, THE UNIVERSAL-GEOSTROPHIC-GRADIENT-SHEAR-WIND COMPUTER AND THE CONSTANT GEOSTROPHIC ACCELERATION SCALE ARE NOT WIDELY KNOWN.

269 597 0418 (*COMPUTERS FOR *WIND FROM NOMOGRAPHS, METEOROLOGICAL CHARTS.) (NAVAL OPERATIONS, CLIMATIC FACTORS.) -

269 598 0421 A NUMERICAL EXPERIMENT ON MODELLING THE BEHAVIOR OF FOG AND STRATUS.

269 598 0421 THE FEASIBILITY OF DESIGNING A DYNAMICAL MODEL FOR FORECASTING, THE DEVELOPMENT OF FOG AND STRATUS WAS STUDIED. TO THIS END, SEVERAL SIMPLE MODELS BASED ON NUMERICAL SOLUTIONS OF THE DIFFUSION EQUATION WERE CONSTRUCTED AND SOLVED, AND THE RESULTING PREDICTIONS WERE EXAMINED WITH TWO MAJOR POINTS IN MIND. THE FIRST POINT DEALS WITH THE FEASIBILITY OF ACHIEVING ANY DEGREE OF SUCCESS WITH THIS TYPE OF MODEL. THE SECOND POINT DEALS WITH THE TYPE OF OBSERVATIONAL DATA WHICH WOULD BE NEEDED FOR IT, AND THE TIME AND SPACE SCALES ON WHICH THE OBSERVATIONS WOULD HAVE TO BE MADE.

269 598 0419 (*FOG, *STRATUS CLOUDS, WEATHER FORECASTING, *ATMOSPHERIC MODELS.) (AIR, TEMPERATURE, WATER VAPOR, WATER, MATHEMATICAL ANALYSIS.) -

269 602 0422 ELECTROLUMINESCENT FERROELECTRIC(ELF) SOLID STATE DISPLAY.

NO ABSTRACT AVAILABLE

269 602 0420 (*DISPLAY SYSTEMS, SOLID STATE PHYSICS, LUMINESCENCE, *
LUMINESCENT MATERIALS.) (FILMS, *ELECTRONIC SWITCHES, CADMIUM COMPOUND
S, SULFIDES.) (IONIC CURRENT, ELECTRONIC SWITCHES, SILICONES.) FERROE
LECTRIC MATERIALS. -

269 604 0423 REMARKS ON THE CONTINUED FRACTION CALCULATION OF
EIGENVALUES AND EIGENVECTORS,

269 604 0423 FOR EIGENVALUE PROBLEMS IN WHICH THE SECULAR
DETERMINANT HAS TRIDIAGONAL FORM, E.G., THE RIGID ASYMMETRIC ROTOR THE
SECULAR EQUATION MAY BE WRITTEN IN THE FORM $F(L')$ EQUALS 0, WHERE $F(L')$
IS A CONTINUED FRACTION AND (L') AN EIGENVALUE. FURTHERMORE, IF THE
SECULAR PROBLEM IS OF NTH ORDER, THEN THE CONTINUED FRACTION (L') MAY
BE DEVELOPED IN N DIFFERENT WAYS. SINCE THE EIGENVALUES ARE ROOTS OF A
FUNCTION $F(L')$, IT IS CONVENIENT TO FIND THE EIGENVALUES BY MEANS OF
THE NEWTON-RAPHSON ITERATIVE PROCEDURE. THIS REQUIRES THAT THE
DERIVATIVE OF $F(L')$ WITH RESPECT TO $L'(F'(L))$ BE DETERMINED. AN EXACT
EXPRESSION FOR $F'(L)$ IS DERIVED AND IT IS SHOWN THAT $F'(L')$ IS IN FACT
THE NORM OF THE EIGENVECTOR BELONGING TO THE EIGENVALUE L' . A SIMPLE
RECURSION FORMULA, IN CONTINUED FRACTION FORM, FOR THE EIGENVECTOR
ELEMENTS IS ALSO DERIVED.

269 604 0421 (*CONTINUED FRACTIONS, METAMATHEMATICS, *INTEGRAL EQUA
TIONS, *MATRIX ALGEBRA, TRANSFORMATIONS (MATHEMATICS), ELECTRONIC EQUIPM
ENT, DIGITAL COMPUTERS.) -

269 607 0424 DEVELOPMENT OF TANTALUM-TUNGSTEN ALLOYS FOR HIGH
PERFORMANCE PROPULSION SYSTEM COMPONENTS.

269 607 0424 NINE MATERIAL EVALUATION ROCKET MOTOR (MERM) NOZZLES
OF CARBURIZED TA AND HIGH W CONTENT TA BASE ALLOYS WERE DELIVERED TO
AEROJET GENERAL-SACRAMENTO FOR TESTING UNDER A-3 CONDITIONS. THE
CARBURIZED INSERTS WERE FIRED THE CARBURIZED PURE TA FAILED, BUT THE
CARBURIZED TA 10% W FIRINGS WERE SUCCESSFUL. THE UNCARBURIZED HIGH W
CONTENT NOZZLES WERE RETURNED FOR CARBURIZING.

269 607 0422 (*ROCKET MOTOR NOZZLES, *TANTALUM ALLOYS, *TUNGSTEN AL
LOYS, TANTALUM COMPOUNDS, CARBIDES, REFRACTORY MATERIALS, HEAT RESISTAN
T ALLOYS, REFRACTORY COATINGS, EXHAUST GASES, EROSION, EXHAUST NOZZLES,
CONTROL SURFACES.) (*MANUFACTURING METHODS, CASTING, MACHINING, SHEET
S, RODS, WIRE, FORGING, EXTRUSION, CARBONIZATION, HEAT TREATMENT, PHYSI
CAL PROPERTIES, MECHANICAL PROPERTIES.) -

269 613 0425 THEORY OF RANDOM FUNCTIONS AND ITS APPLICATION

269 613 0425

269 613 0423 (*CONTROL SYSTEMS, SYNTHESIS, STATISTICAL FUNCTIONS, AU
TOMATIC, FUNCTIONS.) USSR. -

269 615 0426 FUNDAMENTAL PROBLEMS OF CHEMICAL KINETICS

269 615 0426 THIS PAPER DEALS WITH THE PROBLEMS AND PROPERTIES OF
FREE RADICALS. THE PROBLEMS OF FREE RADICALS IN ANISOTROPIC STRUCTURES
ARE DISCUSSED RELATIVE TO THE FOLLOWING THERMOCHEMICAL PROPERTIES, THE
METHODS OF ELECTRON AND ION SHOCK, REACTION KINETICS, DISSOCIATION
ENERGIES, HEAT CONTENT, AND PARAMAGNETIC RESONANCE.

269 615 0424 (*REACTION KINETICS, *FREE RADICALS, IONS, ELECTRONS, CHEMICAL BONDS, DISSOCIATION, RECOMBINATION REACTIONS, CHEMICAL REACTIONS, THERMOCHEMISTRY, THERMODYNAMICS, PARAMAGNETIC RESONANCE, THEORY.) (ORGANIC COMPOUNDS, HALOCARBONS, POLYMERS, ETHYLENES, CRYSTALS, PHENYL RADICALS, ACETYLENES, RIBOSE, NUCLEIC ACIDS.) USSR. -

269 616 0427 FLUX EQUIPMENT FOR AUTOMATIC AND SEMIAUTOMATIC

NO ABSTRACT AVAILABLE

269 616 0425 (*WELDING FLUXES, *INDUSTRIAL EQUIPMENT FOR AUTOMATIC, *WELDING, PREPARATION, PROCESSING, PHYSICAL PROPERTIES, MECHANICAL PROPERTIES, TEST METHODS, SPECIFICATIONS, MATHEMATICAL ANALYSIS, MANUFACTURING METHODS.) (TRANSPORTATION, CONVEYORS, HYDRAULIC PRESSURES, THEORY.) *USSR. -

269 620 0428 THE THEORY OF A DOUBLE GYRO-PENDULUM,

269 620 0428 THE MOTION OF THE AXES OF SYMMETRY OF THE DOUBLE GYRO-PENDULUM IS INVESTIGATED. THE PERIODS OF THESE MOTIONS ARE COMPUTED AND RESONANCE CONDITIONS ARE ESTABLISHED.

269 620 0426 (*GYROSCOPES, DIFFERENTIAL EQUATIONS, RESONANCE.) (TRANSLATIONS, USSR.) (MECHANICS, DYNAMICS, *MOTION, THEORY.) -

269 621 0429 INVESTIGATIONS OF INHOMOGENEITIES IN THE

269 621 0429 NINE ARTICLES DEVOTED TO THE STUDY OF THE PROPERTIES OF INHOMOGENEITIES IN THE IONOSPHERE RANGING IN DIMENSIONS FROM TENS OF METERS TO HUNDREDS OF KILOMETERS ARE PRESENTED. THE DEVELOPMENT OF THE THREE-POINT CORRELATION ANALYSIS METHOD IS DISCUSSED, WHEREBY TWO-DIMENSIONAL ANALYSIS IS DEVELOPED FOR A CASE OF THREE MEASUREMENTS. A METHOD IS DESCRIBED AND RESULTS ARE GIVEN OF INVESTIGATIONS FROM 1957-1959 ON THE PROPERTIES OF LARGE IONOSPHERIC INHOMOGENEITIES WITHIN THE SPACE OF THREE MEASUREMENTS BY COMBINING SPACEDIVERSITY AND FREQUENCY-SEPARATION RECEPTION. THE PROPERTIES OF SMALL INHOMOGENEITIES ARE INVESTIGATED USING THE CORRELATION METHOD, AND THE RESULTS OBTAINED BY THE METHOD OF SIMILARITY AND BY THE CORRELATION METHOD ARE COMPARED. THE MOVEMENT OF DISTURBANCES EMBRACING EXTENSIVE AREA OF THE IONOSPHERE IS GIVEN. THE POLARIZATION OF RADIO WAVES AND ITS INFLUENCE ON THE METHODS OF OBSERVING IONOSPHERIC INHOMOGENEITIES IS INVESTIGATED. THE USE OF THE CORRELATION METHOD IS CONSIDERED IN THE STUDY OF THE PROPERTIES OF IONOSPHERIC INHOMOGENEITIES. THE RESULTS OF THE INVESTIGATIONS OF IONOSPHERIC DRIFTS FOR NEW POINTS (LRKUTSK, ROSTOV), AT WHICH CONSIDERABLE MATERIAL WAS COLLECTED DURING THE IGY ARE GIVEN.

269 621 0427 (*RADIO WAVES, PROPAGATION, *IONOSPHERE.) (*IONOSPHERE MODELS, *CORRELATION TECHNIQUES, STATISTICAL ANALYSIS, *STATISTICAL FUNCTIONS, IONOSPHERIC DISTURBANCES.) USSR. -

269 624 0430 CHEMICAL REACTIONS ON THE SURFACE OF GERMANIUM, SILICON, AND THEIR ELECTRONIC ANALOGUES,

NO ABSTRACT AVAILABLE

269 624 0428 (*SEMICONDUCTORS, *SEMICONDUCTING FILMS, CATALYSTS, *GERMANIUM, *SILICON, INTER-METALLIC COMPOUNDS, METALLIC COMPOUNDS, ZINC COMPOUNDS, NICKEL COMPOUNDS, OXIDES, SURFACES, CHEMICAL REACTIONS, CATALYSIS, REACTION KINETICS, ADSORPTION, IMPURITIES, DECOMPOSITION, *SURFACE PROPERTIES, THEORY.) *BIBLIOGRAPHY, USSR, ELECTRONIC EQUIPMENT. -

269 629 0431 ELECTRON-BEAM GUNS FOR WELDING OF METALS IN VACUUM,

269 629 0431 TWO TYPES OF INDUSTRIAL TWO-STAGE GUNS WERE DEVELOPED WHICH PROVIDE ELECTRON BEAMS WITH DIAMETER OF 0.8-1.5 MM AT GUN POWER OF UP TO 1.5 KW AND ACCELERATING VOLTAGE OF 22-25 KV. METHODS WERE DEVELOPED FOR DETERMINING THE PRINCIPAL CHARACTERISTICS OF ELECTRON GUNS (CONDUCTANCE OF SYSTEM, FOCAL LENGTH, BEAM DIAMETER). HIGH-VOLTAGE POWER SUPPLIES WITH OUTPUT OF 3-5 KW WERE DEVELOPED FOR THE ELECTRON GUNS. ELECTRON BEAM PRESSURE AT THE MELTING PUDDLE POOL WAS CALCULATED.

269 629 0429 (METALS, VACUUM APPARATUS, *WELDING, *ELECTRON GUNS, ELECTRON BEAMS, FOCUSING, CONTROL, OPERATION, ELECTRONS, DENSITY, POWER SUPPLIES.) (PROCESSING, *MANUFACTURING METHODS.) USSR. -

269 631 0432 THE LAMINAR BOUNDARY LAYER OF A FLAT PLATE IN THE PRESENCE OF DISSOCIATION,

269 631 0432 SECOND APPROXIMATIONS OF THE SOLUTIONS OF LAMINAR BOUNDARY-LAYER EQUATIONS ARE DERIVED FOR A HEAT-INSULATED FLAT PLATE AND A FLAT PLATE WITH A GIVEN WALL TEMPERATURE. A NUMERICAL CALCULATION OF THE HEAT-INSULATED FLAT PLATE FOR M NUMBERS OF 10, 20, AND 30 IS ALSO GIVEN AS AN EXAMPLE M IS THE MACH NUMBER ON THE OUTER BOUNDARY OF THE BOUNDARY LAYER.

269 631 0430 (SHEETS, *LAMINAR BOUNDARY LAYER, DISSOCIATION, MATHEMATICAL ANALYSIS, DIFFERENTIAL EQUATIONS.) (*SUPERAERODYNAMICS, VELOCITY, ENTHALPY.) (FLUID MECHANICS, CONTINUUM MECHANICS, USSR.) -

269 633 0433 TEMPERATURE REGULATOR OF A GYROSCOPIC INSTRUMENT

269 633 0433 THE ACCURACY OF ANY KIND OF GYROSCOPIC INSTRUMENT DEPENDS TO A LARGE EXTENT UPON THE STABILITY OF ITS TEMPERATURE. MAINTAINING A CONSTANT TEMPERATURE WITH AN ACCURACY OF UP TO 0.1 C AND OVER IS POSSIBLE BY PLACING THE INSTRUMENT IN A THERMOSTAT OR BY EMPLOYING AUTOMATIC TEMPERATURE CONTROL.

269 633 0431 (*GYROSCOPES, TEMPERATURE SENSITIVE ELEMENTS, *TEMPERATURE CONTROL, *THERMOSTATS, ELECTRONIC CIRCUITS, STABILITY, DESIGN, USSR.) -

269 634 0434 A STUDY OF THE TIME RESOLUTION OF PHOTOMULTIPLIERS USING THE OSCILLOGRAPHIC METHOD,

269 634 0434 A DESCRIPTION IS GIVEN FOR MEASURING THE TIME RESOLUTION OF PHOTOMULTIPLIERS USING A HIGH SPEED OSCILLOGRAPH AND PERIODIC LIGHT FLASHES OF NANOSECOND DURATION. THE RESULTS OF MEASURING THE TIME PARAMETERS OF THE GROUP OF PHOTOMULTIPLIERS ARE GIVEN.

269 634 0432 (*PHOTOMULTIPLIERS, *TIME, MEASUREMENT, *OSCILLOGRAPHS, CIRCUITS.) (ANODES, CATHODES, LIGHT PULSES, PHOTOELECTRONS, ELECTRIC DISCHARGE, SPARKS.) USSR. -

269 635 0435 INTERFERENCE LIGHT FILTERS FOR THE ULTRAVIOLET REGION OF THE SPECTRUM,

269 635 0435 A METHOD FOR PRODUCING DIELECTRIC INTERFERENCE LIGHT FILTERS FOR THE UV REGION OF THE SPECTRUM AND THE FEATURES OF THE APPARATUS DEVELOPED FOR THIS PURPOSE ARE DISCUSSED. THIS NEW METHOD WAS USED TO PRODUCE NARROW-BAND DIELECTRIC LIGHT FILTERS OF A SPECIFIC WAVELENGTH, WITH SURFACE UNIFORMITY FOR THE 3000-4000 ANGSTROMS REGION. THE RESULTS CAN BE USED TO SET UP LARGE-SCALE PRODUCTION OF LIGHT FILTERS FOR THE UV REGION AT PLANT LABORATORIES.

