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AFRPL-TR-67-238

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AFRPL RAPID INDEXING SYSTEM

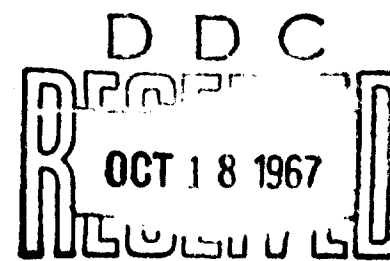
Alfred A. Beltran
Lockheed-California Company
Burbank, California 91503

TECHNICAL REPORT AFRPL-TR-67-238

July 1967

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Air Force Rocket Propulsion Laboratory
Air Force Systems Command
United States Air Force
Edwards, California



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FOREWORD

This report was prepared by the Technical Information Department of the Lockheed-California Company, Burbank, California 91503 under USAF Contract AF 04(611)-11749. Within the contractor's facilities, the report is identified as LR 19969.

The work was performed both at the Air Force Rocket Propulsion Laboratory and in Lockheed's Technical Information Department. Overall direction of the program was provided by Mr. D. E. Kistler, the Air Force Project Officer. Project Manager at the Lockheed-California Company was Dr. H. Jacobs, Manager of the Technical Information Department. Alfred A. Beltran, the project leader, was assisted by Robert R. Scranton in planning and administrative matters, with Robert C. Anthony in charge of on-site indexing. Systems analysis and computer programming were under the direction of Mr. W. B. Thompson, assisted by Mr. A. D. Sobol, of Lockheed's EDP Development Planning Department.

This technical report has been reviewed and is approved.

Dale E. Kistler, RPPR
Project Officer

ABSTRACT

A modified Keyword Out of Context (KWOC) system was developed to gain rapid control over more than 8,000 scattered, unindexed documents. This was the first step in providing the technical information support required by Air Force Rocket Propulsion Laboratory scientists and engineers. Implementation of the KWOC system, computer routines, and progress made during the course of the contract are described. Results are evaluated and recommendations for a total technical information program are presented. Complete, detailed procedures for operating the system are provided in the appendix. This includes an extensive, cross-referenced thesaurus.

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SECTION I

INTRODUCTION

In a 1965 study, conducted by the Lockheed-California Company under Air Force Contract AF 04(611)-10915, it was demonstrated that Air Force Rocket Propulsion Laboratory (AFRPL) personnel had a need for an effective information retrieval service. Contract AF 04(611)-11749 was awarded the Lockheed-California Company in June of 1966, to meet the most pressing information requirements of AFRPL personnel as quickly as possible.

Specifically, the Lockheed-California Company undertook development of a rapid indexing system, associated computer programs, indexing procedures, and the indexing of approximately 8,000 technical documents.

A title-based keyword index, supported by corporate author, contract number, and citation indexes, was selected for the basic system. While not the most advanced method for storage and retrieval of information, it was most suited to satisfying immediate needs and it provided a firm base upon which to develop a more sophisticated system.

This report describes the conversion to automation, the automated system and computer routines, and progress made during the course of the contract. Finally, the system is evaluated and recommendations for future work are presented.

1. AFRPL INFORMATION FACILITY SURVEY

A study of AFRPL information facilities and a survey of AFRPL personnel technical information requirements were completed in August 1965. The information facility study revealed that approximately 8,000 unindexed document titles were scattered throughout the various AFRPL offices. The actual number of documents, counting duplicate copies, was estimated at about 30% higher than individual document titles. Incoming documents numbered about 4600 annually, including duplicate copies. Of these, some 3325 were distributed directly to the individuals concerned. No library record was kept of the 3325 documents. The remaining 1275 documents were received directly by the Air Force Flight Test Center (AFFTC) Technical Library and issued to AFRPL personnel on a permanent retention basis.

Survey results of AFRPL personnel technical information requirements indicated:

- There was a pressing need for central document storage associated with an indexing system capable of quickly gaining control over the many scattered, unindexed documents.

- Documents should be on hand and easily retrievable when needed. This requires an active selection, acquisition, indexing, and circulation program.
- Scientific personnel required a Selective Dissemination of Information (SDI) system as an aid in keeping abreast of the rapidly advancing propulsion technology.
- Complete literature search service was desired in support of problems encountered in the course of research.
- Abstracts would be helpful in an automated indexing system printout to overcome the ambiguity of titles.

A need and desire for an on-base information retrieval course was expressed by AFRPL personnel in subsequent conversations, too late for inclusion in the survey report.

2. RAPID INDEXING SYSTEM

A Key Word Out of Context (KWOC) system had been developed at the Lockheed-California Company (CALAC) and programmed for the IBM 7080. The system was used to gain quick control over CALAC's internal documents as the first phase of the Company's overall information center automation project.

CALAC's KWOC system was modified to meet AFRPL's format and printout requirements and the computer program was converted for use on their IBM 7040. Detailed documentation was provided for program maintenance, and step by step instructions were written for keypunching and computer operations.

The AFRPL Data Processing Programmer was put through a familiarization period with the program logic. Program modifications, as required in the continuing effort, were then made by the Programmer in consultation with CALAC Data Processing Planning, personnel.

Indexing Procedures, including a Corporate Author Authority List, were completed in preliminary form prior to the start of on-site indexing. Indexing routines, forms, and flow of work were developed. A system was developed for gradual recall of the unindexed documents scattered throughout the AFRPL facility. Office space and equipment were provided and the Rapid Indexing project became operative.

3. FUTURE PLANS

The Rapid Indexing System is very flexible. While meeting immediate AFRPL documentation requirements, the system also provides a firm base upon which to develop an advanced, more sophisticated information system. Future plans include both increased information services and use of improved equipment.

Controlled vocabulary indexing has been made feasible by the printout of keywords generated in the KWOC system. This printout, when corss-referenced, becomes the basic thesaurus for future indexing. Once a controlled vocabulary is used, a more advanced information system can be developed. Such a system can index more specifically and with greater consistency, eliminate word suppression, combine descriptors to serve in lieu of an abstract, and provide selective dissemination of information.

Several advances in automated equipment are worth consideration in future plans. Optical scanning equipment has been developed recently that permits direct recording of data from source documents on to magnetic tape. Audio, rather than visual response, is now practical. Extensive use of microfiche has become attractive due to standarization of the microfiche and improved readers and reader-printers.

Advantages, capabilities, and applications of the more sophisticated systems and advanced equipment to AFRPL's information system are explored in detail in SECTIONS VI and VII.

SECTION II

CONVERSION TO AUTOMATION

1. CHRONOLOGY

The period from July 7 through July 20, 1966, was devoted to setting up and equipping the Lockheed Indexing Facility at the Air Force Rocket Propulsion Laboratory. Arrangements were made for delivery of the first 43 cartons of reports for indexing. Upon arrival, these documents were sorted by corporate author; duplicate copies were removed and prepared for destruction.

An indexing test run was started on July 20, and the first trail keypunch input sheets were typed on July 21. On the basis of test results, typing rules were established and a method for indicating chemical subscripts and mathematical superscripts was devised.

During the period from July 25 through July 28, procedures were developed for submitting corrections tokeypunched entires. Final rules for establishing corporate author entries were formulated. The KWOC object program conversion was completed, the AFRPL Data Processing Programmer was instructed in operation of the system, and the sample computer run based on 55 documents was completed.

Computer documentation was submitted to the Air Force in August. Included in the documentation were:

- narrative description of the KWOC indexing computer system
- program logic
- record formats
- compilation source deck lists for all programs
- a test case
- job run procedures
- punched card decks for operation and maintenance of the system.

The first 935 documents were indexed and a printout, covering 585 of these documents, was obtained.

Systems for flow of reports into and out of the Lockheed Indexing Facility and for designating document location became operative in September.

A revised edition of "Procedures for the AFRPL Rapid Indexing System" was issued in December. This revised edition completely replaced preliminary procedures.

The first cumulative printout, covering 1591 documents, was issued on January 27, 1967. On February 8, the first shipment of documents was received from the Air Force Flight Test Center (AFFTC) Technical Library.

On March 24, the second cumulation, covering documents 1 through 2792, was issued. The remodeled AFRPL Library and new vault officially opened on March 31, 1967.

The third cumulated index, covering documents 1 through 4500, was distributed on May 12. A total of 8280 documents was indexed between July 20, 1966 and May 31, 1967.

At close of the initial contract, on June 27, 1967, a cumulation of documents 1 through 8280 was completed. This final cumulation provided the list of keywords and suppressed terms necessary for producing the thesaurus. An additional 558 documents were indexed for keypunching and printout at a later date.

2. BACKGROUND

The Rocket Propulsion Laboratory is the organization assigned the responsibility for Air Force rocket propulsion research and development in the amount of approximately \$42 million a year (FY 67). To this end, AFRPL personnel monitor about 225 contracts, are engaged in over 30 in-house projects, and evaluate over 125 unsolicited proposals annually. They also prepare an average of 125 major purchase requests, each of which yields from 5 to 15 detailed technical proposals which must be evaluated.

AFRPL scientists and engineers must be constantly aware of the latest development in the fields of propulsion, materials, and instrumentation, advanced techniques and materials under study, and successes achieved elsewhere. Without this current state-of-the-art awareness they cannot properly carry out their in-house projects, prepare purchase requests, evaluate proposals, and monitor contract results. Rapid retrieval of the report literature is one of the essentials for effective performance of the Laboratory's assigned tasks.

In pursuit of these R & D activities, AFRPL receives over 4600 documents (including duplicates) per year. Of these, only the AFRPL Memorandum Reports and Technical Reports, numbering over 500 annually, are under excellent control. They have been well indexed by the AFRPL STINFO office since 1958, and the cumulative index receives wide annual distribution.

Another segment of reports, averaging over 1200 a year, are ordered by AFRPL personnel for permanent retention through the AFFTC Technical Library. Until the spring of 1967, when a large classified vault was constructed, the AFRPL Technical Library was not equipped to handle classified documents. Consequently AFRPL scientists and engineers relied primarily on their own individual technical document holdings with a relatively small reliance on AFFTC main base library classified holdings.

Reports produced under AFRPL contract are received directly by contract monitors. Each individual keeps documents related to the contracts for which he is responsible. Others obtain required reports through personal contact with contractors. Reports distributed by the Chemical Propulsion Information Agency (CPIA), about 250 per month, are distributed to individuals by areas of interest.

At AFRPL, these reports have not been centrally indexed or stored. Most individuals maintain unindexed, personal files. Others discard monthly reports and file quarterly and final reports by contract number. Some units keep their reports in scattered filing cabinets without any special filing order or indexing system. Several units have centralized their filing cabinets and maintain simple-to-complex filing and indexing systems. One unit, with over 3000 unindexed reports, has a serious retrieval problem. Another unit receives no reports and is unable to utilize reports scattered throughout other offices and buildings.

In the light of such diverse methods of acquiring, storing, and retrieving documents, conversion to automation could only be effected by establishing a unified indexing system.

It was decided at the outset that, with the availability of documents afforded through a centralized system, duplicate copies of documents could be discarded without loss of effectiveness. However, two copies of more recent reports are now being retained.

The AFRPL STINFO Office was to assume responsibility for obtaining gradual release of documents for indexing. Both parties cooperated closely in quickly solving problems that might otherwise have caused lengthy delays in launching and implementing the conversion to a computer-based, rapid indexing system and a centralized collection of indexed documents.

3. INDEXING SYSTEM

A Keyword Out of Context (KWOC) system was adopted for indexing the backlog of reports. The system's end-product was to be a computer generated book catalog consisting of several indexes.

a. Indexes

The computer program yields four major printouts or reports. Of these, two are for monitoring purposes, and two are indexes. A third monitoring device is a by product of one of these indexes.

(1) Citation Index

The Citation Index is in retrieval number order and has the same function as a library's shelf list. It consists of the retrieval number, corporate author, document title including enhancement terms,

personal author, contract number, report number, AD number, date, number of pages, number of references, and security classification.

(2) KWOC Report

The DWOC Report yields three additional indexes by treating corporate authors and contract numbers as keywords. It also provides a final error detecting printout, the No Key Error section, discussed under monitoring reports. The KWOC Indexes consist of:

(a) Keyword Index

Similar to a library's subject catalog, the Keyword Index consists of a keyword, followed by all document titles from which the keyword was extracted. Date of report and retrieval number are presented for each title.

(b) Corporate Author Index

The Corporate Author Index has the same function as a library's author catalog. It consists of an abbreviated corporate author designation followed by document titles of reports issued by the corporate author concerned. Date and retrieval number follow each title.

(c) Contract Number Index

This index consists of a contract number followed by document titles of reports generated under the contract. Date and retrieval number follow each document title.

b. Monitoring Reports

Three reports are produced for monitoring the accuracy of the indexes.

Two are separate reports and one is a section of the KWOC Report.

(1) Title Master Report

Prior to the computer run, which will result in the various indexes, the sorted master input is audited for card code and retrieval number errors. These computer detectable errors are printed out on the Title Master Report.

(2) Keyword Frequency List

The Keyword Frequency List is an alphabetical listing of all keywords resulting from permutation of words in document titles. This list

indicates the number of times each keyword occurred and which keywords were truncated because of the 18 character limitation. It guides the indexer in selection of descriptors and suppression of terms.

(3) No Key Error List

This section of the KWOC Report indicates document titles without keywords. These titles would not appear on the Keyword Index without title enhancement.

This program provides all indexes and error reports needed for AFRPL to gain access to the indexed reports and for the programmer and indexer to monitor the program. These computer-produced indexes can be issued and cumulated in any desired frequency or quantity within the duplicating capabilities of the printer.

c. Computer Inputs

Three inputs, resulting from information developed by the indexer, are needed to obtain the desired computer runs.

(1) Bibliographic Information Cards

These cards are keypunched from the bibliographic information on the keypunch input sheets which result directly from the indexing process.

(2) Exclusion Word File

This is a file of keypunch cards produced from the suppressed word list prepared and maintained by the indexer. The final, complete suppressed word list appears in SECTION IV of the appendix.

(3) Controls

A set of controls are initiated by the indexer to obtain the type of computer run he requires. These controls are treated in SECTION III on the basis of computer processing and in the Appendix (SECTION I) in relation to the indexing function.

4. PROCESSES AND COMPUTER REPORTS

This section describes the indexing process, brings out significant problems, and indicates how they were resolved. It describes further the computer reports, editing and correcting methods and their application.

Flow of documents through the indexing process is shown in Figure 1, and consists of the following steps:

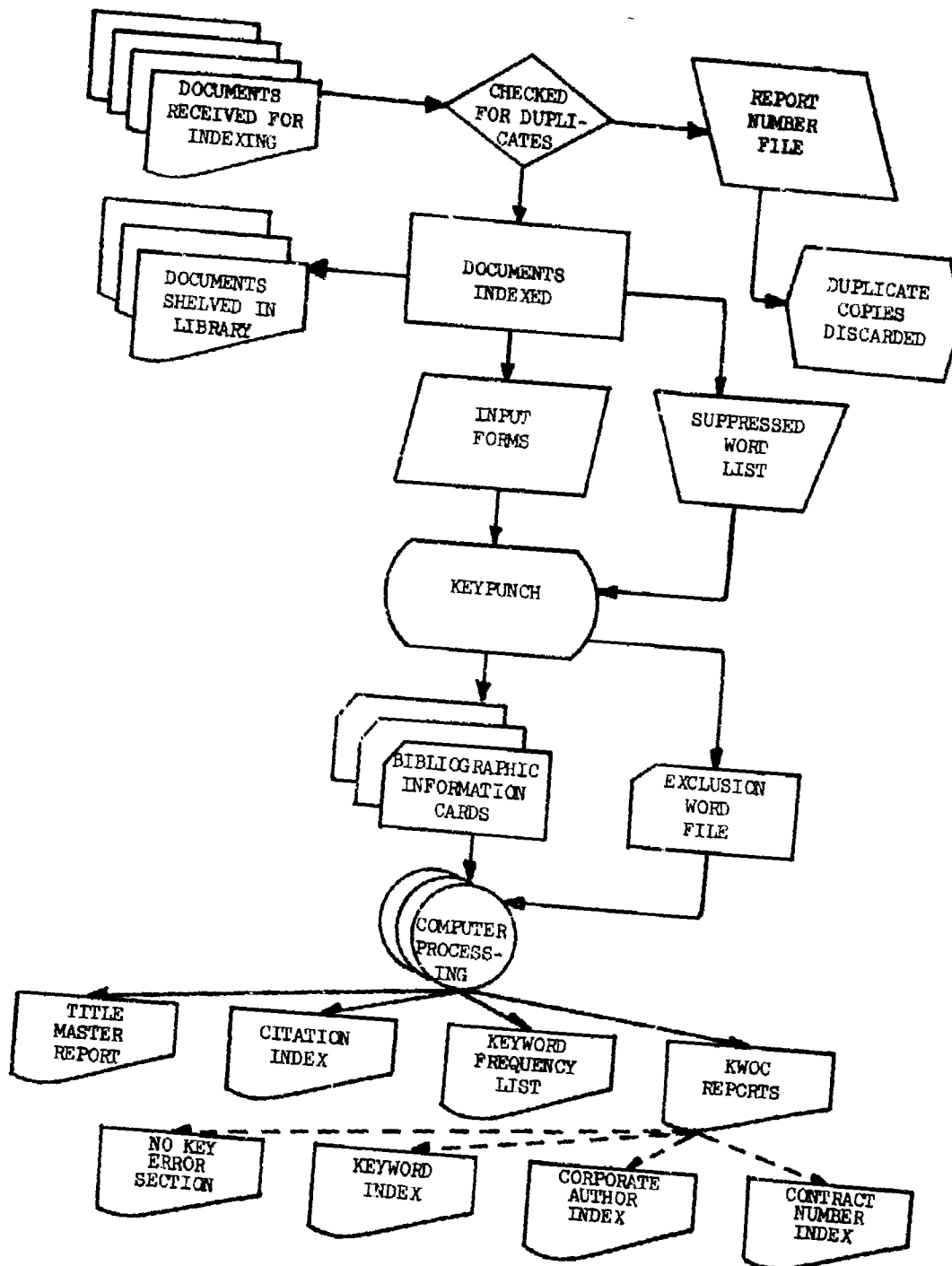


Figure 1 - Rapid Indexing System Basic Flow Chart

- a. Receipt of Documents
- b. Preparation of Report Number File
- c. Indexing
- d. Storing of Documents
- e. Preparation of Computer Input Sheets
- f. Key punching
- g. Computer Processing
- h. Editing and Evaluating

The computer system is discussed in SECTION III and complete indexing procedures are presented in the Appendix.

a. Receipt of Documents

Several months prior to start of indexing, the AFRPL STINFO Office requested Laboratory personnel to cull their files for useful unclassified and confidential documents for which they had no immediate need. These documents were sent to a vault for temporary storage. As a result, approximately 1900 documents were available for indexing at start of the program.

A controlled flow of documents into the Lockheed Indexing Facility vault was essential to maintenance of the indexing schedule. To achieve this controlled flow, the STINFO Officer established a rotation schedule for each division to deliver its documents for indexing. Two men in each division were appointed as contacts for this purpose.

b. Report Number File and Duplication Check

Having determined that one copy each of the older documents was sufficient, a system was developed to eliminate duplicate copies before indexing. A report number/retrieval number file was established on 3" x 5" cards. Each document was checked against this file. If a card bearing the report number was on file, the document was discarded. If no card appeared, a retrieval number was assigned to the document and a report number/retrieval number card was made and filed.

While other methods of checking for duplicates were considered, none proved practical. In all cases, duplicate copies would have been indexed, input sheets typed, cards keypunched, and computer processes performed before duplication could be discovered either through manual scanning of printouts or automatically through an error detection code.

c. Indexing

The document itself was used as the indexer's worksheet. Through title page coding, the typist received the information required for filling out

the keypunch input forms. Detailed indexing procedures are presented in SECTION I of the Appendix and briefly described below.

(1) Document Cover Marking

Each document was assigned a unique, five-digit retrieval number. This number was written on the document's cover and served to identify the document in the computer printouts and on the library shelves.

(2) Title Page Coding

The title page was marked with a code keyed to the keypunch input sheet. Each sheet contained space for three documents. A keypunch input form, explaining the coding used on document title pages, is shown in Figure 2.

Since title pages do not contain the complete bibliographic information required in indexing, some data must be added as shown in Figure 3.

d. Storing of Documents

While remodeling of the AFRPL Library and construction of the adjoining vault was in progress, most reports were stored in a temporarily available vault after indexing. Others were returned to the individual collections from which they had been recalled for indexing.

Once remodeling and construction were completed, it was necessary for the Librarian to know the location of the documents so they could be recalled for central storage. To facilitate recall, the location and safe number of each indexed document returned to personal files was included as a title enhancement term.

The original plan was to house the entire document collection in the new vault adjacent to the library. Retrieval numbers were therefore assigned consecutively. It has since been decided to shelve unclassified documents in the library. This breaks the numbering sequence on the shelves. Therefore, it is not possible to determine, without checking the records, whether a document is out on loan or shelved in the vault.

e. Input Sheets

Indexing information is typed on the keypunch input forms directly from the document's coded title page. This eliminates need for a worksheet. All letters are typed as capitals except the letter "o", which is typed in lower case, to distinguish it from zero. Figure 4 shows a typed keypunch input sheet.

DOCUMENT RETRIEVAL		RETR. NO.		CORRECTION CODE	
NUMBER		1	6		
TITLE					
7 1					
7 9					
TITLE					
7 2					
7 9					
CORP. AUTHOR		PERS. AUTHOR		DATE PGS. REF. SEC. CD.	
2	A	A	B	C	D E F G
7	9	CONTRACT NO.	27	REPORT NO.	AD. NO.
3	R	A	B	C	

- 2A - Corporate Author
 2B - Personal Author
 2C - Yields "et al" if an asterisk is entered
 2D - Date of document
 2E - Number of pages
 2F - Number of references
 2G - Security classification
- 3A - Contract Number under which document was written
 3B - Primary report number
 3C - Defense Documentation Center's "AD" number

Figure 2 - Keypunch Input Sheet Coded to Title Page Marking

LPC Report No. 689-Q-1

Copy No. _____

3B

TECHNICAL REPORT NO. [AFRPL-TR-65-108]

(Unclassified Title)

1 [DEVELOPMENT OF AN ELASTOMERIC SEAL FOR
OMNIAxIAL MOVABLE NOZZLES (LOCKSEAL)
- - QUARTERLY REPORT NO. 1 /REP-LPC-689-Q-1,
AFRPL-TR-65-108]

by

2A [LOCKHEED-PROPULSION COMPANY
Redlands, California

May 1965

to

AIR FORCE ROCKET PROPULSION LABORATORY
RESEARCH AND TECHNOLOGY DIVISION
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE,
EDWARDS, CALIFORNIA

2D - May 65

2E - 108

2F - 3

2G - C

3A - AF04(611)-10537

LOCKHEED PROPULSION COMPANY
P. O. BOX 111
REDLANDS, CALIFORNIA

Figure 3 - Coding of Title Page

RETR.NO.

00836

1 6

TITLE

T	1	DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIDIRECTIONAL MOVABLE NOZZLES (LOCKS

7 9

TITLE

T	2	EAL) -- QUARTERLY REPORT NO. 1/REP-LPC-689-Q-1, AFRPL-TR-65-108

7 9

CORP. AUTHOR

PERS. AUTHOR

DATE

PGS

REF

SEC

CD.

A	LOCKHEED-PROP		MAY 65	108	3	c

7 9

CONTRACT NO.

27

REPORT NO.

44

45

AD

NO

50

54

57

R	AF04(611)-10537	AFRPL-TR-65-108

7 9

27

45

Figure 4 - Typed Keypunch Input Sheet Based upon Title Page Coding

f. Keypunching and Error Correction

Air Force personnel, using the information on the keypunch input sheets, keypunch a maximum of four cards per document. These bibliographic information cards and their functions are described in SECTION III.

The keypunch input sheet is also used for correction of errors detected in preliminary printouts. Column 6 of the Document Retrieval Number box has been set aside for the correction code. It is shown and labeled in Figure 2.

To make a change, the document's retrieval number is entered, followed by a change code. The letter "A" is used for the first change, "B" for a change that supersedes "A", and so forth. It is not necessary to fill in the entire form. Only additional or corrected information need be entered on the keypunch input form. Full procedure is covered in SECTION I of the Appendix.

g. Computer Processing and Reports

As indicated earlier, there are four computer reports providing three monitoring controls and four indexes. These are discussed in the order of their production as shown in Figure 1.

(1) Title Master Report

The Title Master Report is a listing of machine detectable errors. The sample shown in Figure 5 notes such errors as duplicate retrieval numbers, improper retrieval numbers, and retrieval numbers out of the range of the sequence being run. These errors are detected during the input data audit and the list compiled. They concern the document retrieval numbers and the four lines (T1, T2, A and R) on the keypunch input forms.

In Figure 5, the following errors are indicated:

- Two keypunch cards for line "T2" of retrieval number 07112,
- Two cards each for all lines (A, R, T1 and T2) of retrieval number 07113,
- Two cards for line "R" of 07455,
- Two "T1" cards for 07572,
- Two "A" cards for 07733,
- A non-existent line (line 2) for 07895, and
- An unacceptable retrieval or accession number (50240) since the highest number used in the sequence was 08280.

THE FOLLOWING CARDS CONTAIN DUPLICATE CODES.

07112 T2/PERFLUOROGUANIDINE, ISOCYANATE
07112 T2M COMPONENTS -- MONTHLY REPORT. /SPACE-VEHICLES, ALUMINUM, TEFLON

THE FOLLOWING CARDS CONTAIN DUPLICATE CODES.

07113 A JET PROPULSION L MECHREBIAN, R V JUL6111 8 U
07113 A JET PROPULSION L MEGHREBLIA N, R V JUL6111 8 U

THE FOLLOWING CARDS CONTAIN DUPLICATE CODES.

07113 R OA-01-021-AMC11735
07113 R NASW-6 TECH-REP-32-139

THE FOLLOWING CARDS CONTAIN DUPLICATE CODES.

07113 T1RESEARCH ON ADVANCED SOLID-PROPELLANTS -- QUARTERLY REPORT NO. 66-2.
07113 T1THERMAL RADIATION IN GASEOUS FISSION REACTORS FOR PROPULSION. /RADIATION

THE FOLLOWING CARDS CONTAIN DUPLICATE CODES.

07113 T2/PERFLUOROGUANIDINE, SENSITIVITY, AMMONIUM
07113 T2, HYDROGEN

THE FOLLOWING CARDS CONTAIN DUPLICATE CODES.

07455 R AF33(657)-11303 IR-8-150-14
07455 R AF33(657)-11303 IR-8-150-14

THE FOLLOWING CARDS CONTAIN DUPLICATE CODES.

07572 T1NITROGEN-TETROXIDE HANDLING MANUAL. /SSD-TR-61-8, REP-R-3135, HAZARDS,
07572 T1NITROGEN-TETROXIDE HANDLING MANUAL. /SSD-TR-61-8, REP-R-3135, HAZARDS,

THE FOLLOWING CARDS CONTAIN DUPLICATE CODES.

07733 A UNITED TECHNOLOGY LAWRENCE, W J DEC6554 7 C
07733 A UNITED TECHNOLOGY LAWRENCE, W J DEC6554 7 C

THE FOLLOWING CARD CONTAINS AN IMPROPER CODE.

07895 2 2B. /REACTORS, NUCLEAR-POWER

THE FOLLOWING ACCESSION NUMBER IS OUT OF RANGE

50240 T1SYNTHESIS OF CARBAMATES -- THEIR CHEMICAL, PHYSICAL AND ELECTROCHEMICAL

FIGURE 5 - TITLE MASTER ERROR LIST

(2) Citation Index

The Citation Index is the only report providing complete bibliographic information and is similar to the shelf list of a library's card catalog. It provides essentially the same information and represents the numerical order of the actual documents on the library's shelves. A sheet of this printout is shown in Figure 6.

In addition to information brought out in other indexes this index includes:

- Corporate author
- Personal author
- Contract number
- Primary report number
- AD number
- Date of document
- Number of pages
- Number of references
- Security classification

Many documents do not contain all the elements which the Citation Index can accommodate. For example, document number 00836, which is shown in each of the index printouts illustrated, there are neither personal authors nor an AD number.

(3) Keyword Frequency List

The indexing system automatically produces a report, in alpha-numeric order, of all keywords used. Frequency of each term's occurrence is tabulated in the format shown in Figure 7. This printout serves several useful functions. It simplifies detection of keyword errors. It quickly identifies areas in which keywords are overused. It aids in subsequent indexing by enabling standardization of hyphenated terms. It represents the complete vocabulary used in indexing and thereby forms the basis for a thesaurus.

Truncated keywords are terms containing over 18 characters that are automatically cut off by the computer at the 18th letter. These terms also appear on the Keyword Frequency List together with the document retrieval numbers. The document retrieval number permits rapid location of the complete term in the Citation Index.

RETRIEVAL NO.	CITATION INDEX	01	CITATION	PAGE	90
00833	LIQUID PROP INF AG HYBRID-PROPULSION SYSTEMS -- HYBRID-PROPULSION SYSTEMS SYMPOSIUM, 4-5 OCTOBER 1961.				
	JAN62 PGS169	REFS	SEC CD C		
00836	LOCKHEED-PRCP DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIAxIAL MOVABLE NOZZLES (LOCKSEAL) -- QUARTERLY REPORT NO. 1. /REP-LPC-689-Q-1, AFRPL-TR-65-108 AF0416111-10537 AFRPL-TR-65-108 AD		LPIA-LSH-1		
	MAY65 PGS108	REFS3	SEC CD C		
00837	LOCKHEED-PRCP DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIAxIAL MOVABLE NOZZLES (LOCKSEAL) -- PROGRESS REPORT NO. 2. /REP-LPC-689-Q-2, AFRPL-TR-65-173 AF0416111-10537 AFRPL-TR-65-173 AD				
	AUG65 PGS104	REFS	SEC CD C		
00838	LOCKHEED-PRCP EXPLORATORY DEVELOPMENT PROGRAM FOR A LIGHTWEIGHT SOLID ROCKET PULSE MOTOR, 6 NOV 1964 -- 30 APR 1965. /REP-LPC-683-S-1, AFRPL-TR-65-115 AF0416111-9716 AFRPL-TR-65-115 AD				
	MAY65 PGS98	REFS4	SEC CD C		
00839	LOCKHEED-PRCP EXPLORATORY DEVELOPMENT PROGRAM FOR A LIGHTWEIGHT SOLID-ROCKET PULSE MOTOR, 1 MAY 1965 -- 31 JULY 1965. /REP-LPC-683-Q-1, AFRPL-TR-65-165 AF0416111-9716 AFRPL-TR-65-165 AD				
	AUG65 PGS96	REFS	SEC CD C		
00840	LOCKHEED-PRCP GRAIN DESIGN FOR HYBRID-MOTORS. /FUELS DA-04-495-ORD-3577 LPC-594-S-1 AD				
	JAN63 PGS49	REFS	SEC CD C		
00841	LOCKHEED-PRCP HYBRID-PROPULSION RESEARCH PROGRAM -- 1ST QUARTERLY REPORT. /LITHIUM-HYD RIDES, RUBBER, ALUMINUM DA-04-495-ORD-3577 LPC-594-Q-1 AD				
	OCT62 PGS137	REFS12	SEC CD C		
00842	LOCKHEED-PRCP HYBRID-PROPULSION RESEARCH PROGRAM -- 2ND QUARTERLY REPORT. /LITHIUM-HYD RIDES, RUBBER, ALUMINUM DA-04-495-ORD-3577 LPC-594-Q-2 AD				
	JAN63 PGS115	REFS10	SEC CD C		
00843	LOCKHEED-PRCP HYBRID-PROPULSION RESEARCH PROGRAM -- 3RD QUARTERLY REPORT. /LITHIUM-HYD RIDES, RUBBER, NITROGEN-TETROXIDE DA-04-495-ORD-3577 LPC-594-Q-3 AD				
	APR63 PGSVP	REFS	SEC CD C		

FIGURE 6 - CITATION INDEX

KEYWORD	FREQ	KEYWORD LIST RETRIEVAL NUM	KEYWORD	FREQ	RETRIEVAL NUM	KEYWORD	FREQ	PAGE
U-DETA	1	04075	UTAH	1	1	VINYLETFAZOLIS	1	1
U-DIMETHYLHYDRAZIN	1		UTILIZATION	1	1	VIOLET	1	1
UDMH	2		U233	1	1	VISCOSITY	10	10
ULAXITE	2		U235	1	1	VISIOLE	1	1
ULAGE	1		V-1	1	1	VISTANEX-ALUMINUM	1	1
ULIMATE	1		VACUUM	5	5	VISUAL	1	1
ULTRA	6		VACUUM-TECHNIQUES	1	1	VISUAL-TYPE	1	1
ULTRA-HIGH	15		VALUE	1	1	VOLATILITIES	1	1
ULTRA-LOW-CHAMBER	1		VALUES	3	3	VOLTAGE	2	2
ULTRA-VIOLET	1		VALVE	1	1	VOLUME	1	1
ULTRAFINE	1		VALVES	3	3	VOLUMETRIC	3	3
ULTRASONIC	6		VANADIUM	2	2	VORTER	12	12
ULTRAVIOLET	3		VANES	1	1	VORTER-FLOW	1	1
UNCATALYZED	1		VANGUARD	2	2	VORTER-FLOWS	1	1
UNCATALYZED	1		VAPOR	2	2	VORTER-STABILIZED	9	9
UNCLASSIFIED	3		VAPOR-BINDING	2	2	VORTER-TUBE	2	2
UNCOOLED	2		VAPOR-DETECTION	1	1	VULNERABILITY	1	1
UNCOOLED	1		VAPOR-LIQUID	4	4	MALL	4	4
UNDERSEA-WARFARE	1		VAPOR-PHASE	6	6	WARHEAD	3	3
UNDERSTANDING	1		VAPOR-PRESSURE	9	9	WARNING-DEVICES	2	2
UNDERWATER	1		VAPOR-PRESSURES	2	2	WASHINGTON	3	3
UNEXPECTED	2		VAPORIZATION	11	11	WASTE	1	1
UNGUIDED	1		VARIABLE	2	2	WATER	30	30
UNIFIED	1		VARIABLES	2	2	WATER-CONTENT	1	1
UNIQUE	4		VARIANTS	1	1	WATER-COOLED	1	1
UNITED-KINGDOM	3		VECTOR	1	1	WATER-MODERATED	1	1
UNIVERSITY	2		VECTER-CONTROL	1	1	WATER-MOLECULES	1	1
UNREACTED	1		VEHICLE	10	10	WATER-REACTIVE	1	1
UNSATURATED	2		VEHICLES	13	13	WAVE	2	2
UNSATURATION	1		VELOCITIES	3	3	WAVE-PROPAGATION	4	4
UNSATURATED	1		VELOCITY	17	17	WAVES	4	4
UNSTABLE	11		VENTED	2	2	WAX	1	1
UNSTEADY	1		VERBAL	1	1	WEAK	1	1
UNSTEADY-STATE	1		VERIFICATION	1	1	WEAPON	1	1
UNSYMMETRICAL	3		VERNIER	1	1	WEAPON-A	1	1
UNSYMMETRICAL-DIME	1	08032	VERTICAL	1	1	WEAPONS	3	3
UO2	2		VESSEL	2	2	WEAR	1	1
UPPER	4		VIBRATION	5	5	WEAR-EVALUATION	1	1
UPPER-STAGE	1		VIBRATION-LABORATO	1	1	WEIGHT	1	1
UPPER-STAGES	2		VIBRATIONAL	2	2	WEIGHT	5	5
UPRATED	3		VIBRATIONAL-METHOD	1	1	WEIGHT-PERCENT	1	1
UPTAKE	1		VIBRATIONS	1	1	WEIGHTS	2	2
URANIUM	8		VIKING	3	3	WELDED	1	1
URANIUM-DIOXIDE	1		VINYL	9	9	WELDING	7	7
URANIUM-LOADED	1		VINYL-CHLORIDE	1	1	WENKS	1	1
UREA	2		VINYL-POLYMER	1	1	WPA	10	10
UREAS	3		VINYL-POLYMERS	2	2	WPA-AMONIA	1	1
URETHANE	1		VINYLETATION	1	1	WHEEL	1	1
USEFUL	1		VINYLETETRADRAM	1	1	WHITE	30	30
USEFULNESS	1		VINYLTITE	1	1	WHITE-FJNING	1	1

FIGURE 7 - KEYWORD FREQUENCY LIST

(4) KWOC Report

The KWOC Report is divided into four sections: No Key Error section, Keyword Index, Corporate Author Index, and Contract Number Index. Since the indexes are sections of the same report, they all appear in the same format.

The Keyword Index has been further subdivided into a report number index and a document location index by manipulation of terms rather than through computer programming. These indexes occur within the body of the Keyword Index and therefore are not shown on the flow chart (Figure 1).

(a) No Key Error

This is the first of the four KWOC sections. Refer to flow chart, Figure 1. The No Key Error section is a safeguard against the possibility of a document not appearing in any portion of the Keyword Index due to absence of keywords in the title. In actual practice this report was never needed, since the indexer had always provided necessary keywords as title enhancement terms.

(b) Keyword Index and Title Enhancement

This is the second of the KWOC sections shown in Figure 1. Significant words in the title provide the indexing terms under which a document can be retrieved. As shown in Figure 8, this index is an alphabetical listing of keywords followed by the titles containing them. Each keyword appears only once unless the number of entries under a term continues on the following page. In that event, the keyword is repeated at the top of the new page.

Each entry under a keyword contains the full title, title enhancement terms, date of report, and retrieval number. Security classification of the title is not given since only unclassified information appears in the printout.

Keywords are limited to 18 characters, thereby eliminating the possibility of such combined terms as ENGINE-OPTIMIZATION and MECHANICAL-PROPERTIES. Should a space occur between two words of a combined term, each term will index separately. In MECHANICAL PROPERTIES, for instance, mechanical will appear under the "M's" and properties under the "P's".

Numbers preceding letters are automatically dropped. A term such as 5KS4500 will index as KS4500.

Keywords which do not occur in a title cannot appear as indexing points in the Keyword Index. Terms in a title may be combined by joining them with hyphens and they may be simply transposed, but radical changes of the title are not permitted.