269 635 0433 (*OPTICAL FILTERS, *ULTRAVIOLET FILTERS, OPTICAL COATINGS, OPTICAL MATERIALS, MATERIALS, FILMS, *DIELECTRIC FILMS, DIELECTRICS, MAGNESIUM COMPOUNDS, FLUORIDES, LEAD COMPOUNDS, CHLORIDES, MANUFACTURING METHODS, THICKNESS, CONTROL, LIGHT TRANSMISSION.) USSR, LABORATORY EQUIPMENT, VACUUM OPERATIONS. -

269 636 0436 TRANSMITTANCE OF THIN ATMOSPHERIC LAYERS IN THE 1-13 MICRON RANGE,

269 636 0436 THE PROBLEM OF THE APPLICABILITY OF THE EXPONENTIAL LAW AND THE SQUARE-ROOT LAW TO DESCRIBE THE ATTENUATION OF INFRARED RADIATION IS CONSIDERED FOR LAYERS OF WATER (1/10,000) TO (1/100) CM THICK. QUANTITATIVE DATA ARE OBTAINED FOR THE SPECTRAL AND INTEGRAL TRANSMITTANCE OF THIN ATMOSPHERIC LAYERS (UP TO 3 M) IN THE 1-13 MICRON RANGE.

269 636 0434 (*INFRARED RADIATION, ATTENUATION, *ATMOSPHERE, MATHEMATICAL ANALYSIS, NUMERICAL ANALYSIS, FUNCTIONS.) (*INFRARED RADIATION, ABSORPTION, *WATER VAPOR, SPECTROGRAPHIC ANALYSIS, SPECTROGRAPHIC DATA.) USSR. -

269 641 0437 THE ALMOST-PERIODIC REGIME OF A FOUR-DIMENSIONAL AUTOMATIC CONTROL SYSTEM,

NO ABSTRACT AVAILABLE

269 641 0435 (*CONTROL SYSTEMS, AUTOMATIC, SYNTHESIS, DIFFERENTIAL EQUATIONS, TOPOLOGY.) (*ROCKET TRAJECTORIES, MATRIX ALGEBRA, INEQUALITIES, MATHEMATICAL ANALYSIS.) USSR. -

9 645 0436 (SPACESHIPS, *SPACE FLIGHT, SPACE PROBES, BOOSTER ROCKETS, 269 645 0438 INTERPLANETARY ROUTES,

269 645 0438 SPACEFLIGHT IS DISCUSSED IN TERMS OF ROCKET BOOSTERS, LAUNCHING VELOCITY, FLIGHT DURATION, FLIGHT TRAJECTORIES, OPTIMUM LAUNCHING TIME, AND LAUNCHING DELAYS AND ERRORS.

269 645 0436 (SPACESHIPS, *SPACE FLIGHT, SPACE PROBES, BOOSTER ROCKETS, LAUNCHING, SPACE NAVIGATION, FLIGHT PATHS, NAVIGATION, VELOCITY, THEORY, ANALYSIS.) USSR. -

269 653 0439 THE PROTECTION OF CARBON AND GRAPHITE AGAINST OXIDATION AT TEMPERATURES OF 1200 DEGREES,

269 653 0439 HIGH-QUALITY GLASSY SILICIDIC COATINGS TO PROTECT VARIOUS TYPES OF CARBON-GRAPHITE MATERIALS FROM OXIDATION AT 1200 C FOR MORE THAN 100 HR WERE DEVELOPED. THE COMPOSITION OF THE BONDING AGENTS GREATLY INFLUENCED THE PROPERTIES OF THE COATINGS. THESE PROPERTIES WERE CONTROLLED BY CHANGING THE COMPOSITION OF THE BONDING AGENTS. WHEN STUDYING WETTABILITY, DATA OBTAINED BY THE DROP-SPREAD METHOD DID NOT SOLVE THE PROBLEM OF THE SUITABILITY OF A BONDING AGENT FOR HETEROGENEOUS COATINGS. THE METHOD OF THE PRELIMINARY APPLICATION OF

POWDERED-GLASS DROSS TO THE SURFACE OF THE SAMPLES MADE IT POSSIBLE TO DERIVE MORE CORRECT CONCLUSIONS ON THE APPLICABILITY OF GLASS AS A BONDING AGENT FOR COATINGS.

269 653 0437 (*ANTIOXIDANTS, *CERAMIC COAT-INGS, *OXIDATION INHIBITORS, *REFRACTORY COATINGS FOR *GRAPHITE, *CARBON.) (COATINGS, TITANIUM COMPOUNDS, SILICIDES, MOLYBDENUM COM-POUNDS.) (SILICON COMPOUNDS, NITRIDES, OXIDES, CARBIDES.) (TESTS, TEST METHODS, HIGH TEMPERATURE RESEARCH, USSR.) (REFRACTORY MATERIALS, WETTING AGENTS, BONDING.) -

269 654 0440 MAGNETISM AND LIFE,

269 654 0440 NO ABSTRACT AVAILABLE

269 654 0438 *MAGNETIC FIELDS, MAGNETISM, BIOPHYSICS, PLANTS, ANIMALS, GROWTH, USSR. -

269 655 0441 SHIELDING A GRYOSTABILIZER WHICH IS A SOURCE OF ELECTROMAGNETIC INTERFERENCE,

269 655 0441 NO ABSTRACT AVAILABLE

269 655 0439 (*SHIELDING OF *GYRO STABILIZERS.) (SHIELDING AGAINST ELECTRO-MAGNETIC WAVES, *INTERFERENCE FROM GYRO STABILIZERS.) USSR.

269 656 0442 RECOGNITION OF AIRCRAFT, GLIDERS, AND HELICOPTERS

269 656 0442 NO ABSTRACT AVAILABLE

269 656 0440 (*JET FIGHTERS, IDENTIFICATION, AERODYNAMIC CONFIGURATIONS, FLIGHT SPEEDS, ARMAMENT, DESIGN, USSR, POLAND.) -

269 658 0443 PYROLYTIC CARBIDE DEVELOPMENT PROGRAM.

269 658 0443 REFRACTORY PYROLYTIC CARBIDES WERE INVESTIGATED AS EROSION RESISTANT BARRIERS ON THE SURFACE OF ROCKET NOZZLES, SPECIFICALLY FOR POLARIS NOZZLES WITH ADVANCED PROPELLANTS. A MIXTURE OF REACTANT GASES COMPOSED OF A METAL HALIDE AND A HYDROCARBON WAS DEVELOPED FOR COATINGS OF TAC, HFC AND NBC ON GRAPHITE SUBSTRATES. HIGH DENSITY, SINGLE PHASE, IMPERVIOUS CARBIDE COATINGS WERE PRODUCED WHICH ARE INTIMATELY BONDED TO THEIR SUBSTRATE. SPECIAL GRAPHITES ARE REQUIRED WITH COEFFICIENTS OF THERMAL EXPANSION COMPATIBLE WITH THE CARBIDES. PYROLYTIC TACAND NBC-COATED ROCKET NOZZLE INSERTS RESISTED EROSION. PARTIAL FAILURES, IN TERM OF REMOVAL OF THE COATINGS IN THE EXIT CONE SECTION OF THE NOZZLES, APPEARED TO BE CAUSED BY THERMAL STRESSES OR FROM STRUCTURAL CHANGES IN THE SUBSTRATE MATERIAL. THERMAL SHOCK DOES NOT APPEAR TO BE A PROBLEM WHEN THESE COATINGS ARE EMPLOYED. THE FEASIBILITY OF PRODUCING FULL SCALE ROCKET NOZZLES WITH SURFACE COATINGS OF PYROLYTIC CARBIDES WAS ALSO DEMONSTRATED.

269 658 0441 (*ROCKET MOTOR NOZZLES, REFRAC-TORY COATINGS OF *CARBIDES FROM PYROLYSIS OF HYDROCARBONS AND TANTALUM COMPOUNDS, HAFNIUM COMPOUNDS, NIOBIUM COMPOUNDS, CHLORIDES ON GRAPHITE, STRUCTURES, NOZZLES.) (TESTS, FAILURE (MECHANICS), THERMAL EXPANSION, THERMAL STRESSES.) (EROSION, INHIBITION.) -

269 660 0444 ELECTRONIC TUBE TECHNOLOGY-MICROWAVE TUBES.

269 660 0444 RESEARCH WAS CONTINUED ON THE USE OF FAST CYCLOTRON WAVES TO PRODUCE FREQUENCY MULTIPLICATION IN AN OUTPUT COUPLER. AN ATTEMPT WAS MADE TO IMPROVE THE PERFORMANCE OF THE MULTIPLIER BY INCREASING THE PERVEANCE OF THE ELECTRON BEAM. THE HEIL ELECTRON GUN HAS SHOWN GOOD CHARACTERISTICS IN HIGH PERVEANCE OPERATION, SO A STANDARD HEIL GUN WITH A .010 IN. ANODE APERTURE WAS PLACED IN A MAGNETIC SHIELD. THE PERFORMANCE OF THIS GUN WAS ENCOURAGING, AS A BEAM CURRENT OF 7.5 MILLIAMPERES WAS OBTAINED AT 350 VOLTS. THIS IS AN INCREASE OF 2.8 TIMES IN BEAM CONDUCTANCE, WHICH SHOULD INCREASE THE OUTPUT POWER BY THE SAME FACTOR, AND THE OVERALL CONVERSION EFFICIENCY SHOULD INCREASE APPROXIMATELY BY A FACTOR OF 8.

269 660 0442 (*FREQUENCY MULTIPLIERS, *ELEC-TRON TUBES, MICROWAVE EQUIPMENT, ELECTRON BEAMS, ELECTRON GUNS, WAVEGUIDES, MICROWAVES, RADIOFREQUENCY GENERATORS, DESIGN, TESTS.) -

269 670 0445 GENERAL ON-THE-JOB CRITERIA OF AIRMAN EFFECTIVENESS APPLIED TO THREE CAREER FIELDS,

269 670 0445 THREE CRITERION MEASURES WERE CONSTRUCTED AND ADMINISTERED AT TWO AIR FORCE BASES TO AIRMEN SELECTED FROM THREE CAREER AREAS WHICH CORRESPOND TO THREE APTITUDE GROUPS DEFINED BY AIR FORCE CLASSIFICATION TESTS. EACH OF THE THREE INSTRUMENTS WAS SUBJECTED TO A FACTOR ANALYSIS. THE RESULTING FACTOR SCORES, IN COMBINATION WITH TEST SCORES AND OPERATIONALLY DERIVED PERFORMANCE RATINGS, WERE ALSO FACTOR ANALYZED. SIX FACTORS WERE IDENTIFIED, WITH EACH FACTOR DEFINED BY AT LEAST TWO OF THE MAJOR VARIABLES. SHORT FORMS OF TWO OF THE CRITERION INSTRUMENTS WERE PREPARED FOR FURTHER USE. THE RESULTS SUGGEST SUITABILITY OF THESE SCALES ACROSS THE THREE JOB AREAS.

269 670 0443 (*JOB ANALYSIS, STANDARDS, AVIATION PERSONNEL, EFFECTIVENESS.) *FACTOR ANALYSIS. -

269 671 0446 DEVELOPMENT OF RIGID PAVEMENT THICKNESS REQUIREMENTS FOR MILITARY ROADS AND STREETS,

269 671 0446 A NEW PROCEDURE WAS DEVELOPED FOR THE DESIGN OF RIGID PAVEMENTS FOR ROADS AND STREETS AT MILITARY INSTALLATIONS. THE PURPOSE WAS TO PROVIDE GREATER FLEXIBILITY IN THE DESIGN PROCEDURE TO INCLUDE THE EFFECTS OF VEHICLE LOADING, VEHICLE TYPE, WHEEL CONFIGURATION, AND VOLUME OF TRAFFIC. BY EXPRESSING ALL TYPES OF VEHICULAR TRAFFIC IN TERMS OF AN EQUIVALENT NUMBER OF APPLICATIONS OF AN 18,000 POUND LOAD ON A SINGLE AXLE EQUIPPED WITH DUAL WHEELS, THE VARIABLES IN DETERMINING THE REQUIRED PAVEMENT THICKNESS ARE PRODUCED TO THE TOTAL NUMBER OF LOAD APPLICATIONS, THE FLEXURAL STRENGTH OF THE CONCRETE, AND THE MODULUS OF SUBGRADE REACTION. DEVELOPMENT OF THE DESIGN PROCEDURE IS DESCRIBED IN DETAIL. APPLICATION OF THE METHOD TO THE DESIGN OF MILITARY ROADS AND STREETS IS ILLUSTRATED BY EXAMPLE.

269 671 0444 (*PAVEMENTS OF *ROADS IN *MILI-TARY FACILITIES.) (DESIGN OF CONCRETE, PAVEMENTS, THICKNESS, LOAD DISTRIBUTION, TRAF-FIC, EFFECTIVENESS.) -

269 673 0447 COMBUSTION PHENOMENA AS A FUNCTION OF PRESSURE.

269 673 0447 THE BURNING VELOCITIES OF VARIOUS FUEL-OXIDIZER FLAMES WERE MEASURED IN THE SUB-ATMOSPHERIC AND IN THE ABOVE ATMOSPHERIC PRESSURE REGIONS. RESULTS SHOW THE BURNING VELOCITIES OF LOW ENERGY SYSTEMS IN GENERAL DECREASE WITH INCREASING PRESSURE WHILE THE BURNING VELOCITIES OF HIGH ENERGY SYSTEMS INCREASE WITH INCREASING PRESSURE. FOR INTERMEDIATE ENERGY SYSTEMS THE BURNING VELOCITIES INITIALLY INCREASE WITH INCREASING PRESSURE AND DECREASE UPON FURTHER INCREASE OF PRESSURE. THE EFFECT OF PRESSURE TOGETHER WITH THAT OF ADDITIVES ON THE BURNING VELOCITIES OF SEVERAL FUEL-OXIDIZER SYSTEMS WAS ALSO INVESTIGATED. RESULTS SHOWED THAT THE ADDITIVES USED DID NOT CHANGE THE GENERAL PRESSURE EFFECT ON THE BURNING VELOCITIES OF THE SYSTEMS INVESTIGATED. THE BURNING VELOCITIES OF MIXTURES CONTAINING CARBON MONOXIDE INCREASE WHEN A HYDROCARBON ADDITIVE METHYL BROMIDE AND ETHYL NITRATE IS USED. IN OTHER MIXTURES, THE ADDITIVE GENERALLY REDUCED THE BURNING VELOCITIES.

269 673 0445 (*COMBUSTION, CARBON COMPOUNDS, MONOXIDES, METHANES, BROMIDES, CHLORIDES, FLUORIDES, HYDROGEN, AMMONIA, AIR, OXYGEN, FUEL ADDITIVES, PRESSURE, HIGH PRESSURE RE-SEARCH, FLAME PROPAGATION, VELOCITY, TESTS, TABLES.) -

269 677 0448 RESEARCH ON R.F. COAXIAL CONNECTORS, BROADBAND, HIGH TEMPERATURE RADIATION RESISTANT.

269 677 0448 EXTENSIVE WORK ON THE DEVELOPMENT OF A SUCCESSFUL HERMETIC SEAL USING CORNING 51723 GLASS AS THE INSULATOR FOR THE SHELL-INSULATOR-CONTACT STRUCTURE IS REPORTED. DESIGN WORK IN THE AREA OF THE DIFFERENT CONNECTOR TYPES WAS CONTINUED. A SUCCESSFUL METHOD OF MECHANICALLY ATTACHING THE CABLE TO THE CONNECTOR WAS DESIGNED AND TESTED. A METHOD OF AFFECTING A HERMETIC SEAL AT THE INTERFACE WAS DEVELOPED THAT WILL SUCCESSFULLY PASS THE MATING AND UNMATING REQUIREMENTS OF THE CONTACT HOWEVER, DIFFICULTIES WERE ENCOUNTERED WHEN THE UNIT WAS HEAT CYCLED.

269 677 0446 (*ELECTRIC CONNECTORS, *COAXIAL CABLES, BROADBAND, RADIO FREQUENCY CABLES, HIGH TEMPERATURE RESEARCH, RADIATION EFFECTS, TEMPERATURE, DESIGN.) (GLASS SEALS, INSULATING MATERIALS, HEAT RESISTANT GLASS, ELECTRICAL PROPERTIES, PHYSICAL PROPERTIES, TESTS.) -

269 285 0449 THEORY OF IONIZED TRAILS FOR BODIES AT HYPERSONIC SPEEDS,

269 285 0449 THE CHARACTERISTICS OF THE GASEOUS TRAIL REMAINING BEHIND A BODY MOVING THROUGH THE ATMOSPHERE AT HYPERSONIC SPEEDS ARE DISCUSSED. MEANS ARE SOUGHT FOR ASCERTAINING THOSE VARIABLES THAT CAN BE MEASURED AND USED TO PREDICT THE CHARACTERISTICS OF THE BODY CAUSING THE TRAIL. THE AVAILABLE THEORETICAL AND EXPERIMENTAL LITERATURE IS

VIEWED ASPECTS OF HYPERSONIC TRAIL ARE REVIEWED. IN THE CASE OF THERMODYNAMIC EQUILIBRIUM, A UNIVERSAL SOLUTION IS FOUND REVIEWED AND THE BASIC ASPECTS OF HYPERSONIC TRAILS ARE PRESENTED. IN THE CASE OF THERMODYNAMIC EQUILIBRIUM, A UNIVERSAL SOLUTION IS FOUND FOR THE VELOCITY AND ENTHALPY DISTRIBUTIONS AT A STATION BEHIND THE BODY WHERE THE PRESSURE HAS REACHED ITS AMBIENT FREE-STREAM VALUE. THE THERMAL-CONDUCTION PART OF THE TRAIL IS ALSO STUDIED. AN ANALYTIC SOLUTION IS FOUND FOR THE CASE OF VARIABLE THERMAL CONDUCTIVITY. THE

LENGTH OF THE TRAIL BASED ON A MINIMUM IONIZATION LEVEL IS CALCULATED AT DIFFERENT ALTITUDES FOR AN ILLUSTRATIVE RE-ENTRY. THE INFLUENCE OF THE TRAILING SHOCK ON THE CONDUCTION PART OF THE TRAIL IS DISCUSSED. A PRELIMINARY STUDY IS ALSO MADE OF THE TRAIL UNDER CHEMICALLY FROZEN CONDITIONS.