KEY WORD	KWOC INDEX	TITLE	PAGE 627	DATE	RETRIEVAL NUMBER
LMH-2		CRYSTALLOGRAPHIC STUDIES ON LMH-2 -- FINAL REPORT. /BERYLLIUM, DIFFRACTION, DENSITY, AFRPL-TR-65-230			02677
		SYNTHESIS OF LMH-2 -- FINAL REPORT. /BERYLLIUM, HYDRIDES, CRYSTALLIZATION, AFRPL-TR-66-15		OCT65	02711
		SYNTHESIS OF LMH-2 -- QUARTERLY REPORT. /BERYLLIUM, HYDRIDES, PURITY, CHLORIDES, ETHER, AFRPL-TR-66-195		AUG66	02712
		SYNTHESIS OF LMH-2 -- QUARTERLY REPORT NO. 2. /BERYLLIUM, HYDRIDES, CRYSTALLIZATION		OCT66	02730
		SYNTHESIS OF LMH-2 -- QUARTERLY REPORT NO. 3. /BERYLLIUM, HYDRIDES, CRYSTALLIZATION		JAN65	02731
LOADED		DAMAGE STUDIES OF EXPLOSIVE LOADED FIN ASSEMBLIES OF SPARROW, SIDEWINDER, AND FALCON DESIGN. /REP-NOTS-1625		MAY57	00991
		5.00-INCH MARK 4 MOD 1 ROCKET MOTORS LOADED WITH MARK 22 MOD 3 PROPELLANT T GRAINS.		FEB54	01086
LOADING		EFFECT OF LOADING DENSITY ON THE HEAT-OF-EXPLOSION MEASUREMENT. /REP-TR-103		APR58	01080
		STRESS CONCENTRATION IN POLYMERS AS A FUNCTION OF LOADING RATE.		JAN57	01338
LOCAL		FINAL REPORT ON THE LOADING, TESTING AND DELIVERY OF XM 85 ROCKET MOTORS. /MOTOR-XM-85, REP-TR-PL-6504, RPL-TDR-64-78		DEC64	02650
		EFFECT OF LOCAL VARIATIONS IN MIXTURE RATIO ON ROCKET PERFORMANCE. /COMBUSTION		JAN51	00656
LOCATING		FEASIBILITY OF LOCATING FACILITIES FOR CONVERSION OF GUANIDINE NITRATE TO NITROGUANIDINE AT EXISTING PROPELLANT PLANT SITES.		FEB58	01271
		DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIAxIAL MOVABLE NOZZLES (LOCKSEAL) -- QUARTERLY REPORT NO. 1. /REP-LPC-689-Q-1, AFRPL-TR-65-108		MAY65	00836
LOCKSEAL		DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIAxIAL MOVABLE NOZZLES (LOCKSEAL) -- PROGRESS REPORT NO. 2. /REP-LPC-689-Q-2, AFRPL-TR-65-173		AUG65	00837
		LOCKSEAL JOINT FOR ROCKET COMPONENTS. /REP-NOTS-1492		OCT57	01027
LOG-PROBABILITY		PROPELLANT VAPORIZATION A CRITERION FOR ROCKET-ENGINE DESIGN - CALCULATIONS USING VARIOUS LOG-PROBABILITY DISTRIBUTIONS OF --/SAFE-RPC-634-6		OCT57	03130
		NUCLEAR LUNAR LOGISTICS STUDY PRESENTATION 18 JULY 1963. /SPACE-VEHICLES, REP-LMSC-NSP-63-85		JUL63	02375
LOGISTICS		NUCLEAR LUNAR LOGISTICS STUDY PRESENTATION 10 OCTOBER 1963. /SPACE-VEHICLES, REP-LMSC-NSP-63-114		OCT63	02376
		COMPARISON OF LIQUID-OXYGEN AND HFNA AS ROCKET PROPELLANTS - USE AND LOGISTICS. /NITRIC-ACID, SAFE-RPC-634-8		JUN50	03227

FIGURE 8 - KEYWORD INDEX

The indexer can use various devices to index each document adequately within the computer imposed restrictions. These methods are treated extensively in the Appendix. He may, for example, transpose 5KS4500 MOTOR to MOTOR-5KS4500.

The phrase "...process for recovery of uranium..." would not be altered. However, the combined term URANIUM-RECOVERY can be added as a title enhancement term. Such terms are separated from the actual title by a virgule (/).

Such a system imposes a number of restrictions upon the indexer. Operating within these limitations, the indexer must exercise a high degree of skill and judgement to index each document properly.

A Report Number Index was produced by adding originating agency and issuing agency report numbers as title enhancement terms. The computer printouts (Figures 8, 9, and 10) illustrate this method for document number 00836. In Figure 8, the Lockheed Propulsion Company (LPC) and Air Force Rocket Propulsion Laboratory report numbers have been added as title enhancement terms.

Since title enhancement terms appear as keywords, the various report numbers can be easily located. Figure 9 shows the AFRPL report number entry and Figure 10 illustrates the originating agency's report number as a keyword. Report numbers, other than AFRPL, are prefixed by REP to bring them together in the index. As explained in SECTION IV, paragraph 3c(2), these entries have been gathered into a single section of the book catalog.

A Document Location Index became necessary because all documents could not be stored initially in the same location. A location code was developed to indicate the safe number in which each document was stored. This code became a keyword to produce the Keyword Index entries shown in Figure 11.

(c) Corporate Author Index

This is the third KWOC report section illustrated in Figure 1. To overcome the 18-character corporate author limitation, standard abbreviations were established. For the most part these abbreviations are easily recognizable. However, to avoid any possible difficulties, Section 2 of the appendix has been divided into three sections for the benefit of the user and the indexer. Part 1 is specifically for the index user and lists the 18-character corporate author abbreviations followed by the full corporate author name. Part 2 is the tool of the indexer and lists the full corporate author followed by the 18-character abbreviation. To ensure, insofar as possible, consistency in the abbreviations and thereby make the abbreviations even more intelligible.

KEY WORD	KEYWORD INDEX	TITLE	PAGE	DATE	RETRIEVAL NUMBER
AFRPL-TR-64-178		A STUDY OF SYSTEM-COUPLED LONGITUDINAL INSTABILITIES IN LIQUID-ROCKETS - SPECIAL REPORT NO. 1 - ANALYTICAL MODEL. /COMPUTERS, AFRPL-TR-64-178	42	APR65	06889
AFRPL-TR-64-180		FEASIBILITY DEMONSTRATION FOR DIRECT-CHAMBER-BLEED HOT-GAS SECONDARY INJECTION THRUST-VECTOR-CONTROL -- QPR NO. 2. /AFRPL-TR-64-180		DEC64	06008
AFRPL-TR-64-181		SOLID-PROPELLANT SYNTHESIS AND EVALUATION -- SEMI ANNUAL REPORT NO. 1. STORAGE, PURIFICATION, INFO-635, ALUMINUM, HYDRIDES AFRPL-TR-64-181		DEC64	02531
AFRPL-TR-64-182		MANEUVERING SATELLITE PROPULSION - SYSTEM DEMONSTRATION -- QUARTERLY REPORT. /AFRPL-TR-64-182, MATERIALS, FLUORINE, INJECTORS		JAN65	06020
AFRPL-TR-64-184		EXPERIMENTAL EVALUATION OF ADVANCED LIQUID-PROPELLANTS -- SEMI ANNUAL REPORT NO. 4. /GELS, HYDRAZINE, HYDROGEN-PEROXIDE, AFRPL-TR-64-184		DEC64	07741
AFRPL-TR-65-101		AFRPL LIQUID-FLUORINE ROCKET-NOZZLE TEST-FACILITY. /AFRPL-TR-65-101		MAY65	06239
AFRPL-TR-65-102		INVESTIGATION OF HIGH-ENERGY OXIDIZER BINDERS FOR SOLID-PROPELLANTS. /RE P-1734, OXYGEN, DIFLUORIDE, AFRPL-TR-65-102		JAN60	00017
AFRPL-TR-65-103		HIGH-PRESSURE RESEARCH TOWARD HIGH-ENERGY PROPELLANTS -- APRIL 1, 1964 - MAR 31, 1965. /BUTENE, PROPANE, PERFLUOROCYCLOHEXANE, AFRPL-TR-65-103		JUN65	05558
AFRPL-TR-65-104		SYNTHESIS OF HIGH-ENERGY POLYMERS AND SOLID OXIDIZERS -- FINAL REPORT, JANUARY 1, 1964 - MARCH 31, 1965. /DIFLUORAMINE, AFRPL-TR-65-104		JUN65	00831
AFRPL-TR-65-106		DEVELOPMENT OF HIGH-ENERGY SOLID-PROPELLANT FORMULATIONS. /REP-TR-PL-887 3. BERYLLIUM, SAFETY-645-8. AFRPL-TR-65-106		MAR60	02134
AFRPL-TR-65-108		DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIDIRECTIONAL MOVABLE NOZZLES (LOCKSEAL) -- QUARTERLY REPORT NO. 1. /REP-LPC-659-Q-1, AFRPL-TR-65-108		MAY65	00836
AFRPL-TR-65-111		HIGH-ENERGY SOLID-PROPELLANT EFFICIENCY INVESTIGATION. /REP-TR-PL-8623 AFRPL-TR-65-111		JUL65	00206
AFRPL-TR-65-115		EXPLORATORY DEVELOPMENT PROGRAM FOR A LIGHTWEIGHT SOLID ROCKET PULSE MOTOR, 6 NOV 1964 - 30 APR 1965. /REP-LPC-683-S-1, AFRPL-TR-65-115		MAY65	00838
AFRPL-TR-65-116		SOLID-PROPELLANT SYNTHESIS AND EVALUATION -- SEMI ANNUAL REPT NO. 2. /ALUMINUM, HYDRIDES, INFO-635, NITROGEN, FLUORINE, AFRPL-TR-65-116		MAY65	02603
AFRPL-TR-65-118		EVALUATION OF PROPELLANT CONTAINMENT AND VENTING DEVICES FOR ZERO-GRAVITY APPLICATIONS. /AFRPL-TR-65-118, SCREENS, CAPILLARIES		JUN65	07693
AFRPL-TR-65-119		CHARACTERIZATION AND EVALUATION OF LIGHT-METAL HYDRIDES -- OR NO. 7. /BERYLLIUM, SURVEILLANCE, DENSITY, REP-LPC-637-Q-7, AFRPL-TR-65-119		MAY65	02672
AFRPL-TR-65-12		LIGHT METAL COMBUSTION EFFICIENCY INVESTIGATION. /BERYLLIUM, REP-TR-PL-8089, AFRPL-TR-65-12		MAR65	00195
AFRPL-TR-65-122		STUDY, DESIGN, ANALYSIS, FABRICATION, AND TEST OF A SOLID-PROPELLANT PULSE ROCKET-MOTOR -- FINAL REPT VOL I. /REP-LPC-654-P, AFRPL-TR-65-122		AUG65	00833

FIGURE 9 - ISSUING AGENCY REPORT NUMBER INDEX

KEY WORD	KWOC INDEX	TITLE	PAGE 1817	DATE	RETRIEVAL NUMBER
REP-LPC-614-F		DESIGN AND DEVELOPMENT OF THE HIGH-EXPANSION-RATION ROCKET-MOTOR. /RPL-TOR-64-31, REP-LPC-614-F, NOZZLES, SPECIFIC-IMPULSE		MAR64	07301
REP-LPC-622-F		156-INCH DIAMETER MOTOR JET TAB TVC PROGRAM - FINAL REPORT -- VOLUME III. /AFRPL-TR-64-167, REP-LPC-622-F, THRUST-VECTOR-CONTROL, NOZZLES		JAN65	07671
REP-LPC-622-Q-4		156-INCH DIAMETER MOTOR JET TAB TVC PROGRAM -- QUARTERLY REPORT. /RPL-TOR-64-77, REP-LPC-622-Q-4, THRUST-VECTOR-CONTROL		JUN64	07659
REP-LPC-628-F-V0L1		AN INVESTIGATION OF THE CHARACTERISTICS OF HYBRID-PROPULSION SYSTEMS. /FINAL REPORT VOL 1, LITHIUM-HYDRIDES, POLYBUTADIENE, REP-LPC-628-F-V0L1		DEC63	00950
REP-LPC-628-F-V0L2		AN INVESTIGATION OF CHARACTERISTICS OF HYBRID-PROPULSION SYSTEMS. /FINAL REPORT VOL 11, LITHIUM-HYDRIDES, POLYBUTADIENE, REP-LPC-628-F-V0L2		DEC63	00851
REP-LPC-628-Q-1		AN INVESTIGATION OF THE CHARACTERISTICS OF HYBRID-PROPULSION SYSTEMS. /QUARTERLY REPORT NO. 1, LITHIUM-HYDRIDES, POLYBUTADIENE REP-LPC-628-Q-1		JUL63	00849
REP-LPC-637-Q-5		CHARACTERIZATION AND EVALUATION OF LIGHT-METAL HYDRIDES -- OR NO. 5. /BE RYLLUM. SURVEILLANCE, COMBUSTION. REP-LPC-637-Q-5 AFRPL-TR-64-142		DEC64	02670
REP-LPC-654-Q-1		STUDY, DESIGN, ANALYSIS, FABRICATION AND TEST OF A SOLID-PROPELLANT PULS E ROCKET-MOTOR -- QUARTERLY REPORT NO. 1. /RPL-TOR-64-64, REP-LPC-654-Q-1		APR64	07658
REP-LPC-666-F		A STUDY OF STORABLE PREPACKAGED HYBRID-PROPULSION SYSTEMS -- FINAL REPORT. /LITHIUM-HYDRIDES, REP-LPC-666-F, AFRPL-TOR-65-37		MAR65	00857
REP-LPC-666-Q-1		A STUDY OF STORABLE PREPACKAGED HYBRID-PROPULSION SYSTEMS -- QUARTERLY REPORT NO. 1. /LITHIUM-HYDRIDES, REP-LPC-666-Q-1, AFRPL-TOR-64-132		SEP64	00856
REP-LPC-683-Q-1		EXPLORATORY DEVELOPMENT PROGRAM FOR A LIGHTWEIGHT SOLID-ROCKET PULSE MOTOR, 1 MAY 1965 - 31 JULY 1965. /REP-LPC-683-Q-1, AFRPL-TR-65-165		AUG65	00839
REP-LPC-683-S-1		EXPLORATORY DEVELOPMENT PROGRAM FOR A LIGHTWEIGHT SOLID ROCKET PULSE MOTOR, 6 NOV 1964 - 30 APR 1965. /REP-LPC-683-S-1, AFRPL-TR-65-115		MAY65	00838
REP-LPC-689-Q-1		DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIAxIAL MOVABLE NOZZLES (LOCKSEAL) -- QUARTERLY REPORT NO. 1. /REP-LPC-689-Q-1, AFRPL-TR-65-108		MAY65	00836
REP-LPC-689-Q-2		DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIAxIAL MOVABLE NOZZLES (LOCKSEAL) -- PROGRESS REPORT NO. 2. /REP-LPC-689-Q-2, AFRPL-TR-65-173		AUG65	00837

FIGURE 10 - ORIGINATING AGENCY REPORT NUMBER INDEX

KEY WORD	KWBC INDEX	TITLE	PAGE 1970	DATE	RETRIEVAL NUMBER
SAFE-RPC-620-1		HYDROGEN-PEROXIDE BY OXIDATION OF ISOPROPYL-ALCOHOL -- PROGRESS REPORT, /ACETONE, PURIFICATION, SAFE-RPC-620-1		DEC51	03355
		HYDROGEN-PEROXIDE BY OXIDATION OF ISOPROPYL-ALCOHOL -- PROGRESS REPORT, /DETENTION, PURIFICATION, SAFE-RPC-620-1		JAN52	03356
		HYDROGEN-PEROXIDE BY OXIDATION OF ISOPROPYL-ALCOHOL -- PROGRESS REPORT, /DETENTION, STORAGE, SAFE-RPC-620-1		FEB52	03357
		HYDROGEN-PEROXIDE BY OXIDATION OF ISOPROPYL-ALCOHOL -- PROGRESS REPORT, /DETENTION, PURIFICATION, SAFE-RPC-620-1		MAY52	03358
		AN INVESTIGATION OF MIXING IN BENDS, /DUCTS, FLOW, REP-TR-AE5008, SAFE-RPC-620-1		DEC55	03359
		RESEARCH AND DEVELOPMENT ON HIGH-TEMPERATURE FUEL-RESISTANT RUBBER COMPOUNDS, /AMINES, MAGNESIUM-OXIDE, SAFE-RPC-620-1		MAY59	03360
		DEVELOPMENT OF A GAS-GENERATOR FOR BOUNDARY-LAYER CONTROL -- FINAL ENGINEERING REPORT, /NOZZLES, INJECTORS, SAFE-RPC-620-1		SEP54	03361
		PROCEEDINGS OF THE 2ND MONOPROPELLANT CONFERENCE, /ACETYLENE, NITRATES, HYDRAZINE, SYMBOSIA, SAFE-RPC-620-1		OCT55	03362
		INVESTIGATION OF NEW MONOFUELS -- FINAL REPORT, /ETHYLENE-OXIDE, NITRATE S, PROPENE, SAFE-RPC-620-1		FEB54	03363
		SELECTED BIBLIOGRAPHY ON SEVEN MONOPROPELLANTS, /ETHYL-NITRATE, ETHYLENE-OXIDE, HYDRAZINE, HYDROGEN-PEROXIDE, SAFE-RPC-620-1		MAY54	03364
SAFE-RPC-620-2		AN INVESTIGATION OF MONOPROPELLANTS FOR THE NAVY, /ETHYLENE-OXIDE, SAFE-RPC-620-2		FEB50	03365
		LIQUID-MONOPROPELLANT INVESTIGATION -- PROGRESS REPORT NO. 2, /ETHYLENE-OXIDES, PROPYLENE-OXIDES, SAFE-RPC-620-2		APR50	03366
		LIQUID-MONOPROPELLANT INVESTIGATION -- PROGRESS REPORT NO. 3, /ETHYLENE-OXIDES, PROPYLENE-OXIDES, CATALYSTS, SAFE-RPC-620-2		JUN50	03367
		LIQUID-MONOPROPELLANT INVESTIGATION -- PROGRESS REPORT NO. 4, /ETHYLENE-OXIDES, PROPYLENE-OXIDES, CATALYSTS, SAFE-RPC-620-2		AUG50	03368
		LIQUID-MONOPROPELLANT INVESTIGATION -- PROGRESS REPORT NO. 5, /ETHYLENE-OXIDES, PROPYLENE-OXIDES, DECOMPOSITION, ADDITIVES, SAFE-RPC-620-2		OCT50	03369
		LIQUID-MONOPROPELLANT INVESTIGATION -- PROGRESS REPORT NO. 6, /ETHYLENE-OXIDES, PROPYLENE-OXIDES, DECOMPOSITION, SAFE-RPC-620-2		DEC50	03370
		LIQUID-MONOPROPELLANT INVESTIGATION -- PROGRESS REPORT NO. 7, /ETHYLENE-OXIDES, NOZZLES, THRUST, SAFE-RPC-620-2		FEB51	03371
		LIQUID-MONOPROPELLANT INVESTIGATION -- PROGRESS REPORT NO. 8, /REACTORS, INJECTORS, SAFE-RPC-620-2		APR51	03372

FIGURE 11 - DOCUMENT LOCATION INDEX

Part 3 contains a standardized listing of the most frequently used abbreviations. A sample of the corporate author index is shown in Figure 12. This section is in the same format and contains the same information as the Keyword Index. As far as the computer program is concerned, both indexes are part of the same KWOC report. The corporate authors have been removed from the keyword alphabetical sequence for convenience of the user.

This method was selected to provide useful bibliographic information concerning the documents listed under each corporate author. The alternative would be to list only the retrieval numbers of each document. Each sheet would then contain three columns of corporate authors instead of one. However, it would be necessary to consult the Citation Index to identify each document.

Provision has been made for only one personal author. Should more than one occur, column 44 of line 3 of the keypunch input sheet (Figure 4) provides for an asterisk. The computer interprets the asterisk and prints out "et al", thus indicating that the document was written by more than one author. Since there is no personal author index, this information is part of the Citation Index (Figure 5).

(d) Contract Number Index

The fourth section of the KWOC Report is the Contract Number Index illustrated in Figure 13. As in all previous indexes, each entry yields the full title, title enhancement terms, date of the document, and retrieval number.

h. Editing and Cumulating

A preliminary, two copy printout was obtained of each non-cumulative run for editing and correcting. A five copy run of the corrected version was then obtained for distribution. Cumulative printouts consisted of merging several printouts which had already been corrected.

(1) Editing and Correction

As indexing progressed it became increasingly evident that some control over vocabulary was necessary. Some terms had variant forms, BI-PROPELLANT and BIPROPELLANT for example. Such variations are widely separated in computer alphabetization. Other terms were meaningless if left unhyphenated. US AIR FORCE indexes under US, AIR, and FORCE. Some terms, such as PROPELLANT, gather far too many entries to be of practical use. These weaknesses of a title-based indexing system were overcome through editing preliminary printouts. The resultant Keyword Frequency List was used as a thesaurus for consistency in subsequent indexing.

KEY WORD	KNOC INDEX	TITLE	PAGE 100	DATE	RETRIEVAL NUMBER
LINCOLN AIR PROD		PROJECT LADDER. /LIQUID-OXYGEN, STORAGE, SAFE-RPC-637-7		JAN52	33817
		RESEARCH ON THE PROPERTIES OF OZONE -- 1950-1955 FINAL REPORT. /OXYGEN, SAFE-RPC-637-7			33820
LINK ORDNANCE DIV		IMPROVEMENT OF IGNITION SYSTEM FOR SIMULTANEOUS IGNITION OF RETRO AND LA LAGE MOTORS ON SATURN V. /SAFE-815-1		JUL65	02167
		HYBRID-PROPULSION SYSTEMS -- HYBRID-PROPULSION SYSTEMS SYMPOSIUM, 4-5 OCTOBER 1961.		JAN62	00835
LIQUID PROP INF AG		JANAF-NASA-RPCA ROCKET FUELS SYNTHESIS SYMPOSIUM 26-27 SEPTEMBER 1961. SLIDES OF PRESENTATIONS. /METALS, BORON, NITROGEN, HYDRIDES			32570
		SOME IDEAS CONCERNING RESONANT BURNING. /SAFE-565-3A		SEP58	02058
LOCKHEED MIS+SPACE		ADVANCED LUNAR TRANSPORTATION STUDY FINAL REPORT -- VOLUME 1. /SPACE-VEH ICLES, REP-LMSC-8-09-63-1		JAN63	02373
		SUMMARY REPORT -- EARLY MANNED INTERPLANETARY MISSION STUDY SUMMARY REPO RT -- VOLUME 2. /SPACE-VEHICLES, REP-LMSC-8-32-63-1		MAR63	02374
	NUCLEAR LUNAR LOGISTICS STUDY PRESENTATION 18 JULY 1963. /SPACE-VEHICLES + REP-LMSC-NSP-63-85		JUL63	02375	
	NUCLEAR LUNAR LOGISTICS STUDY PRESENTATION 10 OCTOBER 1963. /SPACE-VEHIC LES, REP-LMSC-NSP-63-114		OCT63	02376	
	THERMONUCLEAR PROPULSION WITH DEUTERIUM-FUEL. /SAFE-RPC-537-4		SEP58	33708	
	REVIEW AND PROGNOSIS FOR HEXANITROETHANE PROPELLANTS. /NITRONIUM-PERCHLO RATE, HYBRID-PROPELLANTS, REP-LMSC-5-10-64-1		FEB64	04313	
LOCKHEED-PROP		DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIAxIAL MOVABLE NOZZLES (LOCKSEAL) -- QUARTERLY REPORT NO. 1. /REP-LPC-689-Q-1, AFRPL-TR-65-108		MAY65	30836
		DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIAxIAL MOVABLE NOZZLES (LOCKSEAL) -- PROGRESS REPORT NO. 2. /REP-LPC-689-Q-2, AFRPL-TR-65-173		AUG65	30837
	EXPLORATORY DEVELOPMENT PROGRAM FOR A LIGHTWEIGHT SOLID ROCKET PULSE MOTOR, 6 NOV 1964 - 30 APR 1965. /REP-LPC-683-S-1, AFRPL-TR-65-115		MAY65	30838	
	EXPLORATORY DEVELOPMENT PROGRAM FOR A LIGHTWEIGHT SOLID-ROCKET PULSE MOTOR, 1 MAY 1965 - 31 JULY 1965. /REP-LPC-683-Q-1, AFRPL-TR-65-165		AUG65	30839	
	GRAIN DESIGN FOR HYBRID-MOTORS. /FUELS		JAN63	30840	
	HYBRID-PROPULSION RESEARCH PROGRAM -- 1ST QUARTERLY REPORT. /LITHIUM-HYD RIDES, RUBBER, ALUMINUM		OCT62	30841	
	HYBRID-PROPULSION RESEARCH PROGRAM -- 2ND QUARTERLY REPORT. /LITHIUM-HYD RIDES, RUBBER, ALUMINUM		JAN63	30842	

FIGURE 12 - CORPACATE AUTHOR INDEX

KEY WORD	AWOC INDEX	TITLE	PAGE 1	DATE	RETRIEVAL NUMBER
AF-04(611)-5686		ENCAPSULATION OF INGREDIENTS FOR USE IN SOLID-PROPELLANTS -- FINAL REPORT T. /LITHIUM, ALUMINUM, HYDRIDE, NITRONIUM, PERCHLORATE		JUN61	94340
AF04(603)-7005/558		DEVELOPMENT OF THE SPARK-HEATED, HYPERVELOCITY, BLUMSDJAN TUNNEL -- HOTSHOT. /WIND-TUNNELS		JUN58	30180
AF04(611)-10379		CHEMISTRY OF RARE GAS COMPOUNDS. /XENON, FLUORIDES			31639
AF04(611)-10381		GAS CHROMATOGRAPHIC METHODS FOR LIQUID-PROPELLANT ANALYSIS. /HYDRAZINE, NITROGEN, TETROXIDES, REP-OLIN-10381-2, AFRPL-TR-65-69		JUN65	31173
AF04(611)-10530		TESTING OF ADVANCED HIGH-ENERGY SOLID-PROPELLANTS. /BURNING-RATE, SAFETY , DIFLUORAMINO, STABILITY		NOV65	32725
AF04(611)-10531		FEASIBILITY DEMONSTRATION OF A LARGE IMPULSE SOLID-ROCKET ATTITUDE CONTROL MOTOR -- 1ST QUART TECH REP. REP-WAD-3-624-Q-1, AFRPL-TR-65-72		MAY65	31345
AF04(611)-10535		PERFORMANCE-CHARACTERISTICS OF A CRYOGENIC TRIPROPELLANT-SYSTEM -- QUART ERLY REPORT NO. 5. /BERYLLIUM, OXYGEN, HYDROGEN, AFRPL-TR-66-140		MAY66	04309
		PERFORMANCE CHARACTERISTICS OF A CRYOGENIC TRIPROPELLANT SYSTEM -- QUART ERLY REPORT NO. 4. /BERYLLIUM, HYDROGEN		MAR65	04318
AF04(611)-10537		DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIAxIAL MOVABLE NOZZLES (LOCKSEAL) -- QUARTERLY REPORT NO. 1. /REP-LPC-689-Q-1, AFRPL-TR-65-108		MAY65	00836
		DEVELOPMENT OF AN ELASTOMERIC SEAL FOR OMNIAxIAL MOVABLE NOZZLES (LOCKSEAL) -- PROGRESS REPORT NO. 2. /REP-LPC-689-Q-2, AFRPL-TR-65-173		AUG65	00837
AF04(611)-10538		HIGH-ENERGY OXIDIZER STABILIZATION STUDIES -- QUART REPT NO. 2. /NITRONI UM, PERCHLORATES, ADDITIVES, MERCURY		APR65	32562
		HIGH-ENERGY OXIDIZER STABILIZATION STUDIES -- QUART REPT NO. 3. /NITRONIUM, PERCHLORATES, ADDITIVES, GASSING		JUL65	32563
AF04(611)-10741		SOLID-PROPELLANT IGNITION STUDIES -- FINAL REPORT. /SAFE-563-28 AFRPL-TR-66-32		FEB66	32022
		SOLID-PROPELLANT IGNITION STUDIES -- 2ND QUARTERLY REPORT. /OXYGEN, IONI TION-DELAY, INFRARED, EMISSION-DETECTORS. /AFRPL-TR-65-197		DEC65	04240
AF04(611)-10751		A FEASIBILITY DEMONSTRATION OF A THERMAL-STRUCTURAL NOZZLE FOR SOLID-PRO PELLANT ROCKET MOTORS -- 1ST QUARTERLY PROGRESS REPORT. /AFRPL-TR-65-179		AUG65	30364
AF04(611)-10787		DEVELOPMENT OF A HYPER-SOLID IGNITION-SYSTEM. /STOP-START-MOTORS, DEKAZEN E, POLYBUTADIENE, AFRPL-TR-66-212		AUG66	04239
AF04(611)-10788		HIGH PRESSURE CHEMISTRY OF HYDROGENOUS FUELS -- QUARTERLY PROGRESS REPORT 1 APRIL 1965 - 30 JUNE 1965. /AMMONIA, HYDROGEN			31168
AF04(611)-10789		EXPERIMENTAL INVESTIGATION OF PREPACKAGED HYBRID-PROPELLANT SYSTEMS -- 1ST QUARTERLY REPORT. /BORON, AMMONIUM, CHLORINE-PENTAFLUORIDE		AUG65	34472

FIGURE 13 - CONTRACT NUMBER INDEX

Typing and keypunch errors were detected and corrected during editing of the preliminary printouts.

(2) Cumulating

Eight printouts were issued during the year's indexing. Of these, three were cumulations. Each cumulation included all previous printouts and superseded them. The final cumulation represented 8280 documents, and totaled 4,191 pages as follows:

	Pages
Title Master List	6
Citation Index	903
KWOC Report	
Keyword Frequency List Section	64
No Key Error Section	0
Keyword Index	2503
Corporate Author Section	436
Contract Number Section	279

This final cumulation represents the book catalog of the AFRPL Library's document collection.

SECTION III

KWOC COMPUTER SYSTEM

1. BASIC HARDWARE AND SOFTWARE

The Lockheed KWOC (Keyword Out of Context) Computer System is a series of COBOL and utility programs designed to operate on the 32K IBM 7040/44 Computer utilizing the IBSYS operating system version 9 modification level 9. The system requires six work tapes, a system unit, a system input unit, and a system output unit. The IBSYS UPDATE and IBSYS SORT utilities are required. The computer system flow chart is shown in Figure 14.

2. INPUTS

The system utilizes three inputs: keypunch card file, exclusion word file, and a set of controls. The three inputs result from the indexing process. Throughout the system, documents are identified by a five-digit retrieval or accession number unique to each document. These numbers are assigned by the indexing staff.

a. Keypunch Card File

The keypunch card file is the first input. The file is prepared from the keypunch input sheets and contains all basic bibliographic information pertaining to the indexed documents. A maximum of four cards is required for each document. Each card represents a line on the keypunch input form. These lines are coded "T1" and "T2" for title and title enhancement information; "A" for author, date, pagination, number of references, and security classification information; and "R" for contract and report number information.

b. Exclusion Word File

The exclusion word file or suppressed word list is the second input. Since documents are computer-indexed by words found within the title, it is necessary to suppress indexing of the meaningless terms. One- and two-character words are automatically excluded as indexing terms or keywords. A keypunch card file, containing words of over two characters that are to be suppressed as keywords, has been developed. Documents will not be indexed by these terms even if they appear in the title.

c. Controls

A set of controls constitutes the third input. These controls govern the run number, range of acceptable retrieval numbers, and which of the available reports are to be produced. To establish these controls the indexer fills out KWOC Job Run Set Up Sheet shown in Figure 15.

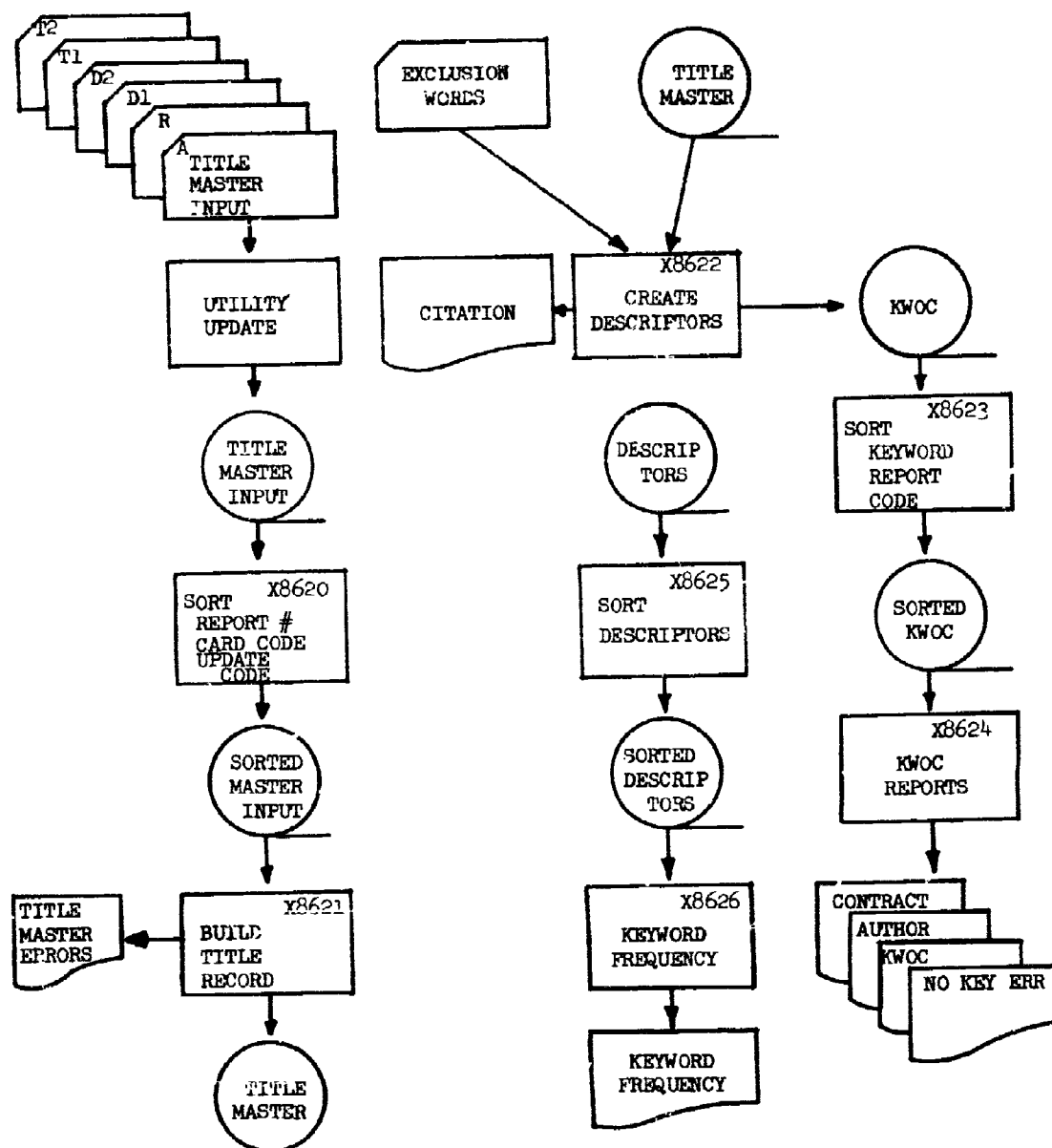


FIGURE 14 - AFRPL RAPID INDEXING COMPUTER SYSTEM

KWOC JOB RUN SET UP SHEET

TØ: _____

DATE: _____

BY: _____

RUN NUMBER

FIRST CARD INPUT _____

(INCLUDES

LAST CARD INPUT _____

TRANSMITTALS)

FIRST RETRIEVAL NUMBER

LAST RETRIEVAL NUMBER

KWØC REPØRT YES NØ⁵⁹

AUTHØR REPØRT YES NØ⁶⁰

CØNTRACT REPØRT YES NØ⁶¹

CITATIØN REPØRT YES NØ⁶²

KEYWØRD REPØRT YES NØ⁶³ (JØBS X8625 (SØRT) AND X8626)

EXCLUSIØN WØRD FILE YES NØ⁶⁴ X8622 X-WDS DATA

THIS RUN WILL REQUIRE THE FØLLØWING INPUTS(S):

TRANSMITTALS	YES	NØ	CARDS	YES	NØ	(UTILITY UPDATE)
DATA TAPES:	RUN	_____	RUN	_____		(SPECIFY TØTAL NUMBER
	RUN	_____	RUN	_____		OF INPUTS ØN X8620
	RUN	_____	RUN	_____		SØRT CØNTRØL CARDS
	RUN	_____	RUN	_____		1 FØR FIRST LINE
	RUN	_____	RUN	_____		AND 1 FØR EACH
	RUN	_____	RUN	_____		RUN TØ BE INCLUDED.)

SAVE INPUT DATA YES NØ (SPECIFY UNLØAD OF X8620 SØRT INPUT AND
RETENTIØN ØF TAPE(S).)

RETURN CARDS TØ LØCKHEED INDEXING YES NØ

NUMBER ØF CØPIES ØF REPØRT TØ BE PRINTED _____

NUMBER OF CØPIES TØ LØCKHEED INDEXING _____

DISTRIBUTIØN ØF ØTHER CØPIES: _____

Figure 15 - KWOC Job Run Set-up Sheet

3. OUTPUTS

Four reports constitute the system's output. These are described in detail in SECTION II, part 3g. The first, the Title Master Report, is a list of errors detected during the audit of input data. A Citation Index, containing full bibliographic information pertaining to the documents, is the second report. Entries are in retrieval number sequence. A Keyword Frequency List of keywords extracted from the title, together with frequency of their occurrence, is the third report.

The fourth report is really a group of four stacked KWOC reports. Should a title contain only suppressed words, it would appear in the No Key Error section of these reports. Another section is the Keyword Index which presents keywords in alphabetic sequence. The next section, the Corporate Author Index, contains the documents keyed on corporate author in alphabetic sequence by author. The fourth section is a Contract Number Index.

4. PROGRAM DESCRIPTION

a. Utility Update

The IBSYS Utility UPDATE Program is one of several magnetic tape file formats for the 7040 IBSYS operating system. The program reads the title master data cards and builds a file of type 2 records for input to program X8620.

b. Program X8620

This program is an IBSYS Utility Sort. The major sort field is the retrieval number. The intermediate sort field is the card code (T1, T2, A, and R). The minor sort field is the change code. Controls are entered into the system via the LABEL control card of this file.

c. Program X8621

This program receives the sorted output from program X8620 and examines the change code to determine whether the current information is to be replaced, deleted, or remain. Records are listed on the Title Master error report if duplicate card codes are detected, a retrieval number contains no title information, or retrieval numbers within the range specified by the control cards are missing. A Title Master file is then created, having one record for each retrieval number that passes the audit.

d. Program X8622

This program reads the Title Master file produced by program X8621 and extracts the keywords from the title. A table is compiled from the exclusion words and used to suppress indexing of words appearing in the Exclusion Word file. Only the first occurrence of a term within a title

is indexed. This prevents a title from appearing twice under the same keyword. All words must be greater than two characters in length and start with an alphabetic character to be indexed. Words shorter than three characters or preceded by numerals are not indexed. If no keywords are found in the title, a record is created for the KWOC No Key Error report.