269 285 0447 (*CONDENSATION TRAILS, BODIES OF REVOLUTION, *HYPERSONIC CS.) (AERODYNAMIC CONFIGURATIONS, THERMODYNAMICS, *GAS IONIZATION, VELOCITY, ENTHALPY.) (*RE-ENTRY AERO-DYNAMICS, HEAT TRANSFER, THERMAL CONDUCTIVITY.) -

269 282 0450 FLIGHT SIMULATION OF ORBITAL AND REENTRY VEHICLES. PART I - DEVELOPMENT OF EQUATIONS OF MOTION IN SIX DEGREES OF FREEDOM.

269 282 0450 EQUATIONS GOVERNING THE MOTION OF A LIFTING REENTRY VEHICLE IN SIX DEGREES OF FREEDOM ARE DEVELOPED FOR SIMULATION PURPOSES. EFFECTS OF EARTH ROTATION, EARTH OBLATENESS AND WIND VELOCITY ARE INCLUDED. THE ROTATIONAL EQUATIONS ARE CONVENTIONAL EQUATIONS INVOLVING ANGULAR RATES REFERRED TO BODY AXES. TWO DIFFERENT FORMULATIONS OF THE TRANSLATIONAL EQUATIONS ARE PRESENTED, USING DIFFERENT COORDINATE SYSTEMS. ONE INVOLVES SPHERICAL COORDINATES REFERRED TO THE EQUATORIAL PLANE OF THE ROTATING EARTH THE OTHER INVOLVES SPHERICAL COORDINATES REFERRED TO A NOMINAL TRAJECTORY PLANE FIXED WITH RESPECT TO INERTIAL AXES. THE FORMER HAS THE ADVANTAGE THAT EARTH ROTATION AND OBLATENESS ARE TAKEN INTO ACCOUNT MORE SIMPLY, BUT AN INDETERMINACY IS ENCOUNTERED IN THE EVENT OF FLIGHT OVER A POLE. THE LATTER FORMULATION ELIMINATES THIS INDETERMINACY BUT IS OTHERWISE MORE COMPLEX. IT IS CONCLUDED THAT THE EQUATIONS DEVELOPED ARE SUITABLE FOR DIGITAL OR HYBRID ANALOG-DIGITAL COMPUTATION, BUT THAT ACCURACY REQUIREMENTS WOULD BE EXCESSIVE FOR ANALOG COMPUTATION EXCLUSIVELY. AN ALTERNATIVE FORMULATION, SUITABLE FOR ANALOG COMPUTATION, IS PRESENTED IN PART II OF THE PRESENT SERIES (AD-269 283).

269 282 0448 (*RE-ENTRY VEHICLES, *SATELLITE VEHICLES, ATMOSPHERE ENTRY, *FLIGHT SIMULATORS, PILOTS, TRAINING DEVICES.) (SATELLITE VEHICLE TRAJECTORIES, FLIGHT PATHS, DYNAMICS, MATHEMATICAL ANALYSIS, EQUATIONS, DIFFERENTIAL EQUATIONS, MATRIX ALGEBRA, DIGITAL COMPUTERS.) -

269 284 0451 MICRO-MODULE PRODUCTION PROGRAM.

NO ABSTRACT AVAILABLE

269 284 0449 (*SUBMINIATURE ELECTRONIC EQUIPMENT FOR *RADIO COMMUNICATION SYSTEMS AND DIGITAL COMPUTERS, *PACKAGING, *PACKAGED CIRCUITS, PROCESSING, PRODUCTION, STANDARDS, COSTS, FEASIBILITY STUDIES, RELIABILITY.) (*MINIATURE ELECTRONIC EQUIPMENT, PACKAGING.) -

269 286 0452 RESEARCH IN BIOPHYSICAL ASPECTS OF PHOTOSYNTHESIS.

269 286 0452 NO ABSTRACT AVAILABLE

269 286 0450 (*PHOTOSYNTHESIS, BIOPHYSICS, BIOCHEMISTRY, FATTY ACIDS, ALBUMINS, THEORY.) (PLANTS, GROWTH.) ELECTRON MICROSCOPY. -

269 280 0453 MAGNETOHYDRODYNAMIC EFFECTS ON EXOTHERMAL WAVES. I. THEORETICAL PROBLEMS ON A MACROSCOPIC SCALE. II. EXPERIMENTAL STUDY WITH HYDROGEN-OXYGEN DETONATION WAVES.

269 280 0453 VARIOUS PROBLEMS ASSOCIATED WITH THE MACROSCOPIC MAGNETOHYDRODYNAMIC EFFECTS ON AN EXOTHERMAL WAVE WERE TREATED ON THE BASIS OF ONE-DIMENSIONAL FLOW CONSIDERATIONS. A STEADY EXOTHERMAL WAVE TRAVELING IN AN IONIZED MEDIUM UNDER THE INFLUENCE OF A TRANSVERSE MAGNETIC FIELD WAS FOUND TO DISPLAY PROPERTIES SIMILAR TO THOSE OF A CLASSICAL DETONATION OR DEFLAGRATION WAVE. FOR A HYDROMAGNETIC EXOTHERMAL WAVE, IT WAS FOUND THAT A DISCONTINUITY EITHER IN THERMODYNAMIC QUANTITIES OR IN MAGNETIC FIELD STRENGTH APPEARS AS SOON AS THE FLOW REACHES THE TRANSITION REGION.

269 280 0451 (*MAGNETOHYDRODYNAMICS, GAS FLOW, GAS IONIZATION, CHEMICAL REACTIONS, HEAT, FLAMES, *ELECTROMAGNETIC WAVES, HALL EFFECT, THERMODYNAMICS, THERMAL CONDUCTIVITY, HYDROGEN, OXYGEN, SHOCK WAVES.) (EXPERIMENTAL DATA, TABLES OF CHEMICAL PROPERTIES, PHYSICAL PROPERTIES.) (PARTIAL DIFFERENTIAL EQUATIONS, LINEAR SYSTEMS, PERTURBATION THEORY.) -

269 283 0454 FLIGHT SIMULATION OF ORBITAL AND REENTRY VEHICLES. PART II - A MODIFIED FLIGHT PATH AXIS SYSTEM FOR SOLVING THE SIX-DEGREE-OF-FREEDOM FLIGHT EQUATIONS.

269 283 0454 THREE TRANSLATIONAL AND THREE ROTATIONAL EQUILIBRIUM EQUATIONS FOR AN ORBITAL VEHICLE SUBJECT TO AERODYNAMIC AND JET REACTION FORCES ARE DERIVED USING A MODIFIED FLIGHT-PATH AXIS SYSTEM FOR THE TRANSLATIONAL EQUATIONS. DEPENDENT VARIABLES OF THE SYSTEM ARE HORIZONTAL VELOCITY COMPONENT, VERTICAL VELOCITY COMPONENT, AND FLIGHT-PATH HEADING ANGLE. RESULTING EQUATIONS ARE SHOWN TO HAVE ADVANTAGES FOR COMPUTER MECHANIZATION OVER ALTERNATIVE AXIS SYSTEMS FOR THE TRANSLATIONAL EQUATIONS. COMPLETE EQUATIONS FOR DETERMINING VEHICLE ORIENTATION, INSTANTANEOUS LATITUDE AND LONGITUDE, ANGLE OF ATTACK, ANGLE OF SIDESLIP, AERODYNAMIC FORCES AND MOMENTS, ETC., ARE PRESENTED. MODIFICATIONS IN THE TRANSLATIONAL EQUATIONS WHICH ALLOW DIRECT SOLUTION BY AN ANALOG COMPUTER ARE ALSO GIVEN. ANALOG COMPUTER MECHANIZATION OF THESE EQUATIONS IN BOTH REAL AND FAST TIME IS DESCRIBED, INCLUDING A NOVEL TECHNIQUE FOR DIVISION WHICH PRESERVES FAVORABLE MULTIPLIER SCALING. SPECIFIC MACHINE RESULTS ARE PRESENTED WHICH DEMONSTRATE ACCURATE SOLUTION OF CLOSE-SATELLITE TRAJECTORIES, INCLUDING RE-ENTRY FROM SATELLITE ALTITUDES TO SEA LEVEL.

269 283 0452 (*RE-ENTRY VEHICLES, *SATELLITE VEHICLES, ATMOSPHERE ENTRY, *FLIGHT SIMULATORS, PILOTS, TRAINING DEVICES.) (SATELLITE VEHICLE TRAJECTORIES, FLIGHT PATHS, DYNAMICS, MATHEMATICAL ANALYSIS, EQUATIONS, DIFFERENTIAL EQUATIONS, VECTOR ANALYSIS, ANALOG COMPUTERS.) -

269 293 0455 SPEECH ANALYSIS TECHNIQUES.

269 293 0455 THE WORK ON THE 51-CHANNEL ANALYZER WAS CONTINUED. THE MECHANICAL ASSEMBLY OF THE FILTERBANK WAS STARTED. COMPARATIVE STUDIES OF VARIOUS MEANS OF SPEECH SPECTRUM ANALYSIS WERE CONCERNED WITH FORMANT FREQUENCY MEASUREMENTS FROM SONA-GRAPH SPECTROGRAMS AND SECTIONS. EVALUATIONS OF VARIOUS MEANS OF VOICE PITCH EXTRACTION WERE FOLLOWED UP BY A COMPLETE CONSTRUCTION OF A DUAL CHANNEL PITCH EXTRACTOR AND DECISION CIRCUIT. DEVELOPMENT WAS CONTINUED ON VARIOUS METHODS FOR AUTOMATIC RECOGNITION OF SPECIFIC PHONETIC FEATURES AND SOUND CATEGORIES. IT WAS DEMONSTRATED THAT THE PROBABILITY OF CORRECT IDENTIFICATION OF A CONSONANT NEXT TO A VOWEL AS A FUNCTION OF THE TIME LOCATION OF THE CUT IN TIME GENERALLY HAS A MAXIMUM IN ITS RATE OF RISE AT THE PHYSICAL BOUNDARIES.

269 293 0453 (SWEDEN, SPEECH, ANALYSIS, DATA PROCESSING SYSTEMS, SPECTROGRAPHIC ANALYSIS, *SPEECH TRANSMISSION.) (*VOICE COMMUNICATION SYSTEMS, *RADIO COMMUNICATION SYSTEMS, INTELLIGIBILITY, SOUND TRANSMISSION, AUDIOFREQUENCY, TRACKING, BAND-PASS FILTERS, FREQUENCY ANALYZERS, *SPECTECH REPRESENTATION, ACOUSTICS, LOW PASS FILTERS.) -

269 295 0456 SURFACE CURRENT MEASUREMENTS WITH AN ELECTRIC PROBE,

269 295 0456 THE USE OF AN ELECTRIC PROBE FOR MEASUREMENT OF INDUCED SURFACE CURRENTS ON OBSTACLES IN A PARALLEL PLATE REGION IS DESCRIBED. AN ANALYSIS OF THE SOURCES OF ERROR, AND IN PARTICULAR THE INTERACTION OF THE PROBE WITH THE OBSTACLE, IS EXAMINED THEORETICALLY AND EXPERIMENTALLY. IT IS CONCLUDED THAT THE TECHNIQUE IS CAPABLE OF YIELDING MEASUREMENTS OF GOOD ACCURACY. THE MEASURED SURFACE CURRENTS ON FLAT AND CURVED STRIPS ARE GIVEN AS EXAMPLES.

269 295 0454 (*ELECTROMAGNETIC FIELDS, ELECTROMAGNETIC WAVES, DIFFRACTION, MAGNETIC FIELDS, SCATTERING, *ELECTROMAGNETIC WAVE REFLECTIONS, MICROWAVES, ELECTRIC FIELDS, IMPEDANCE, MEASUREMENT.) (*MICROWAVE PROBS, TEST EQUIPMENT, REFLECTORS, X BAND, ERRORS, TEST METHODS.) -

269 300 0457 SURVEY OF MICROMINIATURIZATION OF ELECTRONIC EQUIPMENT,

269 300 0457 A SURVEY WAS MADE OF MICROMINIATURIZATION OF ELECTRONIC EQUIPMENT. APPROXIMATELY 150 FIRMS IN THE ELECTRONIC EQUIPMENT AND PARTS INDUSTRY WERE FOUND TO BE ENERGETICALLY ENGAGED IN MICROMINIATURIZATION RESEARCH, DEVELOPMENT, AND TECHNICAL SUPPORT. A WIDE VARIETY OF FABRICATION TECHNIQUES WERE USED, RANGING FROM VACUUM, ELECTRICAL, AND CHEMICAL DEPOSITING OF THIN FILMS TO THE GROWING OF SEMICONDUCTOR RIBBONS. AMONG METHODS USED ARE SPECTROGRAPHIC PLATES FOR PHOTO RESISTS, SCREEN AND PHOTOLITHOGRAPHIC PRINTING, MICROMACHINING, AIR ABRASION, ULTRASONIC MACHINING, AND ELECTRONIC ETCHING. MICROMINIATURE CIRCUITS OF SOME TYPES ARE EXPECTED TO BE AVAILABLE SOON FOR LIMITED APPLICATIONS. IMPROVED PERFORMANCE, RESISTANCE TO ENVIRONMENTAL EXTREMES, AND INCREASED RELIABILITY CAN BE ANTICIPATED. REDUCED SIZE WILL EVENTUALLY PERMIT SATELLITE PAYLOADS WITH HIGHLY SOPHISTICATED INSTRUMENTATION AND COMPLETELY REDUNDANT CONTROL SYSTEMS.

269 300 0455 (*SUBMINIATURE ELECTRONIC EQUIPMENT, *ELECTRONIC CIRCUITS, PRODUCTION, MANUFACTURING METHODS, PACKAGING, PACKAGED CIRCUITS.) (MINIATURE ELECTRONIC EQUIPMENT, *BIBLIOGRAPHY.) -

269 304 0458 ORBITAL CONTROL AND ANALYSIS TECHNIQUES FOR EQUATORIAL 24-HOUR SATELLITES,

269 304 0458 METHODS TO IMPLEMENT SUCH AN ORBITAL CONTROL FUNCTION ARE DESCRIBED. THE REPORT IS LIMITED TO THE PRESENTATION OF BASIC CORRECTION TECHNIQUES AND ANALYTIC METHODS. EMPHASIS IS PLACED ON MINIMIZING OR NEARLY MINIMIZING TOTAL IMPULSE REQUIREMENTS. SUITABLE COORDINATES FOR THE PROBLEM AND, USING THE LINEARIZED EQUATIONS OF MOTION, ARE DERIVED UNFORCED ORBITAL MOTION IN TERMS OF THE COORDINATES. GRAPHIC PORTRAYAL OF THE MOTION IS INTRODUCED TO PRESENT CLEARLY ALL CHARACTERISTICS OF THE MOTION. ORBIT SPECIFICATIONS ARE INTERRELATED AND TABULATED. IMPORTANT ORBITAL PERTURBATIONS CAUSED BY LUNAR AND SOLAR GRAVITATIONAL FIELDS AND EARTH OBLATENESS ARE GIVEN.

269 304 0456 (SATELLITE VEHICLES, SATELLITE VEHICLE TRAJECTORIES, *SATELLITE ALTITUDE, ORBITAL FLIGHT PATHS, SPACE NAVIGATION, CONTROL SYSTEMS, THRUST, CELESTIAL MECHANICS, PERTURBATION THEORY, MOTION, ERRORS, CORRECTION, MATHEMATICAL ANALYSIS, EQUATIONS, THEORY.) -

269 314 0459 EXPERIMENTS IN VERBAL BEHAVIOR. II. THE REINFORCEMENT OF LINGUISTIC STRUCTURES USING AN ELECTRONIC VOICE OPERATED RELAY. I. METHODOLOGICAL CONSIDERATIONS,

269 314 0459 NO ABSTRACT AVAILABLE

269 314 0457 (*VERBAL BEHAVIOR, LANGUAGE, TEST METHODS, CONDITIONED REFLEX.) (*VOICE COMMUNICATION SYSTEMS, ELECTRONIC EQUIPMENT, CIRCUITS.) -

269 315 0460 CONTROL SYSTEMS STUDIES.