A descriptor file record is produced for each valid keyword to be processed on program X8625. The retrieval number is included if the word is over 18 characters long. Each retrieval number generates one record for each keyword, one by corporate author, and one by contract number for the three KWOC reports. An entry is also made in the Citation Index report for each retrieval number. The entry contains the retrieval number, 144 characters of title, corporate author, personal author, ET AL if required to indicate additional personal authors, contract number, report number, the Defense Documentation Center's AD number, date, number of pages, number of references, and the security code.

e. Program X8625

This IGSYS Utility Sort program sorts the descriptor file from program X8622 on keyword major and retrieval number minor. By this method titles are arranged in retrieval number order under each keyword.

f. Program X8626

This program reads the sorted output file from program X8625 and accumulates the number of occurrences of each keyword not over 18 characters long. A Keyword Frequency report is produced with 150 keywords and their frequency of occurrence on each page. Keywords of over 18 characters are also listed. They are repeated as often as they occurred and the retrieval number of each is given.

g. Program X8623

This IBSYS Utility Sort program reads the records for the four sections of the KWOC report that were produced in X8622. The major sort key is the report code, intermediate sort is the keyword, and minor sort key is the retrieval number.

h. Program X8624

This COBOL program builds the KWOC reports from the sorted output of X8623.

There are four acceptable report codes:

- E - No Key Error report
- K - Keyword report
- U - Corporate Author report
- Z - Contract Number report.

The Keyword report starts a new page whenever the first letter of the keyword changes. A duplicate keyword is not repeated on the same page. A duplicate keyword is repeated only on the first line of each successive page. All of these reports (Keyword, Corporate Author, and Contract Number) contain the indexed item. Each indexed item includes full title, issuing date, and retrieval number.

5. DESCRIPTORS

Provision has been made in the computer program for two lines of descriptors. These are shown as keypunch cards "D1" and "D2" of the flow chart, Figure 14.

6. DETAILED FLOW CHARTS

The complete set of flow charts, which have been turned over to the Air Force, are not repeated in this report. While they are required for operation of the Rapid Indexing System, these charts are not necessary for an understanding of overall program logic.

SECTION IV

STATUS AT CLOSE OF PROGRAM

On-site indexing terminated June 27, 1967. As of that date, the basic collection had been cleared of duplicate copies of documents. The remaining documents were indexed and shelved in the AFRPL Library.

1. DOCUMENTS INDEXED

A total of 8,280 documents were fully indexed; that is, preliminary printouts were obtained, edited, and corrected. The final five-copy run was obtained and distributed. Of these documents, (3,311 or 40%) were unclassified, 4,625 (or 55.9%) were confidential, and 344 (or 4.1%) were secret.

Since indexing continued through the last day of the contract, an additional 558 documents were indexed. Of these, 331 were from the Chemical Laboratory and 227 from other sources. Therefore, a total of 8,838 documents were indexed. However, preliminary printouts of the final 558 documents were not received in time for editing.

2. BACKLOG

At the initial survey, completed in August 1965, it was estimated that approximately 8,000 documents were available for indexing (Reference 1). It was also estimated that the number of documents increased by about 4,600 per year. Duplication was placed at between 30% and 35% or about one-third. Therefore, at the start of indexing in July 1966, 12,600 documents were available. Of these, one-third or 4,200 should have been duplicate copies, leaving 8,400 for indexing. This estimate proved fairly accurate.

During the course of indexing, AFRPL personnel acquired additional documents at a rate of approximately 90 to 95 per week. Estimate at close of contract placed unindexed documents at 5,000. Of these, approximately 3,500 are available for recall and indexing. These documents are distributed as follows:

AFRPL Library	3,000 documents
Chemical Laboratory	250
AFPTC Technical Library	250

The remaining 1,500 documents are in individual collections and not available for recall.

Experience with duplicate copies indicates that of the 3,500 unindexed documents 2,350 remain to be indexed. If rate of acquisition remains constant (90 to 95 documents per week), and duplicate copies continue to be discarded, documents to be indexed will increase at a rate of 65 documents per week or 845 per quarter.

Should indexing remain suspended until September 1967, there will be a backlog of 3,195 documents at start of the new program. Approximately 3,380 will be added for indexing during the year for a total of 6,575 documents. An active program to select and acquire additional reports of special importance to AFRPL would increase this figure by 2,800 documents for a possible total of 9,375 documents to be indexed.

Effects of a Selective Dissemination of Information(SDI) program and the possible need to retain duplicate copies of current documents have not been considered in these calculations.

3. BOOK CATALOG

The 8,280 document computer printout required a total of 4,191 pages. Of these, the Title Master List was 6 pages long and the Keyword Frequency List ran to 64 pages. The remaining 4,121 pages constitute the AFRPL Library's document book catalog which stacks 15-3/8 inches high. While admittedly an unwieldy mass of paper, it divides into convenient, easily handled volumes.

Through vocabulary manipulation during the indexing phase, two additional indexes, undetectable by the computer, were created. This permitted their production without additional computer programming, but left them embedded in the Keyword Index. They consisted of a Report Number Index and a Document Location Index. These indexes were removed from the Keyword Index and collected into separate volumes of the book catalog.

The various indexes of the book catalog therefore consist of the following:

- Citation Index
- Corporate Author Index
- Contract Number Index
- Report Number Index
- Document Location Index
- Keyword Index.

A trial use of the book catalog indicated that volumes of 580 to 600 pages ($2\frac{1}{4}$ to $2\frac{1}{2}$ inches thick) were the largest easily handled divisions. Consequently the book catalog was divided into eight volumes. This provided the additional advantage of enabling a number of people to use the catalog simultaneously.

a. Citation Index

The Citation Index or accession list, which ran to 903 pages, was divided roughly in half and bound into two volumes:

Vol. I - Retrieval Numbers 1 to 4005 (pages 1 - 436)

Vol. II - Retrieval Numbers 4006 to 8280 (pages 437 - 903).

b. Corporate Author Index

The Corporate Author Index, which ran to only 438 pages, was bound into a single volume.

c. Contract, Report Number, and Document Location Indexes

These three indexes are somewhat related, and were combined into a single volume of 437 pages. Each index is a section and is marked by a tab label separator.

(1) Contract Number Index

The Contract Number Index is the first section because of its great importance. The section consists of 279 pages.

(2) Report Number Index

This section of 60 pages was removed from two different alpha-numeric positions in the Keyword Index. The Air Force Flight Test Center (AFFTC) and Air Force Rocket Propulsion Laboratory (AFRPL) reports stand out and appear directly under their straight alpha-numeric designation (pages 36 to 55 of the printout).

All other report numbers were preceded by the code REP and appear on pages 1812 to 1851 of the Keyword Index. Within the REP designation, they are in alpha-numeric sequence.

(3) Document Location Index

Since the AFRPL Library vault was not completed until March 31, 1967, many documents were returned to the various safes after indexing. By issuing the Document Location Index as part of each printout, it was possible to locate these documents until they could be shelved in the library vault.

When the vault became available, the Librarian was able to schedule recall of documents in shelving order. Use of this index will phase out after all documents have been recalled and accommodated in the vault.

d. Keyword Index

The equivalent of a library's subject catalog, the Keyword Index, the largest (2503 pages) and the most used of the various indexes, provides the user with a list of all documents on his subject interest in a given collection. With all other indexes, the user must start with a specific

piece of information such as an author, contract number, or report number. The Keyword Index requires no such prior knowledge.

Division of indexes into four volumes proved most effective from the point of view of size, user convenience, and ability to accommodate peak loads. The volumes of the Keyword Index were divided as follows:

- Vol. I - A to D (pages 1 to 583)
- Vol. II - E to L (pages 584 to 1189)
- Vol. III - M to Q (pages 1190 to 1751)
- Vol. IV - R to Z (pages 1752 to 2503).

4. ACCOMPLISHMENTS

During the course of work, the keyword indexes were improved by controlled vocabulary, further defining indexing rules, and creating additional indexes. The Corporate Author List was expanded, rules were formalized, and cross references were added.

These improvements kept printouts within manageable size, decreased the number of suppressed words, decreased computer time, and made printouts easier to use.

a. Keyword Index

The Keyword Index, being the largest and most frequently used of the four basic indexes, provided maximum results from each improvement. Greatest effort was therefore concentrated in this area.

(1) Exclusion Word File

A KWOC system is based upon automatic indexing by keywords contained in a document's title. Since some words in a title are not useful keywords, the computer requires a stored list of words that it will suppress as indexing terms.

The computer must match every word in every document title against every word in the Exclusion Word File. Therefore, a decrease in the number of terms on a suppressed word list causes a decrease in computer processing time.

Though the easiest way to suppress a meaningless term is to add it to the suppressed word list, other methods were developed. Most of these methods tended toward a controlled vocabulary which held down the size of the suppressed word list.

(a) One- and Two Character Terms

As a start in increasing terms on the suppressed word list, all one- and two-character terms were automatically excluded as keywords. In addition to the usual terms in this category, many Roman numerals were automatically excluded.

The computer program itself does not recognize Arabic numerals as keywords unless they are preceded by letters of the alphabet.

These factors paved the way for a further decrease in the exclusion word file.

(b) Hyphenations

A number of terms were removed from the suppressed word list as indexing terms by the mere expedient of removing hyphens. PART-1, PART-2, etc. are used fairly consistently in document titles. Originally it had been necessary to suppress each of these through PART-15. These 15 suppressed terms were reduced to one by suppressing PART and removing the hyphen in the title.

Similarly, progress report numbers appear in titles as PROGRESS REPORT 1 and PR-1. These ran as high as PR-43. By changing these terms to PR 1, PR 2, etc. in the titles, they automatically dropped out as keywords without requiring any suppressed terms.

SEMI-ANNUAL, SEMI-MONTHLY, SEMI-QUARTERLY, SEMIANNUAL, etc. are also common forms used in titles. Each variation had to be suppressed as well as the terms ANNUAL, MONTHLY, etc. This was cleaned up by suppressing the prefix SEMI. Then, in the indexing process a space was always left between the prefix SEMI and whatever followed.

(c) Ordinal Numerals

Many reports and proceedings in the AFRPL document collection contain ordinal numerals (FIRST, SECOND, etc.) in the title. These terms were removed from the suppressed word list by changing them to 1ST, 2ND, etc. in the document titles.

(2) Keywords

Every term in a document's title, not suppressed by the exclusion word file, indexes as a keyword. A keyword is a combination of letters and numbers between two blank spaces, provided the keyword does not begin with an Arabic number. Arabic numbers, not preceded by at least a single letter, are read by the computer as blank spaces and do not index.

The more keywords in a title, the greater the number of indexing points and correspondingly the longer the Keyword Index. Further, the larger the number of keywords, the less information conveyed by each and the greater the number of entries gathered under each term.

To hold down the length of the Keyword Index and to make each keyword more meaningful (specific), as many terms as possible were combined into single keywords by hyphenating. Much of the combining of terms was accomplished during initial indexing. Editing of preliminary printouts provided further opportunity for developing the best possible index under a KWOC system.

(3) Thesaurus

As indexing progressed, it became apparent that a controlled vocabulary was desirable. The combination of terms formed into keywords appeared on the Keyword Frequency List received with each set of printouts. Each Keyword Frequency List then served as a thesaurus for indexing the next batch of documents. This provided for consistency in combining terms and resulted in indexing by a partially controlled vocabulary.

The final cumulated printout for the 8,280 indexed documents produced a Keyword Frequency List containing every keyword occurring in these documents. A sample of the list is shown in Figure 7. This final list has been compiled into a thesaurus through editing and providing cross references. The completed thesaurus appears as SECTION III of the Appendix.

b. Other Indexes

As work on the Rapid Indexing System got under way, the AFRPL STINFO Office recognized additional possibilities of the system and became aware of the duplicate document problem and document storage requirements.

Use of the early printouts indicated that a report number printout, particularly for the AFRPL reports, would be desirable. To avoid indexing duplicate copies of documents, a report number/retrieval number cross index was necessary. This was developed manually on 3 x 5 cards. Storage of indexed documents in various offices raised the need for a document location index.

The above indexes were provided without recourse to computer program changes.

c. Corporate Author Authority List

Prior to the start of on-site indexing, a preliminary Corporate Author Authority List was produced. It was based upon the Chemical Propulsion Information Agency's "Chemical Propulsion Abstract" source index. Rules for continuing the list were also formulated at that time.

As indexing progressed, it was noticed that every 100 documents generated 5 new corporate authors. Of these, some resulted from name changes, others came about through company mergers, and some were caused by the forming of new divisions or regrouping of existing divisions.

Changes in company names split the grouping of documents by corporate author. This is particularly a problem when a name change occurs in the middle of a series of reports. To overcome this problem, the Corporate Author Authority List, appearing as SECTION II of the Appendix, is completely cross referenced.

SECTION V

SYSTEM EVALUATION

The Rapid Indexing System was intended as a quick and simple method to gain bibliographic control over approximately 8,000 documents. The system has accomplished its purpose.

In addition, this title-based indexing system has provided the basis for a more sophisticated system, indicated desirable features to be considered in a future system, and provided several usable by-products.

The overall system is critically evaluated in this section from the point of view of what it was designed to accomplish.

1. INDEXING

There were 47 weeks available for indexing after the first five weeks of the contract were given over to preparation of test runs for Air Force approval and setting up on-site indexing facilities and procedures.

Based upon 47 weeks of active indexing and a goal of 8,000 documents, a quota of 37 documents per day was established. Considering holidays, this was translated into a mean of 170 documents per week. This allowed for a contingency to cover unforeseen delays and to handle overhead activities related to the overall indexing process. The indexing quota was for tracking purposes only and bore no relationship to minutes per document.

On a weekly basis the total varied widely from a low of 66 to a high of 303. However, monthly quantity of documents indexed ran consistently ahead of schedule. This insured meeting the 8,000 document goal.

a. Indexing Rate

Actual indexing consisted in (1) checking for duplicate documents, (2) making a report number/retrieval number index card, (3) determining complete bibliographic information, (4) coding this information on the document's title page, (5) assigning the retrieval number, and (6) typing the keypunch input form.

It is estimated that these activities averaged 20.7 minutes per document. Classified documents represented 60% of the collection and required 23.75 minutes per document. Unclassified documents required 15.8 minutes of indexing time per document. The originally estimated average indexing time for KWOC plus descriptive cataloging was set at 30 minutes per document (Reference 1, Page 36 and 42). Improved indexing procedures, experience gained as work progressed, and growing familiarity with the keypunch input form contributed to cutting the indexing time by 31%.

b. Error Rate

Typing errors averaged 3.5% or one error out of every 28 documents indexed.

Keypunch errors varied from nearly perfect to a few high error groupings, but averaged out at 1.5% or one error for every 67 documents keypunched.

2. PRINTOUTS

Actual indexing of individual documents required 84.5% of the on-site indexing staff's time. The remaining 15.5% of available manhours was devoted largely to print-out improvement.

a. Keyword Index

Each document title, if left in its title page form, would have produced an average of 9 permutations. Therefore the 8,280 titles would have yielded 74,520 entries. At 18 entries per printout page this would have produced 4,140 pages.

Through improved indexing methods, grouping of terms by hyphenation, and a carefully selected suppressed word list, the Keyword Index was cut 39.5%. The index ran a total of 2,503 pages, averaging 5.5 permutations per title. This reduction in permutations per title was effected in spite of the addition of title enhancement terms including report numbers and location codes.

This resulted in:

- A saving in computer time
- A better keyword index with fewer and more specific descriptors
- Two additional indexes (report number and document location indexes).

b. Additional Indexes

(1) A Report Number/Retrieval Number card index was produced as a necessary tool in manually detecting duplicate copies of a document prior to indexing. This card file proved to be a useful index and has therefore been transferred to the AFRPL Library's card catalog.

(2) A report Number Index was developed through keyword manipulation rather than by resorting to computer program alteration. It picks up both issuing agency and originating agency report numbers, giving full title, date, and retrieval number for each.

(3) A Document Location Index was created without computer program change. This index became necessary when many documents were returned to their original location after indexing. Its use will phase out when all documents have been shelved in the central location.

3. SYSTEM SHORTCOMINGS

In a title-based system, most shortcomings stem from the title. The prime problem lies in the fact that title word order often prevents joining terms into meaningful keywords by hyphenation. A second difficulty arises from reversal of words and their separation by prepositions. Use of different terms for the same object or process causes the final problem.

This title-based system was adopted as a quick means of indexing the AFRPL collection of over 8,000 documents. Its shortcomings were recognized but it was considered to be the most practical means of meeting the requirement. The program developed had, however, the potential of full convertibility to indexing by use of controlled vocabulary which was envisioned as the best means of handling current documents.

Many of these difficulties could be handled through title enhancement. However, to hold down computer time and keep the printout within manageable size, title and title enhancement terms were limited to two lines of 72 characters each.

The 144 character limitation was adopted after an actual count of representative titles. After indexing over 12,000 documents at Lockheed and over 8,000 at AFRPL, the space allotted for titles has proven adequate. With few exceptions, there was also room for title enhancement terms. However, the number of enhancement terms that can be accommodated is limited. Unfortunately the longer titles frequently contained all three types of indexing problems and left inadequate space for their correction.

a. Title Alteration

In the Rapid Indexing System, the title in the Citation Index appears exactly as in the various parts of the KWOC Index. In a bibliographic sense, the citation should be a true reflection of the document it represents. Yet several types of manipulations were performed on the title to overcome the above mentioned problems.

Every attempt was made to keep each title essentially intact and still produce a useful keyword index.

Types of changes made to titles included hyphenation, substitution of cardinal for ordinal numerals, and reversal of models and their numbers.

Some desirable changes were too radical and therefore considered impractical.

(1) Hyphenations

Hyphens were inserted between words in a title to form more specific keywords. For example the word SOLID was consistently joined to PROPELLANT.

Hyphens were removed from words in a title when their presence formed misleading terms. The incorrect keyword PERCHLORATE-POTASSIUM would result from the chemical system BARIUM PERCHLORATE-POTASSIUM NITRATE. To correct this for the index, that portion of the title was altered to read BARIUM-PERCHLORATE/POTASSIUM-NITRATE.

(2) Numbers

All ordinal numerals were changed to cardinal numerals, FIRST, SECOND, etc. became 1ST, 2ND, etc. This change in the title automatically suppressed numbers as keywords.

(3) Reversal of Terms

Most reversal of terms were considered too radical a title alteration. Engine and motor designations, however, were reversed in the title for indexing purposes. Frequently such designations appeared as 2060-SL MOTOR. To keep the numerical portion from dropping out of the keyword it was necessary to change this portion of the title to read MOTOR-2060-SL.

(4) Impractical Title Change

One particular title change, having a high frequency of occurrence, was deemed too great an alteration. It was therefore left intact and many important keywords were thus lost. This is the type in which the terms are both in reversed order for keywords and separated by a preposition. Examples of such terms are RECOVERY OF URANIUM and RATE OF BURNING. Natural keywords for these topics would be URANIUM-RECOVERY and BURNING-RATE.

b. Uncontrolled Vocabulary

Two problems are caused by an uncontrolled vocabulary in addition to those requiring changes in document titles. Documents on the same subject are often divided under two different keywords because of synonyms. Computer time is increased by the need to match every word in the title against the Exclusion Word File.

(1) Synonyms

HIGH-ENERGY-FUEL and FEF, BURNING-RATE and COMBUSTION-RATE, SOLID-FUEL and SOLID-PROPELLANT, and many other synonyms, or near synonyms, have

been used interchangeably in various titles. It is possible to add the synonym as a title enhancement term. However, the 144 character title limitation may prevent this. Also it would cause the documents to appear under both synonyms, thus greatly increasing the size of the Keyword Index.

Appearance of the documents under both synonyms could be prevented by selecting one as the keyword and suppressing the other. This method increases the size of the suppressed word list and therefore increases computer time. It also increases indexing time because each word must be looked up in a Thesaurus. The user may not find the keyword because no provision has been made for cross references.

(2) Variant Spellings

The same difficulties caused by synonyms are encountered in the use of variant spellings. For example DEUTEROPENTABORANE and DEUTERIOPENTABORANE.

(3) Exclusion Word File

Use of an uncontrolled vocabulary derived from the words in a document's title necessitated suppression of terms having no information content. This practice (1) increased computer time in the word for word matching process, (2) permitted a fair number of "noise words" to appear in the Keyword Index since the suppressed word list had to be kept as short as possible and could not accommodate terms occurring only a few times, and (3) made word manipulation necessary, thereby increasing indexing time and further altering document titles.

c. Keypunching

Input for the Rapid Indexing System goes from title page coding to typing of keypunch input sheets to keypunching to computer processing. Of the four steps, it is possible to eliminate keypunching in view of recent developments in optical scanning.

While keypunch error is low (1.5%), it does produce errors. Keypunching is also expensive, can cause delays, and is not within the direct control of the indexer.

These system shortcomings can be overcome through the methods recommended in SECTION VI. In spite of the shortcomings that have been noted, the system was an effective solution to the task for which it was designed. However, a more sophisticated system is needed for the second phase of AFRL's information retrieval program.

SECTION VI

SYSTEM RECOMMENDATIONS

A more advanced and complete system is recommended for the second phase of AFRPL's information program. Such a system would consist of (1) indexing by controlled vocabulary - an innovation that extends the system's capabilities in several ways, (2) an active selection and acquisition program, (3) literature searching, and (4) a program for encouraging use of the information services and facilities.

The Rapid Indexing System, devised and implemented during the initial phase, leads logically into the advanced system. The recommended system overcomes the earlier system's shortcomings which have been analyzed in SECTION V. This new system does not displace the initial system but rather supplements it and uses the earlier system's by-products.

These recommendations are based upon findings of the AFRPL information facility survey (Reference 1), experience gained during the initial indexing program, Lockheed's increased information retrieval developments, and some recent developments, and some recent developments in government information storage and retrieval.

1. CONTROLLED VOCABULARY

Use of a controlled vocabulary will (1) increase keyword specificity without title alteration, (2) decrease computer time, (3) provide a descriptor-type abstract as part of each citation, and (4) provide for a form of Selective Dissemination of Information (SDI).

The initial computer program required a maximum of four keypunch cards per document. Of these, "T1" and "T2" provided title information, "A" contained author and bibliographic information, and "R" carried contract and report number information. Keywords were automatically produced from the title card information. A suppressed word list was required to suppress unwanted words in the title from indexing as keywords.

In the controlled vocabulary system, a maximum of six keypunch cards are required. These consist of the four cards defined above and cards "D1" and "D2" for descriptors. Cards "T1" and "T2" continue to contain title information but no longer provide keywords for indexing. Cards "D1" and "D2" provide a total of 144 characters for descriptors selected by the indexer from the thesaurus. These descriptors are the keywords by which the document is indexed. Since only desired terms are entered here, there are no terms to suppress. Need for a suppressed word list and title changes has been eliminated.

a. Keyword Specificity

The initial system tended toward a controlled vocabulary in order to produce an index with keywords of specific meaning and narrow scope. This was of limited success since the necessary control over vocabulary is not the function of a title-based system nor within its capability. Therefore documents were divided under several keywords of similar meaning and too many entries appeared under keywords of broad scope.

Efforts to exert control over the initial system's vocabulary centered on manipulation of words in the title and use of title enhancement terms. Results were reflected in the Keyword Frequency List obtained with each computer run. Considerable but not complete keyword consistency was achieved through use of the previous printout's Keyword Frequency List as a guide in subsequent indexing.

The final cumulated list provided the basis for a thesaurus.

(1) Thesaurus

A thesaurus was produced from the final Keyword Frequency List by (1) removing "noise words", (2) adding cross references from general to specific terms and among related terms, and (3) standardizing vocabulary.

The Keyword Frequency List is an aid to the user of the Keyword Index in that it enables him to determine the keywords under which he will find documents on a desired subject. The thesaurus provides the same retrieval function for users of the controlled vocabulary printouts. However, it will be necessary to develop the thesaurus into a detailed dictionary to meet AFRPL's requirements for a very fine subject breakdown in the propulsion area.

(2) Dictionary

The thesaurus merely provides basic vocabulary for the start of controlled vocabulary indexing. A dictionary of AFRPL indexing terms will be required for continuation of indexing and as a retrieval tool at close of the second year's program. During the duration of the program the dictionary will require constant revision, additions, and defining of terms and scope of terms.

Available thesauruses are too general for AFRPL use. Definitions of terms and their scope also are not sufficiently specific. It is highly unlikely that future thesauruses can provide the fine degree of subject breakdown in the propulsion area required by AFRPL personnel. It is therefore necessary to develop the required dictionary during the course of any future indexing effort and to issue a completed dictionary at the end of the next phase of the program.

b. Computer time

The controlled vocabulary system decreases computer time in two major areas: (1) Exclusion Word File matching, and (2) shorter Keyword Index.

(1) Exclusion Word File

Under the title-based system, every word in each of the 8,280 document titles had to be matched against the 860 words in the Exclusion Word File. This computer process will be eliminated in indexing by controlled vocabulary.

(2) Keyword Index

In the initial indexing system, useless terms appeared in the Keyword Index because it was impossible to suppress every word which gathered only one or two titles. Similarly some terms that were too broad in scope could not be suppressed without greatly altering the titles concerned. A few of these produced as many as 400 entries running to over 20 pages of printout.

In the controlled vocabulary system the indexer will select only the useful terms. Terms that needlessly lengthen the Keyword Index will be discarded, thereby decreasing computer time.

c. Abstracts

In the AFRPL information facility survey, 4.2% of personnel desired abstracts to overcome the problem of misleading titles (Reference 1, Pages 9 and 11). Abstracting is both costly and time consuming to produce. It is therefore not recommended even though desirable.

The recommended indexing system will include two additional lines on which descriptors selected by the indexer are entered. These descriptors will print out on the Citation Index below the bibliographic description of each entry. They constitute a clear description of the subject content of the document concerned. As such they provide much of the information contained in abstracts without the cost of abstracting.

d. Selective Dissemination of Information (SDI)

A controlled vocabulary indexing system makes Selective Dissemination of Information possible. The same thesaurus or dictionary employed in indexing documents is used for establishing personal and unit profiles for SDI.

An active selection and acquisitions program coupled with SDI is a very effective means of keeping personnel abreast of the latest documents in his field. The SDI notice, sent out the day a new document is indexed, represents a document the individual can obtain immediately. This is similar in nature to NASA's SCAN program now under development and in which Lockheed is considering participation.

2. SELECTION, ACQUISITION, AND STORAGE

A collection should contain material completely processed and ready for loan before it is required. This calls for an active selection and acquisitions program.

a. Selection and Acquisition

To provide a document collection of the latest reports available in the propulsion field and avoid delays in furnishing requested documents to AFRPL personnel, an active selection and acquisition program is recommended as part of the advanced information system. It has been estimated that such a program would increase the AFRPL document collection by approximately 2800 items annually (Reference 1, Page 41).

b. Storage

An increase in the document collection will create a storage problem because shelving space in the AFRPL library and adjacent vault is limited. The storage problem can be kept under control through weeding the hard-copy collection, use of microfiche, and increased circulation of documents.

(1) Weeding

The KWOC printouts afford an easy method for selecting documents to be discarded. Each entry yields the document title, date, and retrieval number. Older documents and documents covering topics no longer of interest to AFRPL personnel can be discovered without difficulty.

Removal of discarded documents from future printouts is accomplished quite simply. A list of discarded retrieval numbers is submitted to the indexer. The indexer then has each retrieval number, followed by the code "X" entered on the keypunch input forms. This information when keypunched and put through computer processing removes all entries for the documents concerned from the subsequent printout.

(2) Microfiche

Microfiche is starting to replace hard copy as the lowest priced and quickest form of printing. Several books have already been published simultaneously in hardbound and microfiche form. Microfiche is low in cost, durable, easy to file, requires little space, and is easy to use.

Consideration of an AFRPL microfiche collection is recommended as a possible answer to the storage problem and for future advanced systems.

SDD (Selective Dissemination of Documents) is beginning to replace SDI. In SDD, a microfiche copy of the document is distributed with the

notice in place of an abstract. Eventually, each individual has that portion of the document collection of interest to him in his own desk drawer. Low cost (under \$100) portable readers enable him to read the documents. The automated retrieval system is used to indicate which microfiche in his file will be required for a specific problem.

3. LITERATURE SEARCH

A complete literature search service covering AFRPL's document collection, the full scope of report literature, and English and foreign language publications is recommended as part of the advanced information system. Literature searches are required to enable AFRPL personnel to (1) solve specific technical problems, (2) prevent duplication of effort, (3) keep abreast of their field, (4) utilize basic research results, and (5) define work of contractors.

Each search should be clearly defined in dialogue between the scientist and trained literature searcher. Facilities used in a search should include (1) AFRPL's collection, (2) Defense Documentation Center's services, (3) specialized government information centers, including NASA, (4) the contractor's information services, and (5) the collections of college and university libraries.

The search topic and requester's needs should determine the form of the output. For a very specific search yielding only a few references, the actual items could be delivered to the requester. In other cases, a list of citations may suffice, or a fully annotated, subject indexed bibliography may be required.

Not all search results are of lasting value or of general interest. Worthwhile results should be entered into the indexing system and become part of the document collection.

4. ENCOURAGING USE OF SYSTEM

The recommended information system is directly related to the needs of AFRPL personnel and is based upon sound information retrieval principles. However, it is of no value unless used by the personnel concerned. In fact, the greater the use of the system the lower the cost per use. A continual program for encouraging use of the information services and facilities is an integral part of the recommended system.

Such a program includes (1) library bulletin, (2) handbook of information services, and (3) on-site information retrieval courses.

a. Library Bulletin

This consists of an accession list produced as part of the computer program, a form for requesting the listed items, and any special announcements concerning the library and its services.

b. Handbook

A library handbook should be written, reproduced, and distributed to all library users. It need not be elaborate but it should clearly describe all available services, procedure for obtaining these services, and location of the various collections.

c. Information Retrieval Courses

During the original survey of AFRPL personnel, it was discovered that few were aware of the extent of information services available to them and how to use these services. In a library questionnaire distributed by the AFRPL Library Advisory Committee in August of 1965, only 44 out of 101 respondents were acquainted with the Defense Documentation Center's Technical Abstract Bulletin. This situation is not limited to AFRPL.

Information scientists are receiving formal education, indexers are participating in on-the-job training programs, but the ultimate information user is largely neglected. As a result, the products of advances in the information sciences are little used by the very people for whom they were created. This is a nation-wide problem.

A series of information retrieval courses at the Lockheed-California Company was received with enthusiasm and led directly to increased and more intelligent use of the Company's information services and government sponsored services (Reference 2). A short summary session on information techniques, presented to AFRPL personnel in August of 1965, met with interest and success.

An on-site information retrieval course for interested AFRPL personnel is recommended as part of a complete advanced information system. Such a course would be patterned after the curriculum outlined in Reference 2 but slanted directly toward AFRPL needs.

SECTION VII

FACILITY AND EQUIPMENT RECOMMENDATIONS

To maintain effectiveness of the initial indexing effort and provide for the overall information program recommended in SECTION VI, adequate facilities and equipment are essential. Most, if not all, of the required equipment is available at AFRPL.

Facilities and equipment required by the indexing and literature search staff are determined by size of staff and types of activities. Functions and procedures are sufficiently established to recommend accurate area and equipment requirements.

The recommended indexing system is independent of the computer equipment on which it is run. It will function with on-site computer equipment as well as with recently developed hardware. Therefore, the more advanced equipment is presented for consideration.

1. INDEXING SITE

a. Location

The indexing site should be so located as to afford ease of accessibility to the library. This is important for effective utilization of the reference materials, which include the report number/accession number card file used by the indexer in checking for duplicate reports. Accessibility to the library is also important for the literature search program and for coordination activities with the Air Force program monitor and the AFRPL project manager. Vault space is essential in that 60% of the reports for indexing are classified. The library can meet this need.

b. Size

To accommodate a staff of three, needed to carry out the recommendations made in the previous section together with necessary equipment, would require approximately 400 square feet of unobstructed floor space. This would permit arrangement of equipment for efficient flow of work and provide for the storage of unclassified documents awaiting processing and disposition.

2. COMPUTER EQUIPMENT

a. On-site Equipment

A future step in developing a retrieval system, although not recommended for the upcoming phase, would be to provide the user with a remote terminal

for direct inquiry into the data file. The search strategy would be formulated by the user and input by means of the terminal. The response would be immediate and would be output at the terminal.

A system of this type would require direct-access computer equipment with provision for a mass storage. All of the major computer manufacturers offer this type of equipment. Some of the common types of remote terminals are teletype, typewriter keyboard-printer, and visual display. The mass storage medias offered are drum, disc and magnetic strip.

An important consideration in selecting the computer manufacturer and equipment is the quality of software provided by the manufacturer. Terminal response time will be greatly influenced by the terminal type and the mass storage device selected. The system response time will be inversely proportional to the cost and the system will be a compromise between cost and utility.

Microfiche reader/printers (two reader-printers and two readers) would be required if the active acquisition/SDD program were initiated.

No additional on-site equipment requirements are foreseen for the coming phase of the program.

b. Contractual Equipment

The transcription of source data is a major consideration in any data processing system. There are several techniques available for recording data into machine sensible form. One of the more promising is optical scanning. In this case the data are typed and then read and recorded on magnetic tape by an optical page reader. Several service bureaus in the Los Angeles area sell optical scanning time on the Control Data Corp., 915 optical page reader.

Optical scanning has the advantage of using a typist to record for source recording rather than a keypunch operator as in the case with the standard keypunch or recording on off-line magnetic tape. Work is also being done in direct data input to a computer from a remote terminal, but this is still a costly method.

3. EQUIPMENT INDEXING

a. Office Furniture

Office furnishing requirements are basic and can be met with standard Air Force issue and are as follows:

- 2 ea. Metal Executive Desks
- 1 ea. Metal Typist Desk
- 2 ea. Executive-type Desk Chair
- 1 ea. Typist Chair
- 4 ea. Tables (30-in. x 60-in.)
- 4 ea. Side Chairs
- 2 ea. Two Sectional Book Cases
- 1 ea. 5-Drawer Filing Cabinet
- 1 ea. Security Cabinet
- 4 ea. Waste Receptacles
- 3 ea. Letter Files (3-tier type).

The equipment listed will meet the needs of a three-man effort. The file cabinet requirement will vary depending on actual location of the indexing unit. If the microfiche program is adopted, a microfiche filing cabinet will be needed in the library.

b. Reference Books

Reference books are essential for the indexing operation. If recommendation for location of the indexing unit near the library is followed, book requirements will be met. In the event this is not feasible, a small reference collection to meet the needs of the indexer would have to be established at the indexing site.

SECTION VIII

SUMMARY AND CONCLUSIONS

A basic KWOC system was selected as the quickest method to gain effective control over scattered, unindexed documents numbering over 2,000. Shortcomings inherent in a title-based system were minimized through computer programming, indexing techniques, and editing consistency into the preliminary printouts.

Accomplishments during the contract period included:

- Maintaining a low error rate
- Decreasing computer time
- Improving indexing methods
- Providing better indexes
- Creating additional indexes.

Overall result was a system that accomplished the task for which it was designed, produced useful by-products, and provided the basis for a more sophisticated system.

Final results were (1) a book catalog to a centralized document collection, (2) a detailed handbook for continuing the basic system or converting to a controlled vocabulary system, (3) a computer program capable of conversion to an advanced system, and (4) recommendations for a sound, overall information program.

1. BOOK CATALOG

The book catalog enables the user to approach the document collection by subject via the Keyword Index, corporate author, contract number, and report number. In each of these approaches, the full document title, enhancement terms, date of report, and retrieval number are presented. The user then has the option of requesting the selected documents which are shelved in retrieval number order, or obtaining the full bibliographic citation from the Citation Index.

2. HANDBOOK

The handbook, "Procedures and Guide for the AFRPL Rapid Indexing System" appears as an appendix to this report. It describes the complete system, furnishes detailed indexing and editing procedures, and includes the corporate

author authority list. A thesaurus is added as a means of converting to a controlled vocabulary system. The suppressed word list has also been included for use in case the initial system is continued.

3. COMPUTER PROGRAM

The computer program, as it now stands, permits the initial system to continue in its present form. Further, the descriptor option to the program could be implemented. This would allow use of a controlled vocabulary in lieu of title permutation. It would also provide a printout of the descriptors as part of each bibliographic entry in the Citation Index.

4. RECOMMENDATIONS

A complete program, capable of meeting the information needs of AFRPL scientists and engineers, has been recommended. The program consists of (1) active selection and acquisition of documents, (2) controlled vocabulary documentation, (3) literature search service, and (4) the means for assuring knowledgeable use of the system.

Also presented for consideration were use of microfiche, an SDI program, a system for weeding the collection, and use of recently developed EDP equipment.

These recommendations constitute the logical growth direction of AFRPL's information program and were the product of a year's effort on the Rapid Indexing System.

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APPENDIX

PROCEDURES AND GUIDE FOR THE AFRPL RAPID INDEXING SYSTEM

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Section I

THE INDEXING SYSTEM

1. DESCRIPTION

The Indexer is in control of the Rapid Indexing System's results. It is therefore essential that he have a working knowledge of the system's capabilities. This knowledge provides the Indexer with a basis for understanding the principles behind each rule and procedure. He is thus able to achieve desired results.

Each printout (report) is 110 characters or eleven inches long. This permits photoduplication if desired. The following printouts result from the "AFRPL INDEXING DATA" keypunch input sheets.

a. KWOC REPORT

The KWOC (Key Word Out of Context) Report consists of a keyword, which cannot exceed eighteen characters, followed by the document's title, date, and retrieval (accession) number. Each key word appears only once on each page.

Since the KWOC index is machine produced by permutation of the title and suppression of certain non-essential terms, it is subject to the computer's inflexible obedience to instructions. The computer:

- (1.) Will not combine terms, the Indexer does this by inserting a hyphen between appropriate terms.
- (2.) Will end a term on the eighteenth character whether or not it is the end of a word. The Indexer must make certain no term exceeds eighteen characters, or that it is intelligible without the last few letters.
- (3.) Will not recognize the parts of a combination if spaces occur between the elements, it will index anything after a space separately. The computer will also drop any numbers not preceded by letters. For example, in

REP LR 19969-1

REP will appear under the R's, LR under the L's, and 19969-1 will be dropped.