269 315 0460 CIRCUIT STUDIES WERE CONDUCTED FOR AN ADVANCED CONTROL SYSTEM AND SOME CIRCUIT UNITS WERE PACKAGED. CONTROL SENSORS AND POWER SERVOS WERE INVESTIGATED AND TESTED. A BATTERY EVALUATION PROGRAM WAS CONTINUED AND FUEL CELLS WERE INVESTIGATED. ADVANCED CONTROL SYSTEMS, INCLUDING A MERCURY HOOP MOTOR AND A REACTION WHEEL PLATFORM, WERE DEVELOPED.

269 315 0458 (*GUIDED MISSILES, SURFACE TO SURFACE, *CONTROL SYSTEMS, ELECTRONIC CIRCUITS, SWITCHING CIRCUITS, POWER SUPPLIES, GUIDED MISSILE BATTERIES, FUEL CELLS, SERVO SYSTEMS, GYROSCOPES, ACCELEROMETERS, MONITORS, DETECTORS, SERVOMECHANISMS, RELIABILITY, TESTS.) -

269 317 0461 ON THE UNSTABLE ROLLING MOTIONS OF SHIPS RESULTING FROM NONLINEAR COUPLING WITH PITCH INCLUDING THE EFFECT OF DAMPING IN ROLL,

269 317 0461 THE EQUATIONS OF MOTION FOR A SHIP PITCHING AND ROLLING IN A CALM SEA WERE FOUND TO BE COUPLED BY MEANS OF A SECOND ORDER TERM IN THE ROLLING EQUATION OF MOTION. WHEN THE PITCHING MOTION IS SIMPLE HARMONIC THE EQUATION OF MOTION IN ROLL IS OF THE MATHIEU TYPE, THE TWO INDEPENDENT PARAMETERS BEING PITCHING AMPLITUDE AND FREQUENCY. THE STABILITY DIAGRAM OF THE MATHIEU EQUATION INCLUDING THE EFFECT OF LINEAR DAMPING IS DETERMINED THEORETICALLY AND VERIFIED BY SOLVING THE MATHIEU EQUATION ON AN ANALOGUE COMPUTER. IN EXPERIMENTS WITH ONE SHIP MODEL FORM, IT WAS FOUND THAT THE TRANSITION FROM STABLE TO UNSTABLE MOTION OCCURRED FOR THE VALUE OF THE PARAMETERS PREDICTED BY THE THEORY, AND THAT THE ROLLING MOTIONS OBTAINED EXPERIMENTALLY CLOSELY RESEMBLED THE COMPUTER SOLUTIONS. IT WAS CONCLUDED THAT (1) UNSTABLE ROLLING MOTIONS ARE POSSIBLE FOR VERY SMALL PITCHING AMPLITUDES, (2) WHEN THE NATURAL FREQUENCY OF PITCH IS TWICE THAT OF ROLL THE AMPLITUDE REQUIRED TO PRODUCE UNSTABLE MOTION IS A MINIMUM, AND (3) FOR ANY PITCHING FREQUENCY, THE GREATER THE AMOUNT OF DAMPING, THE GREATER THE AMPLITUDE OF PITCHING MUST BECOME TO PRODUCE UNSTABLE ROLLING MOTIONS.

269 317 0459 (*SHIPS, MOTION, PITCH, DAMPING, *HYDRODYNAMICS, STABILITY, SEA WATER, ROLL.) (*SHIP MODELS, ANALOG COMPUTERS, ANALYSIS, THEORY, FREQUENCY, MOMENTS, TESTS, TEST EQUIPMENT.) (HARMONIC ANALYSIS, DIFFERENTIAL EQUATIONS, LEAST SQUARES METHOD, VECTOR ANALYSIS.) -

269 326 0463 ON ONE DIMENSIONAL HYDROMAGNETIC FLOW WITH TRANSVERSE MAGNETIC FIELD, PART I. SIMPLE WAVE FLOW, PART II. FLOW IN A CHANNEL WITH SMALL AREA VARIATIONS,

269 326 0463 THE ONE-DIMENSIONAL NON-STEADY MOTION OF AN IDEAL, INVISCID, PERFECTLY CONDUCTING FLUID SUBJECTED TO A TRANSVERSE MAGNETIC FIELD IS STUDIED. THE PARTICLE VELOCITY, LOCAL SPEED OF SOUND, SPECIFIC ENTROPY, DENSITY, SQUARE OF ALFVEN SPEED, PERMEABILITY AND RATIO OF SPECIFIC HEAT AT CONSTANT PRESSURE AND AT CONSTANT VOLUME ARE CONSIDERED. PARTIAL DERIVATIVES ARE DENOTED BY SUBSCRIPTS, AND ALL DEPENDENT VARIABLES ARE FUNCTIONS OF X AND T.

269 326 0461 (*FLUID FLOW, HYDRODYNAMICS, MAGNETIC FIELDS, *WAVE ANALYSIS, GAS FLOW, WAVE TRANSMISSION, SHOCK WAVES, *MAGNETOHYDRO-DYNAMICS .) (PARTICLES, VELOCITY, THERMO-DYNAMICS, SPECIFIC HEAT, PRESSURE, ENTROPY.) (PERTURBATION THEORY, DIFFERENTIAL EQUATIONS.) -

269 340 0464 DEVELOPMENT OF MAGNET WIRES CAPABLE OF OPERATION AT 850 C AND UNDER NUCLEAR RADIATION.

269 340 0464 REFRACTORY COATINGS, ALUMINUM COATINGS, NICKEL.) (COPPER, GRAINS (METALLURGY), CRYSTALS, GROWTH.) MANUFACTURING METHODS, PROCESSING, AGING, DRAWING (MACHINE PROCESSING), FLAME SPRAYING, ENCAPSULATION. CLAD CU WIRES DIFFUSION OF CLADDING WITH CONDUCTOR WAS MINIMIZED BY USE OF A REFRACTORY METAL BARRIER OR A REFRACTORY OXIDE BARRIER LAYER. IN A CU-BASED CONDUCTOR, GRAIN GROWTH WAS MINIMIZED BY NUCLEATING THE CORE METAL WITH FINELY DIVIDED REFRACTORY OXIDES. OXIDATION RESISTANCE OF CLADDING SHEATHS WAS ACHIEVED BY ALUMINIZING NI OR UTILIZING DUCTILE OXIDATION RESISTANT ALLOYS. CLAD AG WIRES SHOWED NO SIGNIFICANT CHANGE IN RESISTANCE IN AIR AT 850 C IN OVER 1300 HR. THIS INDICATES A LACK OF A DIFFUSION PROBLEM WITH THIS WIRE. MOUNTED SPECIMENS OF AGED CLAD AG WIRES SHOWED NO OBJECTIONABLE GRAIN GROWTH. A WIRE MADE UP OF CU-FE-NI WAS ADEQUATE FOR 500 C USE. TWO WIRE INSULATIONS BASED ON HIGH EXPANSION COEFFICIENT INGREDIENTS WERE MADE 1000 C FOR CU-BASED CONDUCTORS AND 900 C FOR AG-BASED CONDUCTORS. ENCAPSULATION TECHNIQUES ARE BEING EXPLORED.

269 340 0462 (*MAGNETS, *WIRE, *COPPER WIRE, *SILVER WIRE, CONDUCTOR S, RESISTANCE, OXIDATION, CONTAMINATION, SPACE ENVIRONMENTAL CONDITIONS , RADIATION EFFECTS, THERMAL STRESSES, ELECTRIC INSULATION, *INSULATING MATERIALS, METAL COATINGS, CERAMIC COATINGS. -

269 344 0465 BIBLIOGRAPHY OF RESEARCH AND DEVELOPMENT REPORTS.

269 344 0465 THIS BIBLIOGRAPHY APPLIES TO THE TITAN MISSILE PROGRAM. IT LISTS RESEARCH AND DEVELOPMENT REPORTS PREPARED UNDER CONTRACTS AF 04(645)-8 AND AF 04(647)-521, AND INCLUDES REPORTS SUBMITTED BY SUBCONTRACTORS, IF APPLICABLE. PROPOSALS AND SPECIAL REPORTS ARE NUMBERED IN SPECIAL SERIES WHICH INCLUDE ALL SUCH DOCUMENTS PREPARED AND ISSUED BY THE LIQUID ROCKET PLANT, AEROJET-GENERAL CORPORATION. THE DOCUMENTS IN THE OTHER CATEGORIES ARE NUMBERED CONSECUTIVELY FOR THIS CONTRACT. REPORTS PERTAINING TO COSTS, ADMINISTRATION, CONSTRUCTION PROGRESS, OTHER CONTRACTS, AND OTHER FIELDS NOT DIRECTLY RELATED TO THE TECHNICAL PROGRESS OF THE PROGRAM ARE EXCLUDED.

269 344 0463 (*GUIDED MISSILES, SURFACE TO SURFACE, *BIBLIOGRAPHY.) (*SCIENTIFIC RE-SEARCH, SCIENTIFIC REPORTS.) -

269 349 0466 FUSION WELDING OF BERYLLIUM.

269 349 0466 THE STANDARD CONDITIONS USED FOR FUSION WELDING OF BE ARE GIVEN. STUDIES OF THE EFFECTS OF POSTHEAT TREATMENT AND FIXTURING ON FUSION WELDS ARE REPORTED, ALONG WITH LIMITED STUDIES OF MULTIPLEPASS WELDING AND FILLET WELDING OF BE. THE EFFECTS OF RESIDUAL IMPURITIES ON THE WELDABILITY OF BE ARE DISCUSSED RELATIVE TO THE BE FILLER WIRE DEVELOPMENT PHASE. DRAWN BE WELDING WIRE WAS COATED WITH CU, AG, AU, NI, FE, CO, SN, CR, ZN, AND CD. THE EFFECTS OF THESE COATED WIRES UPON THE FUSION WELD PROPERTIES OF BE ARE DESCRIBED.

269 349 0464 (*BERYLLIUM, *BERYLLIUM ALLOYS, WIRE, *ARC WELDING, ARC WELDS, WELDING, WELDS, MELTING, PROCESSING, MANUFACTURING METHODS.) (GRAINS (METALLURGY), DEFORMATION, THICKNESS, TENSILE PROPERTIES, MECHANICAL PROPERTIES, FRACTURE (MECHANICS), HEAT TREATMENT.) (METALS, OXIDES OR METAL COATINGS, ADDITIVES.) -

269 350 0467 EFFECTS OF CONDUCTION AND VISCOSITY ON THE STABILITY OF LAMINAR FLAME,

269 350 0467 THE EFFECTS OF CONDUCTION AND VISCOSITY ON THE STABILITY OF LAMINAR FLAME ARE EXAMINED. IF L DENOTES THE RATIO OF THE WAVE LENGTH OF A DISTURBANCE TO THE FLAME WIDTH AND α IS THE RATIO OF THE ULTIMATE TEMPERATURE OF THE BURNED GAS TO THE INITIAL TEMPERATURE OF THE FRESH MIXTURE, THE FLAME IS FOUND TO BE STABLE IF L IS LESS THAN (OR EQUAL TO) $2\alpha/(\alpha-1)$ MULTIPLIED BY $1/REPR$ WHERE RE IS THE REYNOLDS NUMBER OF THE FLAME BASED ON THE FLAME WIDTH AND PR DENOTES THE PRANDTL NUMBER OF THE MIXTURE. IT IS FURTHER SHOWN THAT THE STABILIZATION IS ACHIEVED PRIMARILY THROUGH THE EFFECT OF HEAT CONDUCTION ON THE FLAME SPEED RATHER THAN THE INFLUENCE OF VISCOSITY.

269 350 0465 (*LAMINAR BOUNDARY LAYER, *FLAMES, CONDUCTIVITY, VISCOSITY, STABILITY, *FLUID FLOW, GASES, EXHAUST GASES, MACH NUMBER.) (GAS IONIZATION, CHEMICAL REACTIONS, TEMPERATURE, HEAT, SPECIFIC HEAT, PRESSURE.) (MOLECULAR STRUCTURE, THEORY, GASES, LIQUIDS.) (PERTURBATION THEORY, EQUATIONS, DIFFERENTIAL EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS.) -

269 355 0468 GROUND SUPPORT EQUIPMENT. FIGURE A (HARDENED AND DISPERSED 9801 - 999). MINUTEMAN RE-ENTRY VEHICLE. MARK 5 MOD 3.

269 355 0468 NO ABSTRACT AVAILABLE

269 355 0466 (RECORDS OF *GROUND SUPPORT EQUIPMENT, *MAINTENANCE EQUIPMENT, MAINTENANCE TOOLS FOR HANDLING AND SHIPPING AND MAINTENANCE OF *RE-ENTRY VEHICLES.) -

269 363 0469 ULTRASONIC TEMPERATURE DETERMINATIONS IN A PLASMA.

269 363 0469 AN ULTRASONIC PULSE TECHNIQUE FOR MEASURING GAS TEMPERATURES IN AN INTERNAL COMBUSTION ENGINE WAS USED TO DETERMINE TEMPERATURES IN AN ELECTRIC ARC PLASMA JET. MEASUREMENTS OF SOUND VELOCITY AT ONE MC PER SEC WERE OBTAINED IN HIGHTEMPERATURE AIR, ARGON, AND HELIUM AT ATMOSPHERIC PRESSURE. TEMPERATURES ARE CALCULATED FROM THESE SOUND SPEEDS ON THE ASSUMPTION THAT ONLY THE TRANSLATIONAL AND ROTATIONAL DEGREES OF FREEDOM ARE EXCITED BY THE SOUND WAVE, WHILE VIBRATION, DISSOCIATION, AND ELECTRONIC EXCITATION REMAIN FROZEN. THE TEMPERATURES DETERMINED IN THIS WAY RANGE FROM 3500 TO 8000 K. IN THE

CASE OF THE AIR ARC, THE ULTRASONIC TEMPERATURE MEASUREMENTS ARE COMPARED WITH TEMPERATURES DETERMINED FROM AN ENERGY BALANCE ON THE PLASMA JET. THE AVERAGE TEMPERATURES OBTAINED BY THE TWO METHODS AGREE WITHIN 10 PERCENT OVER THE TEMPERATURE AND ENTHALPY RANGE CONSIDERED. THE RESULTS ALSO SHOW THAT TEMPERATURE FLUCTUATIONS AS HIGH AS 50 PERCENT CAN OCCUR DURING A GIVEN ARC RUN. A DISCUSSION OF THE EXPERIMENTAL APPARATUS, METHOD OF MEASUREMENT, EXPERIMENTAL RESULTS, AND ANALYSIS IS PRESENTED.

269 363 0467 (*PLASMA PHYSICS, ULTRASONICS, SOUND TRANSMISSION, TEMPERATURE, MEASUREMENT, CRYSTALS, QUARTZ CRYSTALS, BARIUM COMPOUNDS, TITANATES.) (TRANSPORT PROPERTIES, RELAXATION TIME, EXCITATION, RECOMBINATION RADIIUS.) (INSTRUMENTATION, CAMERAS, OSCILLOSCOPES, PULSE GENERATORS, CATHODE TUBES.) (EQUATIONS, EXPERIMENTAL DATA.) -

269 367 0470 INSPECTION-MAINTENANCE-REPLACEMENT SCHEDULES UNDER MARKOVIAN DETERIORATION,

269 367 0470 IT IS ASSUMED THAT AN INSPECTION IS CAPABLE OF SUPPLYING MORE INFORMATION ABOUT A SYSTEM'S CONDITION THAN JUST WHETHER IT IS OPERATIVE OR INOPERATIVE. SPECIFICALLY, OUR ASSUMPTION IS THAT THE DETERIORATION OF THE SYSTEM CAN BE DESCRIBED AS A DISCRETE TIME, FINITE MARKOV CHAIN AND THAT THE INSPECTION PROCEDURE IS CAPABLE OF DETECTING WHICH STATE THE SYSTEM IS IN AT THE TIME IT TAKES PLACE. REPAIRS, IF MADE, CAN PUT THE SYSTEM IN ONE OF MANY POSSIBLE STATES, THE AS NEW STATE BEING ONLY ONE OF THE AVAILABLE ALTERNATIVES. THE PURPOSE WAS TO SHOW, FOR AN AVERAGE COST PER UNIT TIME CRITERION FUNCTION, THAT THE PROBLEM OF FINDING AN OPTIMAL INSPECTIONREPAIR-REPLACEMENT POLICY CAN BE FORMULATED IN LINEAR PROGRAMMING TERMS.

269 367 0468 (*MANAGEMENT ENGINEERING, *RE-LIABILITY, QUALITY CONTROL, SAMPLING, *SCHED-ULING, STATISTICAL ANALYSIS, PROBABILITY, COSTS, LINEAR PROGRAMMING, LINEAR SYSTEMS.) -

269 369 0471 MIXING AND DISPERSIVE ACTION OF WIND WAVES,

269 369 0471 THE MIXING AND DISPERSIVE ACTION OF WIND INDUCED WATER WAVES WAS STUDIED IN A LABORATORY FLUME AT DIFFERENT WATER DEPTHS, WIND SPEEDS, AND WAVE CONDITIONS. MEASUREMENTS OF THE SHAPE OF THE DISPERSION PLUME WERE MADE, AND THE EFFECTS OF WAVE CHARACTERISTICS ON THE LATERAL DIFFUSION COEFFICIENT WERE NOTED.