- (4.) Will accept exactly 72 characters in T1 of the keypunch input sheet. If only 71 characters appear, the 72nd character will be taken for a space between the last of T1 and the first letter of T2. In the word PROPELLANTS, for

example,

T1

P	R	O	P	E	L	L	
65	66	67	68	69	70	71	72

T2

A	N	T	S
1	2	3	4

will print out as PROPELL ANTS and index PROPELL under P and ANTS under A.

- (5.) Will take a letter in the 72nd column of T1 to be a part of the word in the first column of T2. In MECHANIC HYRIDE, for example,

T1

M	E	C	H	A	N	I	C
65	66	67	68	69	70	71	72

T2

H	Y	D	R	I	D	E
1	2	3	4	5	6	7

will print out as MECHANICHYDRIDE and will be indexed under M.

Rules, procedures, and forms have been developed to meet the computer's strict adherence to instructions.

b. AUTHOR REPORT

The Author Report, or corporate author index, presents the corporate author in alphabetical sequence, document title, date, and retrieval number. Like the KWOC index, the corporate author is limited to eighteen characters. However, spaces between words do not effect the printout, but alphabetical order is effected by spaces.

A corporate author authority list has been developed to establish a standard, preferred form for each corporate author and reduce it to eighteen characters. The preferred form is based upon the Chemical Propulsion Information Agency corporate author index to the Abstracts. Since the Defense Documentation Center's Corporate Author List (1 January 1966) is similar to that of the CPIA abstracts, it is used as the authority for authors not listed in CPIA abstracts.

c. CONTRACT REPORT

The Contract Report or contract number index lists contract numbers in alpha-numeric sequence. Under each contract number, titles of reports produced under the contract are listed in retrieval number order together with date of report and retrieval number.

While a space between parts of a contract number, or a sequence beginning with numbers, does not drop any portion of the sequence, it does change the alpha-numeric position of the number. AFO4(611)-7432 will

index after AF 04(611)-7441 and AF 49(638)-25.

d. CITATION REPORT

The Citation Report (also known as accession list, shelf list, and bibliographic citation) lists full bibliographic information in retrieval (accession) number order.

As in the Author Report, the corporate author entry is limited to eighteen characters.

e. KEYWORD REPORT

This printout lists alphabetically the keywords appearing in the KWOC Report and notes the number of times each keyword has been used.

The Keyword Report does not list the suppressed words and therefore does not provide a count of the number of times each occurred. However, a procedure has been developed by which a frequency count of all words over 1 character in length can be obtained. Comparison with the Exclusion Word File yields the number of times each suppressed word occurred.

f. EXCLUSION WORD FILE

Approximately 860 "exclusion words" were stored in the computer for suppression in KWOC indexing. These are words of no value as indexing terms. In addition, all one and two character words are automatically suppressed.

Since only three to five words are added to the file each week, the printout is updated manually. Section IV lists the suppressed words.

g. ERROR REPORTS

Each report or printout is accompanied by an error report. These reports indicate machine detectable errors such as:

- (1.) Gaps in retrieval number sequence
- (2.) Use of same retrieval number more than once
- (3.) Use of retrieval number with more or less than five characters
- (4.) Truncated words: corporate authors and keywords of more than eighteen characters

Misspellings, joining of words that should be separate, treating a single word as two separate words, dropping of numbers in the KWOC Report, and incorrect alpha-numeric sequencing due to improper spacing on the transmittal sheet must be detected manually.

2. INDEXING PROCEDURES

Based upon the Rapid Indexing System's capabilities, the computer's unvarying response to established instructions, and the printouts (reports) produced by the computer program, the Indexer performs descriptive cataloging operations that yield the most accurate:

1. Title and title enhancement
2. Corporate author
3. Personal author
4. Date of document
5. Pagination
6. Number of references
7. Security classification
8. Contract number
9. Report number
10. Defense Documentation Center AD number

These elements are selected primarily from the information contained on the cover, title page, and last page of the document being indexed. It is occasionally necessary to consult the document's abstract and count the number of references at the end of each chapter. Since January 1964, information required for indexing appears on DD Form 1473, at the end of each document.

a. TITLE PAGE CODING

Indexing notations are coded on the title page of the document. This coding serves as instructions to the typist for filling out the Key punch Transmittal Sheet (FIGURE 1). Title page coding is illustrated in FIGURES 2A to 2C. Resultant Key punch Transmittal Sheet for these sample documents is shown in FIGURE 3.

(1.) TITLE AND TITLE ENHANCEMENT

In preparing the title entry, it is helpful to visualize the KWOC Index entries that will result from permutation of the keywords in the title. Therefore several factors should be considered:

- (a) A total of 144 characters are available for title notation. This is ample space for most titles with room for additional keyword enhancement.
- (b) Keywords are limited to eighteen characters.
- (c) The computer takes a space to be the end of a keyword permuting the title.
- (d) Numbers not preceded by letters are automatically dropped in the machine indexing process.

AFRPL INDEXING DATA

RETR. NO.
1 6

1 { T 1 TITLE
7 9

T 2 TITLE
7 9

2 A 2A 2B 2C 2D 2E 2F 2G
7 9 27 44 45 50 54 57

3 R 3A 3B 3C
7 9 27 45

RETR. NO.
1 6

T 1 TITLE
7 9

T 2 TITLE
7 9

A CORP. AUTHOR PERS. AUTHOR DATE PGS. REF SEC CD.
7 9 27 44 45 50 54 57

R CONTRACT NO. REPORT NO. AD NO.
7 9 27 45

RETR. NO.
1 6

T 1 TITLE
7 9

T 2 TITLE
7 9

A CORP. AUTHOR PERS. AUTHOR DATE PGS. REF SEC CD.
7 9 27 44 45 50 54 57

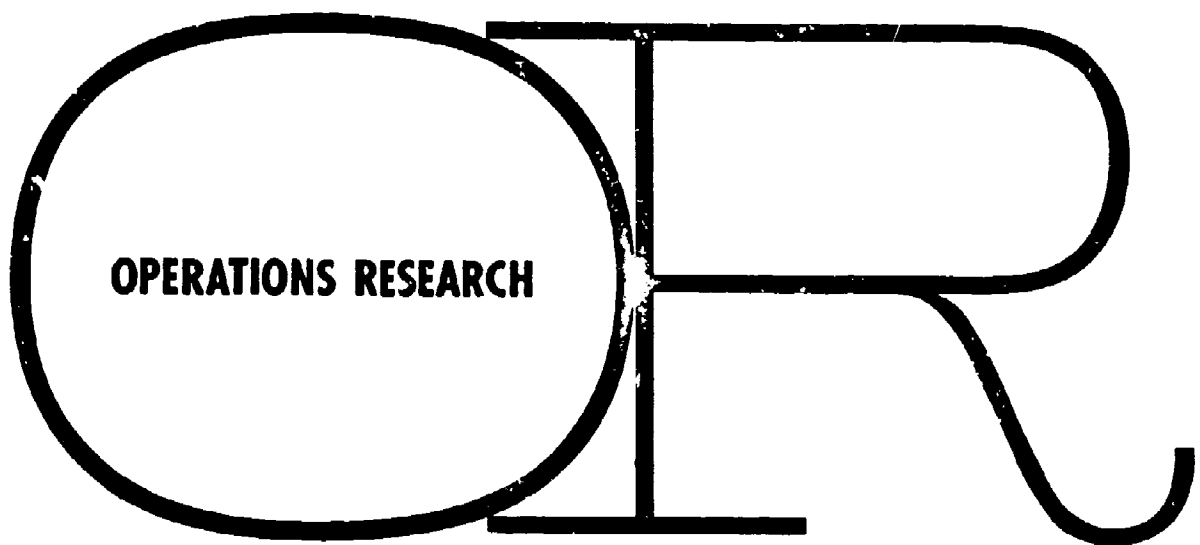
R CONTRACT NO. REPORT NO. AD NO.
7 9 27 4

FIGURE 1 KEYPUNCH TRANSMITTAL SHEET SHOWING CODE NUMBERS USED IN MARKING DOCUMENT TITLE PAGES

[AN EVALUATION OF INFORMATION RETRIEVAL-SYSTEMS]

3B [~~MEMORANDUM~~ REPORT NO. 7170]

2D [~~SEPTEMBER 30, 1959~~]



2A [LOCKHEED AIRCRAFT] CORPORATION
CALIFORNIA DIVISION

2B - MUELLER M.W

2E - 114

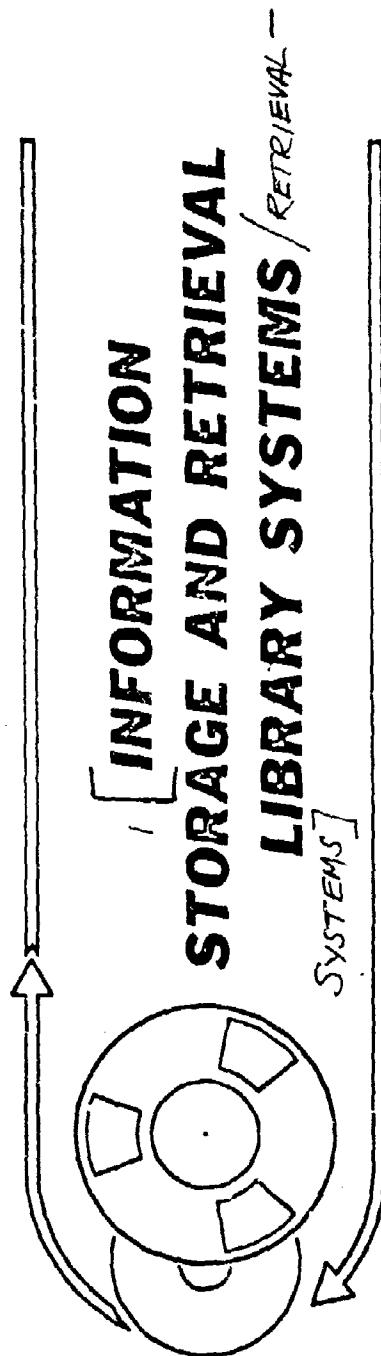
2F - 34

2G - U

FIGURE 2A DOCUMENT TITLE PAGE AS MARKED BY
INDEXER FOR TYPING OF KEYPUNCH TRANSMITTAL SHEET

38 [LMS-6-75-63 13]
20 [MAY 1963]

00002



2E-33

2G-4

RESEARCH LABORATORIES

2A [Lockheed⁷ MISSILES/ & SPACE COMPANY

A GROUP DIVISION OF LOCKHEED AIRCRAFT CORPORATION • PALO ALTO, CALIFORNIA

FIGURE 2B DOCUMENT TITLE PAGE AS MARKED BY
INDEXER FOR TYPING OF KEYPUNCH TRANSMITTAL SHEET

SCIENTIFIC AND TECHNICAL INFORMATION CENTER

**[SPACECRAFT
GUIDANCE,
CONTROL
and RELATED
TOPICS**

— A BIBLIOGRAPHY of the OPEN-LITERATURE
January 1962 - June 1963]

38 [LR 17100] August 1963 [LOCKHEED-2A
CALIFORNIA COMPANY]



FIGURE 2C DOCUMENT TITLE PAGE AS MARKED BY
INDEXER FOR TYPING OF KEYPUNCH TRANSMITTAL SHEET

AFRPL INDEXING DATA

RETR. NO.		00001					
1	6						
TITLE							
T	1	AN EVALUATION OF INFORMATION RETRIEVAL-SYSTEMS.					
7	9						
TITLE							
T	2						
7	9						
CORP. AUTHOR PERS. AUTHOR DATE PGS. REF. SEC. CD.							
A	/	LOCKHEED AIRCRAFT	MUELLE M W	SEP59	111	31	U
7	9	27	44 45	50	54	57	
CONTRACT NO.				REPORT NO.			
R	/		MEM-REP-No-7170				
7	9	27	45				

RETR. NO.		00002					
1	6						
TITLE							
T	1	INFORMATION STORAGE AND RETRIEVAL LIBRARY-SYSTEMS /RETRIEVAL-SYSTEMS					
7	9						
TITLE							
T	2						
7	9						
CORP. AUTHOR PERS. AUTHOR DATE PGS. REF. SEC. CD.							
A	/	LOCKHEED MISSILES		MAY65	33		U
7	9	27	44 45	50	54	57	
CONTRACT NO.				REPORT NO.			
R	/		LMSC-6-75-65-24				
7	9	27	45				

RETR. NO.		00003					
1	6						
TITLE							
T	1	SPACECRAFT GUIDANCE, CONTROL & RELATED TOPICS--A BIBLIOGRAPHY OF THE OFR					
7	9						
TITLE							
T	2	N-LITERATURE, JANUARY 1962 - JUNE 1963.					
7	9						
CORP. AUTHOR PERS. AUTHOR DATE PGS. REF. SEC. CD.							
A	/	LOCKHEED-CALIF	SCRANTON R R	* AUG63	63	111	U
7	9	27	44 45	50	54	57	
CONTRACT NO.				REPORT NO.			
R	/		IR-17100				
7	9	27	45				

FIGURE 3 KEYPUNCH TRANSMITTAL SHEET SHOWING INFORMATION ENTERED FROM DOCUMENT TITLE PAGE CODING (FIGS. -)

- (e) Certain characters are not available on machine print-out.
- (f) The computer cannot handle subscript and superscript notations. This is particularly important in chemical symbols and mathematical formulas.
- (g) Approximately 800 words in the Exclusion Word File will not be permuted as keywords. In addition to these words, all single character words are excluded.

(2.) TITLE ENTRY PREPARATION

The following rules have been developed to aid in title entry preparation:

- (a) Couple terms that are too general singly, such as:

HIGH-
LIQUID-
SOLID-
-ENERGY
-PROPELLANT

- (b) Separate the actual title from enhancement terms by leaving a space after the last letter of the title, entering a slant, and placing the first letter of the enhancement term directly after the slant, for example:

RESULTS OF AFRL TECHNICAL INFORMATION FACILITY SURVEY
/DOCUMENTATION INDEXES RETRIEVAL-SYSTEMS

- (c) Select enhancement terms from existing thesauruses such as that of DDC and NASA wherever possible.
- (d) Use title enhancement to add a second report number, other than AD. Precede such numbers with REP so that they all appear in the same section of the KWOC Index. Leave no spaces between parts of the number, otherwise each part will be indexed separately and numbers will be dropped. AFML TR 65-147 should be entered as REP-AFML-TR-65-147.
- (e) Use title enhancement to spell out corporate authors that are overly confusing in their eighteen character reduction. However, unless the terms in the corporate author are suppressed, they will appear in the KWOC Index.

(3.) CLASSIFIED TITLE TREATMENT

The printouts must be kept unclassified so that they can receive the widest possible distribution and use. Therefore the Key punch Transmittal Sheets and resultant printouts must contain no classified information. To avoid generating classified information:

- (a) Substitute descriptors for the title. Select applicable descriptors from the DDC Thesaurus and the NASA Guide to the Subject Indexes for STAR.
- (b) Do not select specific descriptors. Use the more general terms and do not index too deeply.
- (c) Indicate that the terms are not the exact title by placing a slant before the descriptors.
- (d) If the classification of the title is indicated on the document, state that the title is classified, as follows:

(CLASSIFIED TITLE) /DATA-ACQUISITION GUIDED-MISSILES
TELEMETERING

The words CLASSIFIED and TITLE have been suppressed and therefore will not appear in the KWOC Index.

- (e) If classification of the title is not indicated on the document, enter the selected descriptors as follows:

/DATA-ACQUISITION GUIDED-MISSILES TELEMETERING

This example provides sufficient indication of the document's subject matter without mentioning specific missiles, the portion of the missile under study, the project, or details of the acquisition system.

b. CORPORATE AUTHOR

The corporate author is limited to eighteen characters. This eighteen character reduction appears both in the Author Report and as the corporate author entry of the full bibliographic printout on the Citation Report.

It is essential that the eighteen character reduction be easily identifiable as the corporate author it represents. To achieve this a Corporate Author Authority List has been developed (SECTION II) for many of the likely authors to be encountered in the AFRPL collection.

The following guide lines are set down to provide a uniform method for establishing additional corporate author entries and for limiting them to eighteen characters:

- (1.) Corporate authors are cited in the form by which they are most generally known. The Chemical Propulsion Information Agency (CPIA) abstracts author index serves as the authority. The DDC Corporate Author List is used for authors not appearing in the CPIA abstracts.
- (2.) The corporate author is always based upon the title page of the document being indexed. Therefore, on older documents the older designation of the corporation is used. See Also cross references are used in the Corporate Author Authority List to bring these variations together. For example:

Chemical Propulsion Information Agency

See Also: Liquid Propellant Information Agency
Solid Propellant Information Agency

- (3.) Standard abbreviations are used wherever possible. The list of abbreviations used appears as part of Section II.
- (4.) Corporate authors are subdivided both by geographical location and name of division, as used by the corporation.
- (5.) When a subdivision, used as the main entry, differs from the corporate author, See Also cross references are used, for example:

Thiokol Chemical Corporation

See Also: Reaction Motors

Purdue University

See Also: Jet Propulsion Center

- (6.) On British documents, drop "Ministry of" and go directly to the unit concerned. For:

Ministry of Supply. Explosives Research and Development Establishment.

Enter corporate author as:

Explosives Research and Development Establishment.

Retain "Royal" as in:

Royal Armament Research and Development Establishment.

Do not go to the very specific unit, especially if it is not part of the report number, for example:

Royal Armament Research and Development Establishment.
Weapons and Ammunition Division. RARDE Memorandum 19/63.

Enter corporate author as:

Royal Armament Research and Development Establishment.

(7.) Omit U.S. on all United States government organizations, as:

Bureau of Mines
Naval Air Test Station

(8). Omit: Company, Corporation, Incorporated, Limited, etc. but retain Establishment.

c. PERSONAL AUTHOR

Enter the last name first, no comma, and no periods after the initials.

John Peter Vinti would be set down as:

VINTI J P

Only the first of a series of authors can be entered. Indicate that there are several authors by an asterisk in column 44 of the third card (box 2C of FIGURE 1). The computer will automatically printout "ET AL."

d. DATE OF REPORT

Always enter the date the report was originally issued. Only five characters are available for the date, therefore reduce all months to three characters, leave no space, and enter the last two numbers of the year. The day of the month must be omitted. September 15, 1965 would be entered as SEP65.

If a report was revised at a later date, enter the original date in 2D of FIGURE 1, and the revision date as title enhancement. For example, a report written in June of 1964 and revised on October 3, 1965 would have JUN64 in box 2D and the title enhancement would appear as follows:

...INVESTIGATION /REVISED OCTOBER 3, 1965

Occasionally a classified report is recalled and reissued as an unclassified version with new covers and title page. The new title page bears both the original issue date and the declassified date. Enter the original issue date in box 2D of FIGURE 1 and enhance the title as follows:

...INVESTIGATION /DECLASSIFIED MAY 2, 1965

e. PAGINATION

Most documents are consecutively paged. Enter the last page number in box 2E of FIGURE 1 to indicate the total number of pages.

Some reports page each chapter separately. Rather than count each page, enter VP for "various pagination" in box 2E.

f. REFERENCES

Enter the total number of references in box 2F of FIGURE 1.

In most reports, the references are consecutively numbered and either gathered at the end of the document or treated as footnotes at the bottom of each page. In these situations, merely use the highest number as the total number of references. Other reports number the references separately for each chapter and gather the references at the end of each chapter or as footnotes at the bottom of each page. Add the highest number in each chapter if there aren't too many chapters, otherwise leave 2F blank.

g. SECURITY CLASSIFICATION

Use the following code to designate the security classification of a document in the Security Code (SEC CD) box 2G of FIGURE 1:

U	for unclassified
URD	for unclassified restricted data
C	for confidential
CRD	for confidential restricted data
S	for secret
SRD	for secret restricted data

h. CONTRACT NUMBER

Enter the contract number in box 3A of FIGURE 1. Do not leave a space between any portion of the number. A space will cause the number to be indexed out of its proper alpha-numeric sequence.