269 369 0469 (*WATER WAVES, *WIND, JET MIX-ING FLOW, TRANSPORT PROPERTIES, SEWAGE, DIF-FUSION, PARTICLES, DISTRIBUTION, EQUATIONS.) (HYDRAULIC MODELS, WATER TANKS, TESTS.) -

269 371 0472 SYSTEM ANALYSIS TEST STANDS AND TRANSDUCERS,

269 371 0472 TWO TEST STANDS WERE DESIGNED AND BUILT TO AID IN THE EVALUATION OF PROSTHETIC SYSTEMS AND COMPONENTS. THE FIRST, A SYSTEMS TEST STAND, YIELDS TIME DATA ON AE PROSTHETIC SYSTEM PERFORMANCE. THE SECOND, A COMPONENT TEST STAND IS SPECIFICALLY DESIGNED FOR THE DETERMINATION OF ACTUATOR FORCE-LENGTH RELATIONSHIPS. THE SYSTEMS TEST STAND CONSISTS OF ELBOW, FOREARM, VO HOOK, AND DUAL CABLE CONTROL, AND IS POWERED BY 2 BPA'S, CONNECTED IN TANDEM. THE TEST SPECIMEN IS OPERATED FROM THE CONTROL CHASSIS, WHILE PERFORMANCE DATA ARE OBTAINED FROM SPECIAL TRANSDUCERS IN THE SYSTEM AND FROM

ELECTRICAL CONNECTIONS IN THE CONTROL CIRCUIT. THE COMPONENT TEST STAND INCORPORATES A FORCE TRANSDUCER, A VELOCITY TRANSDUCER, A LOADING PLATFORM, AND A VARIABLE DAMPER. WEIGHT LOADING OF THE TEST ACTUATOR CAN BE REPLACED BY CONSTANT FORCE SPRING LOADING WHERE INERTIA EFFECTS ARE NOT DESIRED. THIS TEST STAND WILL MAKE POSSIBLE THE COMPARATIVE EVALUATION OF PROSTHESIS ACTUATORS UNDER WIDELY VARIABLE CONDITIONS OF LOADING AND DAMPING.

269 371 0470 (*TRANSDUCERS, TEST EQUIPMENT, *TEST FACILITIES, SOLENOIDS, PNEUMATIC SYSTEMS, OPERATION, DESIGN.) -

269 384 0473 LOW-ENERGY ELECTRON SCATTERING FROM ATOMIC OXYGEN,

269 384 0473 THE TOTAL CROSS SECTION FOR THE SCATTERING OF ELECTRONS BY ATOMIC O WAS MEASURED AS A FUNCTION OF ELECTRON ENERGY FROM 2.3 TO 11.6 EV. THE NUMBER OF ELECTRONS SCATTERED FROM A REGION DEFINED BY THE INTERSECTION OF AN ELECTRON BEAM AND A MODULATED MOLECULAR O BEAM WAS COMPARED WITH THE NUMBER SCATTERED WHEN THE O BEAM WAS PARTIALLY DISSOCIATED. A RADIO-FREQUENCY DISCHARGE DISSOCIATED ABOUT 30% OF THE MOLECULES. THE DEGREE OF DISSOCIATION WAS MEASURED WITH A MASS SPECTROMETER. FROM THE DATA, THE RATIOS OF ATOMIC TO MOLECULAR SCATTERING CROSS SECTIONS WERE OBTAINED. THE ABSOLUTE ATOMIC VALUES WERE CALCULATED BY MULTIPLYING THESE RATIOS BY THE MOLECULAR O CROSS SECTIONS OBTAINED BY BRUCHE (ANN. PHYSIK 831065, 1957). THE RESULT IS A VIRTUALLY CONSTANT CROSS SECTION OF $6.2 \pm 0.5 \text{ \AA}^2$ IN THE ENTIRE ENERGY RANGE STUDIED. THESE RESULTS ARE COMPARED WITH 5 THEORETICAL ESTIMATES.

269 384 0471 (*ELECTRONS, *ATTENUATION FROM *OXYGEN, ATOMS, ELECTRON GUNS, ELECTRON BEAMS, MOLECULAR BEAMS, RADIOFREQUENCY, GAS DISCHARGES, DISSOCIATION, IONIZATION, MEASUREMENT, MASS SPECTROSCOPY.) (SCATTERING, ELECTRONS.) -

269 386 0474 HANDBOOK OF FIBROUS MATERIALS.

NO ABSTRACT AVAILABLE

269 386 0472 (*HANDBOOKS, *TEXTILES, *SYNTHETIC FIBERS, *FIBERS, CORDAGE, NYLON, DACRON, DECELERATION, PARACHUTE FABRICS, COATINGS.) (PHYSICAL PROPERTIES, MECHANICAL PROPERTIES, POROSITY, SEMIPERMEABILITY, CLIMATIC FACTORS, RADIATION EFFECTS, TEMPERATURE, AERODYNAMIC HEATING, COOLING, AGING, FRICTION.) *BIBLIOGRAPHY. -

269 387 0475 OBSERVED EMISSIVITIES OF ROCKET COMBUSTION GASES.

269 387 0475 THE TOTAL AND THE SPECTRAL INTENSITY OF THE RADIATION EMITTED BY ROCKET COMBUSTION PRODUCTS AT HIGH PRESSURE WAS STUDIED. SPECTRAL AND TOTAL RADIATION DATA ARE PRESENTED FOR 3 ROCKET PROPELLANT SYSTEMS HNO_3 AND HN_3 N_2O_4 AND NH_3 AND N_2O_4 AND N_2H_4 . EACH OF THE COMBINATIONS CONTAINED H_2O AS THE PRINCIPAL RADIATING GAS. THE MEASUREMENTS WERE MADE AT A NOMINAL COMBUSTION PRESSURE OF 700 PSIA. EMISSIVITY CORRELATIONS AND METHODS OF ESTIMATING THE TEMPERATURE OF THE COMBUSTION GASES ARE DEVELOPED. A TECHNIQUE IS GIVEN FOR OBTAINING DIRECT OBSERVATION OF HIGH TEMPERATURE GASES INSIDE THE COMBUSTION CHAMBER OF A SMALL ROCKET MOTOR.

269 387 0473 (ROCKET MOTORS, LIQUID ROCKET PROPELLANTS, COMBUSTION, *COMBUSTION CHAMBER GASES, *EXHAUST GASES, PRESSURE, TEMPERATURE, *THERMAL RADIATION, INFRARED RADIATION, IN-FRARED SPECTROSCOPY, DETECTION, MEASUREMENT, TESTS, THEORY, MATHEMATICAL ANALYSIS.) (NITRIC ACID, AMMONIA, HYDRAZINES, NITROGEN COMPOUNDS, TETROXIDES.) (TEST EQUIPMENT, INFRARED DETECTORS, THERMOPILES, DETECTORS.) (TEST METH-ODS, SPECTROGRAPHIC ANALYSIS.) -

269 388 0476 ELECTRIC PROPULSION SYSTEMS. APPENDIX 1.

269 388 0476 A DETAILED DISCUSSION OF ONE PHASE OF THE LOW MAINTENANCE MACHINERY STUDY PROGRAM IS PRESENTED IN SUPPORT OF THE FINAL REPORT (AD-327 314). DIRECT CURRENT-, ALTERNATING-, AND ACYCLICELECTRIC MOTOR SYSTEMS WERE CONSIDERED.

269 388 0474 (*SUBMARINE ENGINES, MAIN PROPULSION PLANTS, *ELECTRIC PROPULSION, UNDER-WATER PROPULSION, *NUCLEAR PROPULSION, ELECTRIC MACHINERY, DIRECT CURRENT, ALTERNATING CURRENT, DESIGN, CONFIGURATION, EFFECTIVENESS, MAINTENANCE, RELIABILITY, SUBMARINE NOISE.) -

269 145 0477 THE FRACTURE ANALYSIS OF ALUMINA USING THE ELECTRON MICROSCOPE.

269 145 0477 STRESSES, MECHANICAL PROPERTIES, TEST METHODS, ELECTRON MICROSCOPY.) (GRINDING WHEELS, MATERIALS, GRAINS (METALLURGY), THERMAL CONDUCTIVITY.) A MODEL SYSTEM OF PURE HOT PRESSED AL2O3 WAS USED TO STUDY THE EFFECT OF TEMPERATURE ON THE TRANSVERSE STRENGTH AND TYPE OF FRACTURE IN POLYCRYSTALLINE MATERIAL. THE TYPE OF FRACTURE DEPENDS UPON THE RELATIONSHIP OF CRYSTALLINE TO INTERCRYSTALLINE BOND STRENGTHS. IN PARTICULAR, IT WAS FOUND THAT THESE STRENGTHS WERE EQUAL IN HOT PRESSED AL2O3 AT VERY NEARLY 1200 C. THIS IS CALLED THE EQUICOHESIVE TEMPERATURE. THE TRANSVERSE STRENGTH DECREASED RAPIDLY ABOVE THE EQUICOHESIVE TEMPERATURE WHERE THE FRACTURE WAS ENTIRELY INTERGRANULAR. SAMPLES OF FUSED AL2O3 MADE DIRECTLY FROM BAUXITE WERE STUDIED WITH THE AID OF THE ELECTRON MICROSCOPE AND THE METALLOGRAPH TO RELATE THE ABRASIVE CHARACTER OF THREE TYPES OF THIS PRODUCT TO ITS MICROSTRUCTURE. IT WAS SPECULATED THAT FOR HIGH PRESSURE GRINDING WHEELS OF AGGLOMERATED FINE GRAINED AL2O3 WOULD GIVE A LOWER BREAKDOWN RATE THAN THE SAME SIZED MONOCRYSTALLINE GRIT USED IN A BONDED ABRASIVE WHEEL.

269 145 0475 (*FRACTURE (MECHANICS), CRYSTALS, *ALUMINUM COMPOUNDS, *OXIDES, IMPURITIES, MICROSTRUCTURE, HIGH TEMPERATURE RESEARCH. -

269 146 0478 ONGOING VISUAL MONITORING PROCEDURES FOR EXPERIMENTAL ANALYSIS AND CONTROL. PART I MACHINE DEFINITION OF ONGOING SILENT AND ORAL READING RATE. PART II - A MULTI-PURPOSE PERCEPTUAL DEVICE,

269 146 0478 PROCEDURES FOR CONTROLLED ALTERATION AND DEFINITION OF ONGOING READING ARE PRESENTED. READING NOT ONLY HAS INTRINSIC INTEREST, BUT CAN ALSO BE CONSIDERED AS A FORM OF VISUAL MONITORING OF A COMPLEX DISPLAY, IN WHICH THE BEHAVIORS REQUIRED HAVE LINEAR SEQUENCES. A PAGE IS PROJECTED ON A SCREEN, WITH THE SUBJECT REQUIRED TO READ ALOUD, OR SILENTLY. THROUGH THE SAME OPTICAL SYSTEM, AN OPAQUE LOOP IS PROJECTED. A TRANSPARENT SLIT ON THE OPAQUE LOOP EXPOSES PART OF A LINE WITH EACH FRAME, THE SLIT MOVES LINEARLY AND SEQUENTIALLY EXPOSING SUCCESSIVE READING MATERIAL. RECYCLING OF THE LOOP TRIGGERS

OFF PRESENTATION OF ANOTHER PAGE. CONTROL OF EACH FRAME OF THE LOOP IS BY THE SUBJECT, WHO PRESSES A MICRO-SWITCH TO ADVANCE THE FRAME, THEREBY EXPLICITLY DEFINING A READING RESPONSE. THE PROCEDURE IS SENSITIVE TO VARIABLES SUCH AS SIGNAL/NOISE RATIO, ITEM DIFFICULTY, TRANSIENT AND LONG-TERM EFFECTS, PAY-OFFS (CONTINGENCIES) ATTACHED TO RESPONDING, AGE. PROCEDURES ARE SUGGESTED FOR TRAINING SUBJECTS TO BE DIFFERENTIALLY ATTENTIVE TO DIFFERENT PARTS OF A DISPLAY. COMMERCIALY AVAILABLE EQUIPMENT IS DISCUSSED WHICH CAN BE USED FOR SCHEDULED PRESENTATION AND CONTROL OF RESPONSES IN THE MAJOR PSYCHOPHYSICAL METHODS, FOR BOTH HUMAN AND ANIMAL MONITORING RESEARCH.

269 146 0476 *READING, BEHAVIOR, VISUAL PER-CEPTION, EFFECTIVENESS, TEST EQUIPMENT, MONI-TORS, MOTION PICTURE PROJECTORS. -

269 148 0479 QUARTERLY RESEARCH REVIEW NO. 30, 1 MAY/31 JULY 61.

NO ABSTRACT AVAILABLE

269 148 0477 (REINFORCING MATERIALS, GLASS TEXTILES, *PHENOLIC RESIN S, MECHANICAL PROP-ERTIES.) (*BORON, PREPARATION, PURIFICA-TION.) (NUC LEAR PHYSICS, *RADIOACTIVE DECAY.) (ETHYLENE, NITROGEN COMPOUNDS, FLUORI DES, COM-BUSTION.) (ELECTRONICS, ATMOSPHERICS, *NOISE ANALYZERS, THEORY .) (GASES, *MAGNETOHYDRODY-NAMICS, PLASMA PHYSICS, PLASMA JETS, HIGH TE M-PERATURE RESEARCH.) (*HYPERSONIC WIND TUNNELS, HYPERSONICS, RE-ENTRY AERODYNAMICS, AERODY-NAMIC HEATING, SIMULATION.) (SOLID STATE PHYSICS, ELECTRONS, TRANSPORT PROPERTIES.) -

269 151 0480 INNOVATIONS IN MOTOR VEHICLE ENGINEERING.

269 151 0480 SUCCESSFUL EXPERIMENTS WITH PIEZOELECTRIC IGNITION INDICATE THAT IN THE FUTURE, THIS IGNITION WILL COME INTO USE. THE ADVANTAGE OF THE NEW PIEZOELECTRIC IGNITION SYSTEM IS ITS SIMPLE DESIGN AND CONSEQUENTLY ITS LOW PRICE. FURTHER, IT NEEDS LITTLE SPACE (THE IGNITION SYSTEM FOR A ONE-CYLINDER MOTOR FITS INTO A SPACE OF 56 CUBIC CENTIMETERS AND WEIGHS 0.24 KILOGRAMS). THE LIFE SPAN OF THE PIEZOELECTRIC SYSTEM IS VERY LONG. IT WITHSTOOD 1,000 HOURS OF TESTING IN A -CYLINDER 2-PHASE MOTOR. ITS LIFE-SPAN WAS LIMITED NOT BY THE CRYSTAL BUT BY MECHANICAL WEAR OF THE METAL PARTS. THE CRYSTAL LIFE-SPAN IS FIVE TIMES THAT OF THE MOTOR.

269 151 0478 (*IGNITION SYSTEMS, *PIEZOELEC-TRIC CRYSTALS, USSR.) (P IEZOELECTRIC MATERIALS, ZIRCONIUM, TITANIUM, CERAMIC MATERIALS, LIFE EXP ECTANCY, TESTS.) (VEHICLES, MOTORCYCLES, ELECTRICAL EQUIPMENT, IGNITIO N SYSTEMS.) -

269 157 0481 STANDARD RELIABILITY COEFFICIENT OF ELECTRONIC PRODUCTS,

269 157 0481 THE CONCEPT OF RELIABILITY OF MASS PRODUCTS OF THE RADIO ENGINEERING INDUSTRY IS DISCUSSED. THE ERRORS COMMITTED DURING THE TESTING OF GOODS CAN BE ELIMINATED BY INTRODUCING THE CONCEPT OF STANDARD RELIABILITY, UNDER WHICH IT SHOULD BE UNDERSTOOD THAT THE CONFORMITY OF THE MANUFACTURED GOODS MUST COMPLY WITH STANDARDS AND TECHNICAL REQUIREMENTS REVEALED IN THE PROCESS OF SELECTIVE PLANT TESTS OF THEIR FUNCTIONAL PROPERTIES. THE CONCEPT OF STANDARD RELIABILITY PERMITS A QUANTITATIVE EVALUATION OF THE PRODUCTION QUALITY BY EACH TYPE OF TEST SEPARATELY, AND BY ALL TYPES OF TESTS TAKEN TOGETHER, AND ALSO DETERMINES THE PERCENTAGE OF SERVICEABLE PRODUCTION AND REJECTS IN THE ENTIRE BATCH OF GOODS BY DIVIDING THE LATTER INTO SEPARATE TYPES.

269 157 0479 (USSR, *ELECTRONIC EQUIPMENT, PRODUCTION, STANDARDS, *RELIABILITY, MATHEMATICAL ANALYSIS.) -
269 160 0482 INVESTIGATIONS OF HEAT RESISTANT ALLOYS (SELECTED

NO ABSTRACT AVAILABLE

269 160 0480 (*HEAT RESISTANT ALLOYS, *CORROSION-RESISTANT ALLOYS, HIGH TEMPERATURE RESEARCH, STAINLESS STEEL, AUSTENITE, STEEL, TITANIUM ALLOYS, ALUMINUM ALLOYS, TUNGSTEN ALLOYS, SILICON ALLOYS, CHROMIUM ALLOYS, BORON ALLOYS.) (TESTS, CRYSTAL STRUCTURE, GRAINS (METALLURGY), MECHANICAL PROPERTIES, PHYSICAL PROPERTIES, SURFACE PROPERTIES.) (AIRCRAFT, HYPERSONICS, SUPERSONIC PLANES, GAS TURBINE BLADES FOR JET ENGINES, NUCLEAR POWER PLANTS.) USSR. -

269 174 0483 A FUNDAMENTAL STUDY OF ROLLING CONTACT FATIGUE.

NO ABSTRACT AVAILABLE

269 174 0481 (*FATIGUE (MECHANICS), LUBRICATION, ROLLER BEARINGS, BALL BEARINGS.) (*SINGLE CRYSTALS, *LITHIUM COMPOUNDS, *FLUORIDES, STRESSES, ELASTICITY, MECHANICAL PROPERTIES, CHEMICAL MILLING, ABRASION, PICKLING.) TEST EQUIPMENT. -

269 177 0484 INVESTIGATION OF GLASS FIBER STRENGTH ENHANCEMENT THROUGH BUNDLE DRAWING.

NO ABSTRACT AVAILABLE

269 177 0482 (BRITTLE MATERIALS, GLASS, FIBERS, *GLASS TEXTILES, *CERAMIC FIBERS, COATINGS, MECHANICAL PROPERTIES, THEORY, METAL COATINGS, LEAD ALLOYS, INDIUM ALLOYS, ALUMINUM ALLOYS, SILICON ALLOYS.) (MANUFACTURING METHODS, *DRAWING (MACHINE PROCESSING), INDUSTRIAL EQUIPMENT.) -

269 186 0485 SYNCHROTRON RADIATION AS THE SOURCE OF THE POLARIZED DECIMETER RADIATION FROM JUPITER.

269 186 0485 A STOKES PARAMETER DESCRIPTION IS DEVELOPED FOR SYNCHROTRON RADIATION FROM A GROUP OF ULTRARELATIVISTIC ELECTRONS WITH ANY SPECIFIED DISTRIBUTION OF POSITIONS, ENERGIES AND DIRECTIONS OF MOTION. THIS DESCRIPTION IS USED TO STUDY THE RADIATION FROM A SHELL OF ULTRARELATIVISTIC ELECTRONS TRAPPED IN A DIPOLE FIELD. IT IS FOUND THAT THE POLARIZATION OBSERVED FOR THE 31-CM RADIATION FROM JUPITER COULD BE OBTAINED FROM SUCH SHELLS PROVIDED A LARGE NUMBER OF THE ELECTRONS HAVE RELATIVELY FLAT HELICES.

269 186 0483 (*JUPITER, MARS, SYNCHROTRONS, POLARIZATION, ELECTROMAGNETIC WAVES, COSMIC RAYS, RADIO ASTRONOMY, *EXTRATERRESTRIAL RADIO WAVES, PLASMA PHYSICS.) (PARTICLES, TERRESTRIAL MAGNETISM, OPTICS, GALAXIES, NEBULAE, ATMOSPHERIC ELECTRICITY, MAGNETIC STORMS, MAGNETOHYDRODYNAMICS, PLANETS, SUPER HIGH FREQUENCY, ULTRA HIGH FREQUENCY.) (VAN ALLEN RADIATION BELT, SOLAR ENERGY, GASES IONIZATION, HIGH TEMPERATURE RESEARCH, IONOSPHERE, MASER.) (GEOMETRY, DIFFERENTIAL EQUATIONS, DIFFRACTION GRATINGS, MAGNETO-OPTIC ROTATION, DIFFERENCE EQUATION, BESSEL FUNCTIONS.) (ELECTRONS, PROTONS, RELATIVITY THEORY.) -

269 187 0486 SONIC FATIGUE RESISTANCE OF STRUCTURAL DESIGNS.

269 187 0486 RESEARCH ON SOUND-INDUCED FATIGUE OF FLIGHT VEHICLE PANELS IS DESCRIBED. PRIMARY EMPHASIS IS PLACED ON THE PROBLEMS OF PANEL RESPONSE AND PANEL STRAIN CONCENTRATION. SECONDARY EMPHASIS IS PLACED ON THE ACQUISITION OF FATIGUE DATA. SEVERAL PANEL DESIGNS WERE CONSIDERED, INCLUDING BOTH IDEALIZED PANELS AND PANELS OF MORE PRACTICAL DESIGN. PROCEDURES FOR THE IMPROVEMENT OF SONIC FATIGUE RESISTANCE, AND FOR THE TESTING OF PANELS WITH SIREN SOUND SOURCES,

HAVE BEEN DERIVED FROM THE STUDY. THEORETICAL AND/OR EXPERIMENTAL STUDIES ARE PRESENTED ON LINEAR RESPONSE, ANGLE-OF-INCIDENCE EFFECTS, SANDWICH CONSTRUCTION, STRAIN CONCENTRATIONS IN SUBSTRUCTURES, NONLINEAR RESPONSE, FATIGUE OF NOTCHED PANELS, AND FATIGUE AT RIVET LINES.

269 187 0484 (*AIRPLANE PANELS, SANDWICH PANELS, AIRFRAMES, RIVETED JOINTS, ACOUSTICS, SOUND, *NOISE, *FATIGUE (MECHANICS), DYNAMICS, DEFORMATION, STRESSES, MEASUREMENT, MATHEMATICAL ANALYSIS.) -
269 193 0487 UNICOM. UNIVERSAL INTEGRATED COMMUNICATIONS SYSTEM.

269 193 0487 THE FIRST PARTIAL DRAFT OF THE SYSTEM ENGINEERING PLAN WAS ISSUED. NETWORK PLANNING, ANALYSES OF THE SURVIVABILITY OF THE PHASE I AND PHASE II VERSIONS OF UNICOM IS REPORTED. THE MAJOR WORK IN SWITCHING AND SIGNALING HAS BEEN IN SUPPORTING TEST MODEL DEVELOPMENT AND IN PREPARING DETAILED REQUIREMENTS FOR INCLUSION IN THE SYSTEM ENGINEERING PLAN. TRANSMISSION AND STATIONS, WORK ON THE TRANSMISSION ASPECTS CONNECTING UNICOM TO SIGNAL CORPS AUTOMATIC NETWORK (SCAN) AND INDIGENOUS TELEPHONE COMPANIES WAS COMPLETED. OTHER WORK ON TRANSMISSION FACILITIES AND DIGITAL SIGNAL CONVERTERS WAS CARRIED ON.

269 193 0485 (*MILITARY COMMUNICATIONS, COMMUNICATION SYSTEMS, DESIGN.) (DATA STORAGE SYSTEMS, DATA TRANSMISSION SYSTEMS, DIGITAL SYSTEMS.) (COMPUTERS, SWITCHING CIRCUITS, COMPUTER LOGIC, MEMORY DEVICES.) (*RADIO COMMUNICATION SYSTEMS, *VOICE COMMUNICATION SYSTEMS.) ANALOG-TO-DIGITAL CONVERTERS. -

269 194 0488 STUDY OF A SPEECH COMPRESSION SYSTEM (SPECTRUM SELECTION).

269 194 0488 THE EFFECTS OF SAMPLING THE FREQUENCY SPECTRUM OF SPEECH BY NARROW PASS BANDS IS DISCUSSED. INCLUDED IS ENGINEERING INFORMATION ABOUT A NEW 6-CHANNEL FILTERING SYSTEM, EACH CHANNEL OF WHICH IS CAPABLE OF PASSING A BAND OF FREQUENCIES EITHER 35 OR 75 CPS WIDE. ALSO INCLUDED ARE RESULTS OF EXPERIMENTS ON COMPANDING, DELTA MODULATION AND STRAIGHT PULSE CODE MODULATION OF A SPEECH SIGNAL. PRELIMINARY RESULTS INDICATE THAT THE 75 CPS WIDE FILTERS, DELTA MODULATION AND COMPANDING CAN BE USED TO ADVANTAGE IN THE TRANSMISSION OF SPECTRUM SAMPLED SPEECH. (AUTHOR)

269 194 0486 (*VOICE COMMUNICATION SYSTEMS, *SPEECH TRANSMISSION, ELECTRONIC EQUIPMENT, TEST EQUIPMENT.) (*BAND-SELECTIVE AMPLIFIERS, BAND-PASS AMPLIFIERS, *BAND-PASS FILTERS, ACOUSTIC FILTERS.) (*PULSE MODULATION, PULSE GENERATORS, DIGITAL SYSTEMS, ANALOG-TO-DIGITAL CONVERTERS, TIMING CIRCUITS, MEMORY DEVICES.) (PSYCHOACOUSTICS, INTELLIGIBILITY.) (*VOICE COMMUNICATION SYSTEMS, INTELLIGIBILITY.) NOISE GENERATORS. -

269 195 0489 ESTABLISHING PROVEN DESIGN CRITERIA FOR CRYOGENIC BOOST TANKS.

269 195 0489 THE DESIGN AND FABRICATION OF TWO 7000 GAL LIQUID HYDROGEN FUEL TANKS OF TI AND STAINLESS STEEL ARE DESCRIBED. INSULATING MATERIALS AND METHODS OF INSULATION ARE ALSO DESCRIBED. TESTS WERE SUCCESSFULLY CONDUCTED TO CHECK OUT THE TANK DRAIN ASSEMBLY. FURTHER TESTS WILL BE CONDUCTED TO DETERMINE THE HEAT TRANSFER OF THE TANKS DURING SIMULATED ROCKET FLIGHT CONDITIONS.

269 195 0487 (LIQUID ROCKET PROPELLANTS, CRYOGENICS, *PROPELLANT TANKS, FUEL TANKS, PROPELLANT TANK LINERS, INSULATING MATERIALS, DESIGN, PROCESSING, HEAT TRANSFER, AERODYNAMIC HEATING, TEST METHODS, TEST EQUIPMENT.) (LIQUEFIED GASES, HYDROGEN.) THERMAL INSULATION. -

269 198 0490 QUADRATIC VARIATIONAL PROBLEMS INVOLVING HIGHER ORDER, ORDINARY DERIVATIVES.

269 198 0490 A QUADRATIC FUNCTIONAL $J(x)$ INVOLVING ORDINARY DERIVATIVES OF HIGHER ORDER IS STUDIED. THE SELF-ADJOINT, LINEAR OPERATOR T ASSOCIATED WITH $J(x)$ IS IN GENERAL AN INTEGRO-DIFFERENTIAL OPERATOR. THE STUDY OF $J(x)$ IS OF COURSE EQUIVALENT TO THE STUDY OF A PROBLEM OF BOLZA, INVOLVING ONLY FIRST ORDER DERIVATIVES. HOWEVER, IT IS DESIRABLE TO STUDY $J(x)$ DIRECTLY, WITHOUT TRANSFORMING THE PROBLEM, AND TO ASCERTAIN THE NATURE AND FORM OF THE CONSEQUENT RESULTS. THE RESULTS PRESENTED DEPEND FUNDAMENTALLY ON AN EXTENSION OF THE FUNDAMENTAL LEMMA IN THE CALCULUS OF VARIATIONS. THE EXTENSION OF THAT LEMMA IS FORMULATED IN TERMS OF THE LEBESGUE-STIELTJES INTEGRAL.

269 198 0488 (*CALCULUS OF VARIATIONS, OPERATORS (MATHEMATICS), FUNCTIONAL ANALYSIS, TOPOLOGY, *DIFFERENTIAL EQUATIONS, INTEGRAL EQUATIONS, TRANSFORMATIONS (MATHEMATICS), LINEAR SYSTEMS.) -

269 200 0491 THE SELF DIFFUSION OF LEAD - 210 IN SINGLE CRYSTALS OF LEAD SULFIDE AS A FUNCTION OF STOICHIOMETRY AND DOPING ADDITIONS,

269 200 0491 MEASUREMENTS OF THE SELF DIFFUSION OF PB-210 INTO UNDOPED AND DOPED SINGLE CRYSTALS OF PBS OF KNOWN DISLOCATION DENSITY HAVE SHOWN THAT IN THE TEMPERATURE RANGE OF 500 TO 800 C, THE DIFFUSION IS PREDOMINANTLY VIA FRENKEL DEFECTS. IN THE CASE OF N-TYPE, UNDOPED PBS AND P-TYPE, AG DOPED PBS THE DIFFUSION COEFFICIENTS WERE LARGER THAN FOR UNDOPED, STOICHIOMETRIC PBS. CONVERSELY FOR P-TYPE, S EXCESS UNDOPED PBS AND FOR N-TYPE, BI DOPED SOLID SOLUTIONS, THE DIFFUSION COEFFICIENTS WERE LARGER THAN FOR UNDOPED STOICHIOMETRIC PBS.

269 200 0489 (*LEAD, DIFFUSION, *SINGLE CRYSTALS, *LEAD COMPOUNDS, *SULFIDES, IMPURITIES, BISMUTH, SILVER, SULFUR, TEST METHODS.) (SEMI-CONDUCTORS, LABELED SUBSTANCES, CONTROLLED ATMOSPHERES, HIGH TEMPERATURE RESEARCH.) -

269 203 0492 PENTABORANE THERMAL STABILITY AT TEMPERATURES OF 100 DEGREES C, 125 DEGREES C AND 150 DEGREES C FOR 7 PERCENT ULLAGE,

269 203 0492 THE THERMAL STABILITY OF B5H9 WAS DETERMINED AS THE RATE OF PRESSURE INCREASE IN 800-ML TEST CYLINDERS FILLED TO 7% ULLAGE. DECOMPOSITION OF THE B5H9 RESULTED IN PRESSURE INCREASES FROM 3 TO 1200 PSIG (APPROXIMATELY 6% DECOMPOSITION OF B5H9) AT TEMPERATURES OF 100, 125 AND 150 C AFTER 360, 28 AND 3 HR, RESPECTIVELY. AT LONG HOLD TIMES AND HIGH TEMPERATURES THE PREDICTED PERCENT DECOMPOSITION WAS HIGHER THAN THE OBSERVED PERCENT DECOMPOSITION. INVESTIGATIONS WERE MADE TO DETERMINE THE EFFECTS OF H AND B10H14 ON PENTABORANE THERMAL STABILITY AFTER 138 HR, AT A TEMPERATURE OF 110 C AND AN ULLAGE OF 52%. THE ADDITION OF 26.8 MOL-% H (APPROXIMATELY 1175 PSIG) FOR ONE TEST AND 9.2 MOL-% B10H14 FOR ANOTHER TEST RESULTED IN 6.5% AND 8.1% DECOMPOSITION. A BLANK B5H9 TEST RESULTED IN A 10.3% DECOMPOSITION.

269 203 0490 (*PENTABORANES, FUELS, ADDITIVES, HYDROGEN, DECABORANES .) (TEST METHODS, TEMPERATURE, STABILITY, DECOMPOSITION, PHASE STUDIES , PRESSURE, PHYSICAL PROPERTIES.) (TEST EQUIPMENT, DESIGN, HAZARDS.)

269 206 0493 THE ARC JET AS A MEANS OF PRODUCING FULL TEMPERATURE SIMULATION IN A HYPERSONIC WIND TUNNEL 9APPLICATION OF A CROSSED FIELD ACCELERATOR.

269 206 0493 THE GENERAL CONCEPT OF USING CROSSED ELECTROSTATIC AND MAGNETIC FIELDS TO ACCELERATE THE FLOW OF AN IONIZED PLASMA WAS INVESTIGATED EXPERIMENTALLY AND THEORETICALLY. THE EXPERIMENTAL INSTALLATION CONSISTS OF THE FOLLOWING UNITS AN AIR-STABILIZED ARC WHICH SERVES AS THE PLASMA GENERATOR, AN INLET VIEWING CHAMBER FOR VELOCITY MEASUREMENTS, THE ACCELERATION SECTION, AN OUTLET VIEWING CHAMBER, THE TEST SECTION WITH QUARTZ VIEWING WINDOW, AND FINALLY THE VACUUM SYSTEM. THE EXPERIMENTAL EFFORT CONSISTS IN CORRELATING THE INPUT AND OUTPUT ACCELERATOR VELOCITY AND MACH NUMBER WITH THE APPLIED ELECTROMAGNETIC FIELDS, MASS FLOW, AND GROSS OPERATING PARAMETERS OF THE INSTALLATION. THE THEORETICAL RESULTS OF THE ONE-DIMENSIONAL, STEADY, COMPRESSIBLE FLOW TREATMENT OF THE PROBLEM ARE PRESENTED. THESE RESULTS ARE SUMMARIZED IN THE FORM OF NONDIMENSIONAL CHARTS WHICH DISPLAY THE ROLE OF THE RELEVANT NONDIMENSIONAL GROUPS THAT ENTER INTO THE INTERACTION. THESE CHARTS READILY ESTABLISH THE PERFORMANCE LIMITS OF SUCH AN ACCELERATOR.

269 206 0491 *HYPERSONIC WIND TUNNELS, ELEC-TRIC ARCS, PLASMA JETS, ACCELERATION BY ION ACCELERATORS, SUPERSONIC NOZZLES, MAGNETO-HYDRODYNAM ICS, DESIGN, MATHEMATICAL ANALYSIS, TABLES.) (HYPERSONICS, TEMPERATURE, HIGH TEMPERATURE RESEARCH, SIMULATION, WIND TUNNELS, TEST FACILITIES.)

269 208 0494 FLIGHT VIBRATION SURVEY OF JRB-52B AIRCRAFT.

269 208 0494 THE JRB-52B AIRCRAFT WAS SURVEYED TO DETERMINE THE VIBRATION ENVIRONMENT EXISTING THROUGHOUT THE VEHICLE UNDER ALL FLIGHT CONDITIONS EXPECTED IN SERVICE. APPROXIMATELY 34,000 DATA POINTS WERE OBTAINED FROM 26 SEPARATE LOCATIONS ON THE VEHICLE DURING 7 TEST FLIGHTS. THE DATA OBTAINED WERE EVALUATED TO DETERMINE THE ADEQUACY OF VIBRATION TEST REQUIREMENTS FOR LONG RANGE BOMBER EQUIPMENT CONTAINED IN MIL-E-5272A. THE DATA INDICATED THAT THE VIBRATION TEST REQUIREMENTS OF THAT SPECIFICATION WERE SATISFACTORY TO SIMULATE THE ACTUAL ENVIRONMENT EXISTING ON THE JRB-52B AIRCRAFT.

269 208 0492 (*JET BOMBERS, JET PLANES, VIBRATION, DYNAMICS, FLIGHT TESTING, TEST METHODS, TEST EQUIPMENT.)

269 209 0495 A REVIEW OF RECENT DEVELOPMENTS IN TITANIUM AND TITANIUM ALLOY TECHNOLOGY.

269 209 0495 A STUDY OF THE AIR CONTAMINATION AND PROTECTION FOR 4 DOD TI SHEET ALLOYS INDICATED THAT TI-4AL3MO-1V AND TI-6AL-4V HAD ABOUT EQUAL RESISTANCE TO PENETRATION BY INTERSTITIAL CONTAMINANTS. THE HARDNESS PENETRATION TESTS SHOWED TI-13V11CR-3AL AND TI-2.5AL-16V ALLOYS HAD LOWER RESISTANCE TO CONTAMINATION IN THAT ORDER. THE TI-5AL-2.5SN, TI-6AL-4V, AND TI-13V-11CR-3AL ALLOYS WERE EVALUATED FOR SUSCEPTIBILITY TO H EMBRITTLEMENT INDUCED BY CHEMICALLY MILLING IN A HYDROFLUORIC ACID BATH. THE ALL-ALPHA TI-5AL2.5SN ALLOY WAS NOT.

EMBRITTLED. THE TI-6AL-4V ALLOY WAS ONLY SLIGHTLY EMBRITTLED, WHILE THE TI-13V-11CR-3AL ALLOY WAS SEVERELY EMBRITTLED. AN INVESTIGATION CONCERNING THE TITANIUM-LOX REACTION WAS CONDUCTED BY USING HIGH-PRESSURE GASEOUS O. THE STUDY ESTABLISHED THAT A FRESH TI SURFACE WOULD REACT WITH GASEOUS O UNDER ABOUT 100-PSIG PRESSURE BETWEEN -250 F AND ROOM TEMPERATURE. SEVERAL METHODS OF PRODUCING FLAT SOLUTION-TREATED TITANIUM ALLOY SHEET ARE REVIEWED AND A NEW CONCEPT IS DESCRIBED. BASICALLY, THE NEW METHOD INVOLVES HEATING AND COOLING THE SHEET UNDER TENSION.

269 209 0493 (*TITANIUM ALLOYS, *SHEETS, CONTAMINATION, AIR, GASES, CORROSION INHIBITION, HIGH TEMPERATURE RESEARCH.) (CHEMICAL MILLING, OXIDATION, OXIDATION INHIBITORS, COATINGS.) IGNITION, MANUFACTURING METHODS, MECHANICAL PROPERTIES, IMPURITIES, PROCESSING, EXTRUSION, METALLURGY. -

269 188 0532 DEVELOPMENT OF PROCEDURES FOR WELDING 2-INCH THICK TITANIUM-ALLOY PLATE.

NO ABSTRACT AVAILABLE

269 188 0494 (*TITANIUM ALLOYS, *METAL PLATES, *ARC WELDS, *WELDS, *WELDED JOINTS, WIRE, *WELDING, ARC WELDING, MECHANICAL PROPERTIES, TENSILE PROPERTIES, FRACTURE (MECHANICS), IMPACT SHOCK.) (ALUMINUM ALLOYS, TIN ALLOYS, VANADIUM ALLOYS, NIOBIUM ALLOYS, SUBMARINE HULLS.) -

269 189 0533 GAS TURBINE AND JET ENGINE FUELS.

NO ABSTRACT AVAILABLE

269 189 0495 (*TURBOJET ENGINES, DUCT INLETS, GUIDE VANES, RELIABILITY, CORROSION BY SULFUR AND SEA WATER, TESTS.) (COMBUSTION CHAMBERS, COMBUSTION CHAMBER LINERS, SHIELDING, THERMAL RADIATION, CORROSION, EROSION FROM FLAMES, COMBUSTION CHAMBER GASES, TESTS.) (HYDROCARBONS, JET ENGINE FUELS.) -

269 190 0534 DEFENSE METALS INFORMATION CENTER SELECTED ACCESSIONS. DECEMBER 1961,

NO ABSTRACT AVAILABLE

269 190 0496 (*BIBLIOGRAPHY, *MATERIALS, *METALS, ALLOYS, CERAMIC MATERIALS, REFRACTORY MATERIALS, RARE EARTH ELEMENTS, PROCESSING, MECHANICAL PROPERTIES, PHYSICAL PROPERTIES.) -

269 191 0535 THE PHYSIOLOGY OF MECHANICAL TRAUMA.

NO ABSTRACT AVAILABLE

269 191 0497 (*SURGICAL TRAUMA, *KIDNEYS, PATHOLOGY, TRAUMATIC SHOCK.) (HEART ARREST, *PLASMA VOLUME, RESPIRATION.) (*WOUNDS, BACTERIA, CLOSTRIDIUM HISTOLYTICUM.) (*ORTHOPEDICS, STAINLESS STEEL, SURGERY, ARTHROPLASTY.) -

269 192 0536 THE MAGNUS FORCE ON A ROTATING CYLINDER IN TRANSONIC CROSS FLOWS,

NO ABSTRACT AVAILABLE

269 192 0498 (CYLINDRICAL BODIES, BODIES OF REVOLUTION, *TRANSONIC FLOW, *SUPERSONIC FLOW, *BALLISTICS, *AERODYNAMICS, LIFT, DRAG.) (ANGLE OF ATTACK INDICATORS, LAMINAR BOUNDARY LAYER, TURBULENT BOUNDARY LAYER, WAKE, VELOCITY, DENSITY, SPARK SHADOWGRAPH PHOTOGRAPHY.) (WIND TUNNELS, WIND TUNNEL MODELS, TESTS.) -

269 196 0537 MATERIALS PROPERTY DATA.

NO ABSTRACT AVAILABLE

269 196 0499 (FRICTION BRAKES, *BRAKE LININGS, MATERIALS, METALS, ALLOYS, ADDITIVES, GRAPHITE, AIRCRAFT.) (TESTS, TEST EQUIPMENT, TEST FACILITIES, HIGH TEMPERATURE RESEARCH.) (EROSION, DEPOSITS.) (*ROCKET MOTORS, *ROCKET MOTOR NOZZLES, MATERIALS, *REFRACTORY MATERIALS, INSULATING MATERIALS, THERMAL INSULATION, *REFRACTORY COATINGS, CERMETS, CERAMIC MATERIALS, SILICON COMPOUNDS, BERYLLIUM COMPOUNDS, ZIRCONIUM COMPOUNDS, MAGNESIUM COMPOUNDS, OXIDES, TUNGSTEN, STEEL, TUNGSTEN ALLOYS, MOLYBDENUM ALLOYS, *GRAPHITE, HEAT RESISTANT POLYMERS.) -

269 197 0538 PROBLEMS OF THE MECHANICS OF INTERPLANETARY SPACE TRAVEL,

NO ABSTRACT AVAILABLE

269 197 0500 (*SPACESHIPS, *SPACE FLIGHT, SPACE PROBES, SPACE NAVIGATION, *CELESTIAL MECHANICS, LAUNCHING, FLIGHT PATHS, VELOCITY, THRUST, GRAVITY, MATHEMATICAL ANALYSIS, THEORY.) -

269 199 0539 EFFECT OF STRESS ON THE CREEP RATE OF HIGH PURITY ALUMINUM IN THE CROSS-SLIP REGION.

NO ABSTRACT AVAILABLE

269 199 0501 (*ALUMINUM, CRYSTALS, CRYSTAL STRUCTURE, LATTICES, TEMPERATURE, STRESSES, DEFORMATION, *CREEP, THEORY, ENERGY.) -

269 204 0540 OPERATIONAL GROUND SUPPORT EQUIPMENT SYSTEM SPECIFICATION FOR 566TH SMS-OFFUTT AIR FORCE BASE.

NO ABSTRACT AVAILABLE

269 204 0502 (*GROUND SUPPORT EQUIPMENT, SPECIFICATIONS FOR SURFACE TO SURFACE, *GUIDED MISSILES.) (LAUNCHING, PREPARATION, MAINTENANCE.) (BOOSTER ROCKETS, HANDLING, TRANSPORTATION.) HYDRAULIC SYSTEMS, FUEL CONSUMPTION, RELIABILITY. -

269 006 0541 EXTENSIONS OF A THEOREM BY CLARK,

NO ABSTRACT AVAILABLE

269 006 0503 (*LINEAR PROGRAMMING, *MATRIX ALGEBRA, SCHEDULING, THEORY.) -

269 017 0542 PENDULUM TESTS OF TWO CRUISE FOILS AND VARIOUS STRUTS,

NO ABSTRACT AVAILABLE

269 017 0504 (*HYDROFOILS, DESIGN, PARABOLIC BODIES, LIFT, DRAG, CAVITATION, SPLIT FLAPS, FLAPS, WATER TUNNELS, TESTS, MODEL TESTS, TEST EQUIPMENT, TEST METHODS, *HYDRODYNAMICS, STRUCTURES.) -

269 031 0543 ELECTROMAGNETIC VACUUM BALANCE,

NO ABSTRACT AVAILABLE

269 031 0505 (*BALANCES, *ELECTROMAGNETS, VACUUM SYSTEMS, USSR, DESIGN.) (*ELECTRICAL NETWORKS, CIRCUITS, VARIABLE RESISTORS, GALVANOMETERS, SOLENOIDS.) -

269 041 0544 INSTRUMENTATION FOR THE DETERMINATION OF THE COMPOSITION OF THE UPPER ATMOSPHERE.

NO ABSTRACT AVAILABLE

269 041 0506 (GEOPHYSICS, INSTRUMENTATION, DESIGN, TESTS.) (*MASS SPECTROMETERS FOR SOUNDING ROCKETS, MASS SPECTROSCOPY OF *UPPER ATMOSPHERE, ATMOSPHERE, HELIUM, OXYGEN, NITRO-GEN, SPECTROGRAPHIC ANALYSIS.) (IONIZATION GAGES, PRESSURE GAGES, MANOMETERS, CALIBRATION, TESTS.) (ATMOSPHERE MODELS, ANALYSIS.) -

269 042 0545 AFT-END CLOSURE STUDY FOR POLARIS A-3 ROCKET MOTOR CASE.

NO ABSTRACT AVAILABLE

269 042 0507 (*GUIDED MISSILES, UNDERWATER TO SURFACE, ROCKET MOTORS, *ROCKET CASES, COMBUSTION CHAMBERS, GLASS TEXTILES, METAL GLASS ADHESIVES, RUBBER SEALS, BONDING, ALUMINUM ALLOYS, SHEAR STRESSES, STRESSES, HYDROSTATIC PRESSURE, TESTS.) (ROCKET CASES, FILAMENT WOUND CONSTRUCTION, TEST METHODS.) -

269 051 0546 THE ELECTROSTATIC INSTABILITY OF A BEAM OF CHARGED PARTICLES PENETRATING A PLASMA,

NO ABSTRACT AVAILABLE

269 051 0508 (*PARTICLE BEAMS, ELECTRON BEAMS, PARTICLES, STABILITY, ELECTROMAGNETIC WAVES, ELECTROSTATICS, TRANSPORT PROPERTIES, *PLASMA PHYSICS, PLASMA OSCILLATIONS, PENETRATION, MAGNETIC FIELDS, DIELECTRICS.) (PERTURBATION THEORY, INTEGRAL EQUATIONS, MATRIX ALGEBRA.) -

269 055 0547 PROBLEMS OF SPACECRAFT SCIENTIFIC INSTRUMENT CALIBRATION AND SYSTEMS TESTS,

NO ABSTRACT AVAILABLE

269 055 0509 (GUIDED MISSILE RESEARCH, *SPACE-SHIPS, LUNAR PROBES, SPACE PROBES, ELECTRONIC EQUIPMENT, *FLIGHT INSTRUMENTS, DETECTORS, GROUND SUPPORT EQUIPMENT, INSTRUMENTATION, CALIBRATION, TEST SETS, TEST EQUIPMENT.) -

269 083 0548 SPECIAL PURPOSE ANALYSIS TECHNIQUES.

NO ABSTRACT AVAILABLE

269 083 0510 (*DIRECTION FINDING, AUTOMATIC, *RADIO INTERCEPTION, RADIO SIGNALS, HIGH FREQUENCY, RADIO RECEIVERS, BEARING FINDING, DISPLAY SYSTEMS, *DIGITAL COMPUTERS, PULSE ANALYZERS, CALIBRATION, *LOOP ANTENNAS, ANTENNAS, DESIGN, TESTS.) (*RADIO SIGNALS, DETECTORS, IDENTIFICATION, DATA STORAGE SYSTEMS, ANALYSIS.) -

269 088 0549 ACOUSTIC SPIN-WAVE BRANCHES OF A CLASS OF FERRIMAGNETS.

NO ABSTRACT AVAILABLE

269 088 0511 (CRYSTALS, DEFORMATION, FERRITES, *FERROMAGNETIC MATERIALS, MAGNETITE, GARNET, *CRYSTAL STRUCTURE, MAGNETIC EFFECTS, MAGNETIC PROPERTIES.) (*ACOUSTICS, ENERGY, WAVE TRANSMISSION, SPIN.) (DATA, TABLES.) -

269 096 0550 NUCLEAR MAGNETIC RESONANCE IN ALUMINUM AND COPPER
SINGLE CRYSTALS,

NO ABSTRACT AVAILABLE

269 096 0512 (METALLIC CRYSTALS, METALS, *ALUMINUM, *COPPER, SINGLE
CRYSTALS, *NUCLEAR MAGNETIC RESONANCE, ABSORPTION, MAGNETIC MOMENTS, ME
ASUREMENT, SPECTROPHOTOMETERS, TEST METHODS, CRYSTAL STRUCTURE.) -

269 101 0551 POLYSTATION DOPPLER TRACKING.

NO ABSTRACT AVAILABLE

269 101 0513 (*DOPPLER TRACKING, DOPPLER SYSTEMS, TRACKING, *SATELL
ITE VEHICLES, RADIO TRANSMITTERS, AIRBORNE, ORBITAL FLIGHT PATHS, DETERM
INATION, FEASIBILITY STUDIES.) (RADIO STATIONS, RADIO RECEIVERS, DATA PR
OCESSING SYSTEMS, POSITION FINDING, ERRORS, EFFECTIVENESS.) -

269 104 0552 SATELLITE CHARGE-UP AS A MEANS OF MAINTAINING THE
SHAPE OF ECHO-TYPE SATELLITES IN THE OUTER VAN ALLEN BELT,

NO ABSTRACT AVAILABLE

269 104 0514 (*SATELLITE VEHICLES, BALLOONS, SATELLITES, RADIO, REF
LECTORS, RADIO COMMUNICA-TION SYSTEMS, HAZARDS FROM METEORITES, REDUC-TI
ON BY VAN ALLEN RADIATION BELTS, ELECTRICAL EFFECTS.) -

269 105 0553 VALUES OF LARGE GAMES, III A CORPORATION WITH TWO
LARGE STOCKHOLDERS,

NO ABSTRACT AVAILABLE

269 105 0515 (*GAMES THEORY, MANAGEMENT ENGINEERING, COMMERCE, CONTR
OL, ECONOMICS, INDUSTRY.) -

269 108 0554 MATERIALS FOR AND THE MECHANISM OF GETTERING MULTIPLE
COMPONENT GASES.

NO ABSTRACT AVAILABLE

269 108 0516 (*ELECTRON TUBES, METALS, SUR-FACES, *DEGASIFICATION, *
GAS DIFFUSION, *GASES, CHEMICAL REACTIONS, REACTION KINETICS, GAS IONIZA
TION, PRESSURE, THEORY.) (MASS SPEC-TROSCOPY, MASS SPECTROMETERS, VACUU
M APPARATUS, DESIGN.) MATERIALS. -

269 109 0555 A TECHNIQUE FOR THE LONGITUDINAL STUDY OF GROUP
STABILITY AND ITS APPLICATION TO GROUP HOMEOSTASIS,

NO ABSTRACT AVAILABLE

269 109 0517 (*GROUP DYNAMICS, *SOCIAL COM-MUNICATION, *LABOR, MEASU
REMENT.) STATISTICAL ANALYSIS, SOCIOMETRICS, PROBABILITY, MATRIX ALGEBRA

269 114 0556 THE ORBITS OF THE SATELLITES 1959 ALPHA-1 AND 1959
ALPHA-2 AND THE PERTURBATIONS ON THE PERIGEE DISTANCE OF 1959
ALPHA-1.

NO ABSTRACT AVAILABLE

269 114 0518 (*SATELLITE VEHICLES, *ORBITAL FLIGHT PATHS, TRACKING T
ELESCOPES, ASTRONOMICAL DATA, TABLES.) (DRAG, CELESTIAL MECHANICS, PERT
URBATION THEORY, MATHEMATICAL ANALYSIS.) -

269 115 0557 CATALOG OF PRECISELY REDUCED OBSERVATIONS NO. P-1.
NO ABSTRACT AVAILABLE

269 115 0519 (*SATELLITE VEHICLES, *ORBITAL FLIGHT PATHS, TRACKING TELESCOPES, ASTRONOMICAL DATA, TABLES.) -

269 117 0558 EXISTENCE OF SMOOTH SOLUTIONS OF THE CAUCHY PROBLEM FOR DIFFERENTIAL SYSTEMS OF ANY TYPE,

NO ABSTRACT AVAILABLE

269 117 0520 (*PARTIAL DIFFERENTIAL EQUATIONS, *COMPLEX VARIABLES, FOURIER ANALYSIS, GREEN'S FUNCTION, MATRIX ALGEBRA, POLYNOMIALS, INTEGRAL TRANSFORMS, TAYLOR'S SERIES.) -

269 134 0559 RESEARCH ON ELECTRON BOMBARDMENT INDUCED CONDUCTIVITY TARGETS IN CAMERA TUBES.

NO ABSTRACT AVAILABLE

269 134 0521 (*CAMERA TUBES, *ICONOSCOPES, ELECTRON BOMBARDMENT, CONDUCTIVITY, SECONDARY EMISSION, SIGNAL-TO-NOISE RATIO, ELECTRON MULTIPLIERS, ARSENIC COMPOUNDS, SULFIDES, HALIDES, SELENIDES, ALKALI METAL COMPOUNDS, THIN FILMS, TARGETS FOR IMAGE TUBES, IMAGE INTENSIFIERS (ELECTRONIC), THEORY, DESIGN, TESTS.) MATHEMATICAL ANALYSIS. -

269 826 0560 INVESTIGATION OF STRESS-CORROSION CRACKING OF HIGH-STRENGTH ALLOYS.

NO ABSTRACT AVAILABLE

269 826 0522 (*ALLOYS, *STEEL, *STAINLESS STEEL, *TITANIUM ALLOYS, STRESSES, CORROSION, FRACTURE (MECHANICS).) (ROCKET CASES, MATERIALS.) (CORROSIVE LIQUIDS, CORROSIVE GASES, SOLUTIONS, SOLID ROCKET PROPELLANTS.) -

269 878 0561 SCIENTIFIC EXPERIMENTS FOR RANGER 3, 4, AND 5.

NO ABSTRACT AVAILABLE

269 878 0523 (*LUNAR PROBES, INSTRUMENTATION FOR MOON, LANDING.) (GUIDED MISSILE TRAJECTORIES, SATELLITE VEHICLE TRAJECTORIES, GUIDANCE.) (TELESCOPES, *TELEVISION CAMERAS, TELEMETERING TRANSMITTERS, DIGITAL COMPUTERS FOR TELEVISION DISPLAY SYSTEMS, PHOTOGRAPHS.) (*GAMMA RAY SPECTROMETERS, DESIGN FOR SURFACES, ANALYSIS.) (*RADIO ALTIMETERS FOR RADAR REFLECTIONS, MEASUREMENT.) (*SEISMOGRAPHS, RECORDING DEVICES, DATA STORAGE SYSTEMS, DATA TRANSMITTING SYSTEMS.) -

269 817 0562 ON THE FUNDAMENTAL EQUATIONS OF THE KINETIC THEORY OF GASES,

NO ABSTRACT AVAILABLE

269 817 0524 (*GASES, *KINETIC THEORY, GAS IONIZATION, *QUANTUM STATISTICS, TRANSPORT PROPERTIES, SUPERAERODYNAMICS.) (SPHERES, PARTICLES, PENETRATION.) (INTEGRAL EQUATIONS, INTEGRALS, STATISTICAL ANALYSIS, PHYSICS, PROBABILITY, STATISTICAL DISTRIBUTIONS, STATISTICAL FUNCTIONS, FUNCTIONS.) -

269 821 0563 A REVIEW ABOUT THE THEORY OF THE CONDENSATION OF DROPS,

NO ABSTRACT AVAILABLE

269 821 0525 (*WATER VAPOR, *CONDENSATION, THEORY, GASES, AEROSOLS, KINETIC THEORY.) (PHYSICAL PROPERTIES, SURFACE PROPERTIES, THERMODYNAMICS, CHEMICAL PROPERTIES.) (MATHEMATICAL ANALYSIS, PARTIAL DIFFERENTIAL EQUATIONS.) -

269 848 0564 MILIMETER WAVE RESEARCH,
NO ABSTRACT AVAILABLE

269 848 0526 (*MICROWAVES, ANALYSIS, WAVE TRANSMISSION, WAVEGUIDES, ELECTROMAGNETIC WAVES, SPECTROGRAPHIC ANALYSIS, REFLECTION, MEASUREMENT.) (OPTICS, POLARIZATION.) (INSTRUMENTATION, SHEETS, RADIO FREQUENCY FILTERS, ELECTRIC FILTERS, ANTENNAS, HARMONIC ANALYSIS, DETECTORS, POWER SUPPLIES.) -

269 860 0565 THE CONSTANT-RATIO RULE AND VISUAL DISPLAYS,
NO ABSTRACT AVAILABLE

269 860 0527 (*VISUAL PERCEPTION, *DISPLAY SYSTEMS, REACTION (PSYCHOLOGY), INTELLIGIBILITY, POSITION FINDING, *STATISTICAL ANALYSIS.) (*VISIBILITY, *VISUAL THRESHOLDS, *SPACE PERCEPTION, BRIGHTNESS.) INFORMATION THEORY. -

269 862 0566 ON EFFECTS OF CARBON AND MANGANESE CONTENT AND OF GRAIN SIZE ON DYNAMIC STRENGTH PROPERTIES OF MILD STEEL.

NO ABSTRACT AVAILABLE

269 862 0528 (*STEEL, MECHANICAL PROPERTIES, PLASTIC FLOW, FRACTURE (MECHANICS), STRESSES, IMPACT SHOCK.) (ADDITIVES, CARBON, MANGANESE.) GRAINS (METALLURGY). -

269 965 0567 RESEARCH ON THERMAL CONVECTION IN ROTATING FLUIDS.
NO ABSTRACT AVAILABLE

269 965 0529 (CYLINDRICAL BODIES, *FLUIDS, *FLUIDS FLOW, ROTATION, THERMODYNAMICS, HEAT TRANSFER, HYDRODYNAMICS.) (WATER, GLYCOLS, DENSITY, ACCELERATION, GRAVITY, TEMPERATURE, OSCILLATION, VISCOSITY.) -

270 039 0568 PRESENTATION OF CREEP DATA FOR DESIGN PURPOSES.

NO ABSTRACT AVAILABLE

270 039 0530 (*TITANIUM ALLOYS, ALUMINUM ALLOYS, TIN ALLOYS, *IRON ALLOYS, *NICKEL ALLOYS, CHROMIUM ALLOYS, COBALT ALLOYS, *STEEL, *HEAT RESISTANT ALLOYS, HIGH TEMPERATURE RESEARCH, HIGH PRESSURE RESEARCH, *CREEP, MECHANICAL PROPERTIES, DEFORMATION, STRESSES, TEMPERATURE, MATHEMATICAL ANALYSIS, TESTS.) AIRCRAFT, STRUCTURES, DESIGN, MATERIALS. -

270 174 0569 VARIATIONAL CALCULATIONS OF SCATTERING,

NO ABSTRACT AVAILABLE

270 174 0531 (*SCATTERING, MATHEMATICAL ANALYSIS, *CALCULUS OF VARIATIONS, MATRIX ALGEBRA.) -

269 900 0570 CONVERSION OF AN/ARR-41 RADIO RECEIVER TO SINGLE SIDEBAND OPERATION.

NO ABSTRACT AVAILABLE

269 900 0532 *RADIO RECEIVERS, AIRBORNE, SIDE-BANDS, AMPLITUDE MODULATION, RADIO COMMUNICATION SYSTEMS, HIGH FREQUENCY. -

270 026 0571 GLOSSARY OF TERMS. DATA REDUCTION AND COMPUTING
WORKING GROUP.

NO ABSTRACT AVAILABLE

270 026 0533 (GUIDED MISSILES, *ROCKETS, *TRACKING, COMPUTERS, *DICTIONARIES.) RANGE. -

270 027 0572 GLOSSARY OF TERMS, ELECTROMAGNETIC PROPAGATION
WORKING GROUP.

NO ABSTRACT AVAILABLE

270 027 0534 (*ELECTROMAGNETIC WAVES, RADIO WAVES, *PROPAGATION, *DICTIONARIES.) -

270 176 0573 THE IMPORTANCE OF ANGULAR CORRELATIONS BETWEEN ATOMIC
ELECTRONS,

NO ABSTRACT AVAILABLE

270 176 0535 (ATOMS, *ATOMIC ENERGY, *ELECTRONS, *ELASTIC SCATTERING, ELECTRON TRANSITIONS, HYDROGEN.) (QUANTUM MECHANICS, WAVE ANALYSIS, NUMERICAL ANALYSIS.) -

270 001 0574 FUEL CELL AND ITS RELATED TECHNOLOGY. II.
CORRELATION BETWEEN INFRARED SPECTRUM AND CATALYTIC ACTIVITY OF
ELECTRODE.

NO ABSTRACT AVAILABLE

270 001 0536 (*FUEL CELLS, CHEMICAL REACTIONS, *ADSORPTION, *CATALYSIS, *ELECTRODES, *INFRARED SPECTROSCOPY, THEORY.) (NICKEL PLATING, COATINGS, THIN FILMS ON CALCIUM COMPOUNDS, FLUORIDES BY VACUUM SYSTEMS, TRANSMISSIONS, THICKNESS.) -

270 234 0575 CONTROL SYSTEMS FOR HIGHWAY TRAINS.

NO ABSTRACT AVAILABLE

270 234 0537 (CONTROL SYSTEMS FOR *CARGO VEHICLES, FEASIBILITY STUDIES, TESTS.) (ARMY OPERATIONS, *VEHICLES, ANALOG COMPUTERS, MATHEMATICAL ANALYSIS.) (TERRAIN, *MILITARY TRANSPORTATION, TRAFFIC.) -

270 250 0576 STUDY OF LOW-SPEED AERODYNAMIC CHARACTERISTICS OF A
RIGHT-TRIANGULAR PYRAMID CONFIGURATION,

NO ABSTRACT AVAILABLE

270 250 0538 (GLIDERS, *TRIANGULAR WINGS, WEDGES, WIND TUNNEL MODELS, STABILITY, STABILITY (LATERAL), STABILITY (LONGITUDINAL), LIFT, DRAG, AERODYNAMICS, TESTS.) -

270 238 0577 VECTORCARDIOGRAPHIC DIAGNOSIS WITH THE AID OF ALGOL,
NO ABSTRACT AVAILABLE

270 238 0539 (*HEART, *MUSCLES, *ELECTRO-CARDIOGRAPHY, ELECTRICAL PROPERTIES, DIAGNOSIS, COMPUTERS, STATISTICAL ANALYSIS.) -

270 064 0578 SPACE NAVIGATION SYSTEMS AND DEVICES AN ANNOTATED BIBLIOGRAPHY,

NO ABSTRACT AVAILABLE

270 064 0540 (*BIBLIOGRAPHY, *SPACE NAVIGATION.) (*AERONAUTICS, *SPACE FLIGHT, SATELLITES, RE-ENTRY VEHICLES, MANNED.) (*SPACE PROBES, *LUNAR PROBES, LANDING.) (ELECTRONIC EQUIPMENT, *GUIDANCE, CONTROL SYSTEMS.) -

270 051 0579 OXIDATION OF METALS AND ALLOYS.

NO ABSTRACT AVAILABLE

270 051 0541 (HIGH TEMPERATURE RESEARCH, TRANSPORT PROPERTIES, *OXIDATION, *METALS, *ALLOYS, SINGLE CRYSTALS, IRON, MAGNETIC FIELDS, TRACE RESEARCH STUDIES, *DIFFUSION, IONS, IRON COMPOUNDS, SULFIDES, LATTICES, ELECTRON SPIN.) -

270 155 0580 INVESTIGATION AND FUNDAMENTAL STUDY OF CRYOSAR OPERATION AND APPLICATION.

NO ABSTRACT AVAILABLE

270 155 0542 (*DIGITAL SYSTEMS, *DATA STORAGE SYSTEMS, ELECTRONIC CIRCUITS, OPERATION.) (*GERMANIUM, ELECTRONS, INELASTIC SCATTERING, IMPURITIES.) (*CRYSTALS, PRODUCTION, GROWTH, IMPURITIES, ELECTRICAL PROPERTIES, LOW TEMPERATURE RESEARCH.) -

269 912 0581 DEEP DRAWN PRE-PRODUCTION UNITS A2 1ST STAGE POLARIS ROCKET MOTOR CHAMBERS AND A2 1ST STAGE POLARIS AFT CLOSURES.

NO ABSTRACT AVAILABLE

269 912 0543 (SOLID ROCKET PROPELLANTS, *ROCKET MOTORS, *ROCKET CASES, *ROCKET MOTOR NOZZLES, PROCESSING, MANUFACTURING METHODS, PRODUCTION TEST METHODS, METALLURGICAL ANALYSIS, HARDNESS, LOW TEMPERATURE RESEARCH, PHASE TRANSITIONS, STRESSES, WELDING, WELDS, MICRO-STRUCTURE.) (STEEL, MANGANESE ALLOYS, CHROMIUM ALLOYS, MOLYBDENUM ALLOYS, IMPACT SHOCK.)

Hq. ESD, L.G. Hanscom Field, Bedford, Mass. Rpt. No. ESD-TDR-63-159 Suppl. 1. MARK I EXPERIMENTAL CORPUS AND DE-SCRIPTOR SET FOR THE STATISTICAL ASSOCIATION PROCEDURES FOR MESSAGE CONTENT ANALYSIS (U). Preliminary report, April 1963, 18Op. incl. illus, 5 refs. Unclassified Report This supplement to TDR-63-159 de-scribes the corpus initially used for experiments with the Statistical	1. Coding 2. Data processing system 3. Library science I. Project No. 702 II. AF33(600)-39852 III. The MITRE Corporation, Bedford, Mass. IV. Spiegel, J. V. SR-79 Suppl. 1	Hq. ESD, L.G. Hanscom Field, Bedford, Mass. Rpt. No. ESD-TDR-63-159 Suppl. 1. MARK I EXPERIMENTAL CORPUS AND DE-SCRIPTOR SET FOR THE STATISTICAL ASSOCIATION PROCEDURES FOR MESSAGE CONTENT ANALYSIS (U). Preliminary report, April 1963, 18Op. incl. illus, 5 refs. Unclassified Report This supplement to TDR-63-159 de-scribes the corpus initially used for experiments with the Statistical	1. Coding 2. Data processing system 3. Library science I. Project No. 702 II. AF33(600)-39852 III. The MITRE Corporation, Bedford, Mass. IV. Spiegel, J. V. SR-79 Suppl. 1
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Association Procedures for Message Content Analysis Program. The ASTIA TABs served as a source from which the initial experimental corpus was drawn. Unclassified Abstract	VI. In ASTIA collection	Association Procedures for Message Content Analysis Program. The ASTIA TABs served as a source from which the initial experimental corpus was drawn. Unclassified Abstract	VI. In ASTIA collection
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