No provision has been made for listing the task and project numbers of individual contracts nor for listing more than one contract number per document. Where significant, additional numbers can be treated as title enhancement items.

i. REPORT NUMBER

Enter the Department of Defense agency number in box 3B of FIGURE 1 and the Defense Documentation Center AD number in box 3C.

Should the document also have a contractor's report number it is to be treated as a title enhancement item. Prefix it with REP and leave no spaces between parts of the number. AFRPL TR 65-157 is also Lockheed Report LR 19040. Therefore AFRPL TR 65-157 would be entered in box 3B and Lockheed's number would appear in the title as:

...SURVEY /REP-LR-19040

j. DEFENSE DOCUMENTATION CENTER NUMBER

Defense Documentation Center AD numbers must be entered as six digit numbers in box 3C of FIGURE 1. AD numbers with five digits or less must be preceded by the number of zeros required to complete a six digit number. The "AD" is omitted because the computer will automatically printout AD before any number appearing in this box.

For AD-9375, enter 009375 in box 3C.

k. ERROR CORRECTIONS

Column 6 of the Retrieval Number box on the Key punch Transmittal Sheet, FIGURE 1, is used to correct errors or add information such as a Defense Documentation Center AD number. It is also used to delete an entire card and to reinstate deleted cards.

To make a change, type the Retrieval Number of the document concerned and enter "A" in column 6 for the first change, "b" for the change that supersedes "A", and so on through "W". Only the additional or corrected information need be entered on the Transmittal Sheet.

FIGURE 4 illustrates three corrections to the documents illustrated in FIGURE 3. The first example shows the addition of a Defense Documentation Center AD number. The second shows the addition of a contract number and adding "REP" to the report number. The final example shows the addition of a NASA number as a title enhancement item.

To delete an entire entry, type the Retrieval Number and an "X" in column 6 on a Key punch Transmittal Sheet. Now, despite any earlier corrections, all information associated with this entry will be removed from future printouts.

To reinstate a deleted entry, place the number "1" in column 6. To make corrections to the information in the reinstated entry, place a number "2" in column 6. Warning - a reinstated entry can never be deleted again.

1. OBTAINING JOB RUNS

The KWOC Job Run Set Up Sheet, shown in FIGURE 5 is used to obtain printouts. With this form the Indexer may have the AFRPL Data

AFRPL INDEXING DATA

RETR. NO.
00001 A
1 6

T 1 TITLE

T 2 TITLE

CORP. AUTHOR PERS. AUTHOR DATE PGS. REF. SEC. CD.

A 7 9 27 44 45 50 54 57

CONTRACT NO. REPORT NO. AD NO.

R 7 9 27 45 095376

RETR. NO.
00002 A
1 6

T 1 TITLE

T 2 TITLE

CORP. AUTHOR PERS. AUTHOR DATE PGS. REF. SEC. CD.

A 7 9 27 44 45 50 54 57

CONTRACT NO. REPORT NO. AD NO.

R 7 9 27 45 AFOL(611)-7432 REP-IMSC-6-75-65-24

RETR. NO.
00003 A
1 6

T 1 SPACECRAFT GUIDANCE, CONTROL AND RELATED TOPICS--A BIBLIOGRAPHY OF THE??

T 2 OPEN-LITERATURE, JANUARY 1962 - JUNE 1963. /NASA-N64-11412

CORP. AUTHOR PERS. AUTHOR DATE PGS. REF. SEC. CD.

A 7 9 27 44 45 50 54 57

CONTRACT NO. REPORT NO. AD NO.

R 7 9 27 45

FIGURE 4 USE OF KEYPUNCH TRANSMITTAL SHEET TO CORRECT ERRORS

KWOC JOB RUN SET UP SHEET

TO: _____ DATE: _____
BY: _____
RUN NUMBER ⁵⁷ ☐ ⁵⁸ ☐ FIRST CARD INPUT _____ (INCLUDES
LAST CARD INPUT _____ TRANSMITTALS)
FIRST RETRIEVAL NUMBER ⁴⁵ ☐ ⁴⁹ ☐
LAST RETRIEVAL NUMBER ⁵¹ ☐ ⁵⁵ ☐
KWOC REPORT YES ⁵⁹ NO ☐
AUTHOR REPORT YES ⁶⁰ NO ☐
CONTRACT REPORT YES ⁶¹ NO ☐
CITATION REPORT YES ⁶² NO ☐
KEYWORD REPORT YES ⁶³ NO ☐ (JOBS X8625 (SORT) AND X8626)
EXCLUSION WORD FILE YES ⁶⁴ NO ☐ X8622 X-WDS DATA

THIS RUN WILL REQUIRE THE FOLLOWING INPUT(S):
TRANSMITTALS YES ☐ NO ☐ CARDS YES ☐ NO ☐ (UTILITY UPDATE)
DATA TAPES: RUN _____ RUN _____ (SPECIFY TOTAL NUMBER
RUN _____ RUN _____ OF INPUTS ON X8620
RUN _____ RUN _____ SORT CONTROL CARDS
RUN _____ RUN _____ 1 FOR FIRST LINE
RUN _____ RUN _____ AND 1 FOR EACH
RUN _____ RUN _____ RUN TO BE INCLUDED)

SAVE INPUT DATA YES ☐ NO ☐ (SPECIFY UNLOAD OF X8620 SORT INPUT
AND RETENTION OF TAPE(S).)

RETURN CARDS TO LOCKHEED INDEXING YES ☐ NO ☐
NUMBER OF COPIES OF REPORT TO BE PRINTED _____
NUMBER OF COPIES TO LOCKHEED INDEXING _____
DISTRIBUTION OF OTHER COPIES: _____

NOTES: _____

Processing Programmer run: (1) the Keypunch Transmittal sheets only, (2) punched cards only, (3) data tapes only, or (4) any combinations of these three inputs.

The Indexer can also obtain all the various reports: KWOC, Author, Contract, Citation, Keyword, and Exclusion Word File by circling "YES" after each report. He can elect to receive only one of the reports by circling "NO" after the reports he does not want.

3. SPECIAL SYMBOLS, NOTATION AND TYPING INSTRUCTIONS

Since the computer is limited in the symbols it can print, substitutions must be made. The computer is also unable to print subscripts and superscripts. Therefore special rules have been devised for chemical and mathematical notations.

The following table shows what the computer will print in response to an input. Many of the items are not indexed in the KWOC report. Circled symbols are indexed only if following an alphabetic character.

<u>TYPED</u>	<u>KEYPUNCHED</u>	<u>PRINTED</u>
0-9	0-9	0-9
A-Z	A-Z	A-Z (ø)
+	+	+ Not Indexed ¹
.	.	. Not Indexed
)	)	) Not indexed without left (preceding it
-	-	-
\$	\$	\$ Not Indexed
*	*	*
,	,	, Not Indexed
(	(	(
/	/	/ Not indexed
-	-	-
@	@	@ Not Indexed
?	Space	Space

<u>TYPED</u>	<u>KEYPUNCHED</u>	<u>PRINTED</u>
%		(
#		-
::		Space
;		Space

¹NOTE: R+D would not index. Only the word before the plus sign would index. Since "R" is a single character it is automatically excluded in the KWOC Index.

RESEARCH+DEVELOPMENT. Only RESEARCH would index. For both "Research" and "Development" to index, a space must be left on either side of the plus sign. However, the + would be dropped out, RESEARCH would be indexed under the R's, and DEVELOPMENT would index separately under the D's.

a. SUBSTITUTION OF SYMBOLS

When an apostrophe is desired, type an @ sign.

In place of a colon, use a comma, a single hyphen, a double hyphen, or a space. Select which ever is most appropriate to the sense of the title. For example:

TERNARY METALS: AN ANNOTATED BIBLIOGRAPHY

can be typed as

TERNARY METALS -- AN ANNOTATED BIBLIOGRAPHY

In place of a semicolon, use a comma or a hyphen as appropriate to the sense of the title, for example:

STUDY OF WIND MEASUREMENTS; PROGRESS REPORT FOR MAY 1966

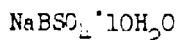
can be typed as

STUDY OF WIND MEASUREMENTS - PROGRESS REPORT FOR MAY 1966

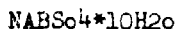
b. CHEMICAL NOTATION

The computer does not print lower case letters, subscripts, or the . for separating radicals. Therefore use all capital letters, except for the "Q" which must be typed in lower case to distinguish it from zero; type all subscript numbers on the line; and use an asterisk to separate

radicals.



would be typed as



c. MATHEMATICAL NOTATION

Indicate superscripts by using a double asterisk. For example:

$$3.8 \times 10^{33}$$

would be typed as

$$3.8 \times 10^{**33}$$

d. TYPING KEYPUNCH TRANSMITTAL SHEET

Type all capital letters except for the letter "o" as shown in FIGURE 3.

If a word ends in the 72nd column on line T1, start T2 with a question mark of the last word in T1 will be tied to the first word in T2 without a space.

Always enter 72 characters in T1 before going on to T2, even if it is not the proper place to hyphenate the word. See the last example in FIGURE 3.

4. INDEXING AND EDITING GUIDE

The rules which follow are keyed to examples in the printout covering Retrieval Numbers 00001 through 00585.

a. SUPPRESSED TERMS

As a general rule, suppressed terms should be held to a minimum. While suppressing a term may often be the easiest way to obtain a desired result, other methods will work equally well. These methods are presented and illustrated in the topics which follow.

b. SUBTITLES

Meaningless keywords frequently result from subtitles. Rarely does information contained in subtitles add substantially to the citation's information content. Subtitles should be omitted wherever possible.

- (1.) Symposia - Many symposia subtitles contain the name and location of the hotel where the conference was held. Such

useless keywords as:

CALIFORNIA	MENLO
FLORIDA	PARK
FLORIDAN	TAMPA
HOTEL	WASHINGTON

are generated by the subtitles. This information should be deleted from the citation.

- (2.) Reports - Subtitles particularly of periodic reports, produce such useless keywords as:

ANNUAL	COVERING
APPENDIX	ENDING
BOOK	PERIOD
COVERED	PROF
	SEMI

These terms can be deleted from the title without decreasing the information content of the citation.

c. ALPHA-NUMERIC DESIGNATIONS

Care must be exercised to hyphenate alpha-numeric designations in a manner that will prevent portions of a combination from dropping out of the keyword. The computer program causes the following to occur:

- (1.) Numerals, not preceded by alphabetic characters, drop out. For example, 4-DS-93000 prints out as DS-93000, NORD 1026 merely yields NORD.
- (2.) In numerals following a comma, both the comma and the numerals drop out. KS-12,000 prints out as KS-12.
- (3.) A virgule (/) does not print out as part of a keyword nor do the characters following it. LAU-6/A prints out as LAU-6.
- (4.) Parenthesis will print out as part of a keyword if not preceded by a space. These keywords are, therefore, possible: DDP(80), EJC(90), and MOTORS (X226-A-3). However, since parenthesis preceded by a space drop out, (FBO)3 prints out as FBO.

Certain alpha numeric combinations are meaningless as keywords. To overcome this problem, either place the combination after the noun it modifies or append a descriptive term.

<u>In Place Of</u>	<u>Use</u>	<u>Retrieval Number</u>
4-DS-93000	JATO-4-93000	00523
NORD 10260	NORD-10260	00351
KS-12,000	KS-12000	00191
LAU-6/A	LAU-6-A	00122
(FBO)3	FBO3	00574
A-EO-51	FLIGHT-A-EO-51	00178
II-C-22	TEST-PLAN-II-C-22	00176
TX8	ROCKET-TX8	00182
PROJECT ABLE-1	ABLE-1-PROJECT	00187

d. ACRONYMS, ABBREVIATIONS, AND PHRASES

Spell out meanings of acronyms and abbreviations that are not in general use. Join abbreviations and ambiguous terms to the nouns they modify even if their position in a title must be reversed. Let the 18 character keyword limitation cut off the resulting combinations of greater length.

<u>In Place Of</u>	<u>Use</u>	<u>Retrieval Number</u>
ABL	ALLEGANY-BALLISTICS-LABORATORY	00500
B-N	B-N-PROPELLANTS	00052
BALL	BALL-PROPELLANTS	00424
AFB	EDWARDS-AFB	00355
AIR	AIR-FORCE	00274
ALLEGANY	ALLEGANY-BALLISTICS-LABORATORY	00466
BUREAU	BUREAU-OF-ORDNANCE	00507
DEPARTMENT OF DEFENSE	DEFENSE-DEPARTMENT	00004
GRAND	GRAND-CENTRAL-ROCKET	00457
HYPER	HYPER-PERFORMANCE	00322

In some instances, it is advisable to repeat a word as a title enhancement term so that it is not lost as an indexing point. In the combinations BALL-PROPELLANTS and B-N-PROPELLANTS, the word PROPELLANTS should be added as a title enhancement term.

e. REPORT NUMBERS IN TITLES

The "Report No." box (Line R, Cols. 27-44) of the Key punch Transmittal Sheet gives preference to the DOD agency report number. Columns 45 through 51 of Line R are reserved for the DDC AD number. Any additional report numbers such as the contractor's number, progress report number, monthly, quarterly, and letter report numbers are treated as title enhancement terms.

It is desirable to print out the contractor's distinctive report numbers as keywords but to suppress the progress, monthly quarterly, and letter report numbers.

(1.) Individual Report Numbers

To gather these numbers under a single heading in the KWOC index, they are preceded by "REP" for "report". CPIA PUB-14 is entered as REP-CPIA-PUB-14.

Occasionally, this method produces an alpha-numeric sequence of over 18 characters, causing all characters over 18 to drop out of the keyword. In REP-RE-65-110-CRE-32, for example, the "32" would drop out. By deleting the hyphens separating letters from numbers, the report number can be presented as REP-RE65-110-CRE32 without causing confusion.

(2.) Series Report Numbers

Progress report numbers are not of sufficient value to justify keyword print out. They can be suppressed by deleting the hyphen. Instead of PR-43, enter PR 43. The PR drops out because all 1 and 2 character words are suppressed and the 43 drops out because all numbers not preceded by a letter are automatically suppressed.

Monthly, quarterly, and letter report numbers can be similarly suppressed. MONTHLY, QUARTERLY, LETTER, and REPORT are suppressed terms, but REP is not. Instead of QUARTERLY REP-39, enter QUARTERLY REPORT 39. This provides full information in the title but yields no keyword printout.

Both SEMI and ANNUAL are suppressed terms. SEMI-ANNUAL and SEMIANNUAL will print out as keywords, but SEMI ANNUAL will not.

f. MISCELLANEOUS

(1.) Ordinal Numbers

FIRST, SECOND, ... , TENTH have not been added to the suppressed word list. To include them in the title but suppress them as keywords, change them to 1ST, 2ND, ... , 10th.

SECOND RADAR ATTENUATION SYMPOSIUM

would be entered as:

2ND RADAR ATTENUATION SYMPOSIUM

(2.) Effect of Hyphen

The hyphen can cause individually suppressed terms to unintentionally print out in combination. Care must be exercised to avoid the following situations:

- (a) Months - All months are suppressed terms. However, when combined as APRIL-JUNE for example, the combination will print out as a keyword. This is avoided by leaving a space on each side of the hyphen.
- (b) Parts - The term PART is suppressed but PART-1, PART 2, etc. are not. Avoid keyword print out by deleting the hyphen and entering the term as PART 1, PART 2, etc.
- (c) Model Numbers - Such model numbers as M-2, M-55, SM-62 can be eliminated from keyword print out by entering them in the title as M 2, M 55, SM 62.

SECTION II

CORPORATE SOURCE AND ABBREVIATION LISTS

The following section consists of three parts:

1. ABBREVIATED CORPORATE SOURCE NAME is an alphabetical arrangement of the shortened, eighteen Character Corporate source name used to designate corporate sources in the author printout. The user of the index can refer to this list to find the complete name of a corporate source opposite its eighteen character designation.
2. CORPORATE SOURCE AUTHORITY LIST is an alphabetical arrangement of Corporate Authors with their shortened eighteen character designation opposite. The indexer can use this list to locate a desired shortened corporate source designation opposite the complete corporate source name.
3. ABBREVIATIONS USED IN CORPORATE SOURCE DESIGNATIONS is a alphabetical listing of words which frequently appear in corporate source entries with their standardized abbreviations opposite.

1. ABBREVIATED CORPORATE SOURCE NAME

Aberdeen Prov Grd	Aberdeen Proving Ground
Acoustica Assocs	Acoustica Associates
Adaptronics	Adaptronics, Incorporated
Adm Mat Lab UK	Admiralty Materials Laboratory (U.K.)
Adv Metals Res Lab	Advanced Metals Research Corp.
Advis Grp Aero R+D	Advisory Group for Aeronautical Research and Development
Advis Pan on Fuels	Ad Hoc Group on Solid-Propellant Instability of Combustion. Advisory Panel on Fuels and Lubricants
Advis Pan on Ord	Ad Hoc Group on Solid-Propellant Instability of Combustion. Advisory Panel on Ordnance, Transport, and Supply
Aero Res Assocs	Aerospace Research Associates
Aero Res Labs	Aerospace Research Laboratories
Aero Tech Intel C	Aerospace Technical Intelligence Center
Aerochem Res Lab	Aerochem Research Laboratories

Aerojet Eng	Aerojet Engineering Corp
Aerojet-Gen/Adv Sy	Aerojet-General Corporation, Advanced Systems
Aerojet-Gen/Aerov	Aerojet-General Corporation, Aerovessels Division
Aerojet-Gen/Aetron	Aerojet-General Corporation, Aetron-Covina Plant
Aerojet-Gen/Astri	Aerojet-General Corporation, Astrionics
Aerojet-Gen/AZU	Aerojet-General Corporation, Azusa
Aerojet-Gen/Chem	Aerojet-General Corporation, Chemical Division
Aerojet-Gen/Liquid	Aerojet-General Corporation, Liquid Rocket Plant
Aerojet-Gen/Nucl	Aerojet-General Corporation, Nucleonics
Aerojet-Gen/Ord	Aerojet-General Corporation, Ordnance Division
Aerojet-Gen/REON	Aerojet-General Corporation, REON Division
Aerojet-Gen/Res	Aerojet-General Corporation, Research Division
Aerojet-Gen/Rocket	Aerojet-General Corporation, Rocket Engine Operations - Nuclear
Aerojet-Gen/Sacra	Aerojet-General Corporation, Sacramento
Aerojet-Gen/Solid	Aerojet-General Corporation, Solid Rocket Plant
Aerojet-Gen/VonKar	Aerojet-General Corporation, Von Karman Center
Aeron Res Assocs P	Aeronautical Research Associates of Princeton, Inc.
Aeron Res C UK	Aeronautical Research Council (U.K.)
Aeronautical Sys D	Aeronautical Systems Division
Aeronca Mfg.	Aeronca Manufacturing Corp.
Aeronutronic/Ford	Aeronutronic, Division of Ford Motor Co.
Aerophysics Dev	Aerophysics Development Corporation

Aeroprojects	Aeroprojects, Inc.
Aeroquip	Aeroquip Corporation
Aerospace	Aerospace Corp.
Aerospace Chem Sys	Aerospace Chemical Systems, Inc.
AF Aero Prop Lab	Air Force Aero Propulsion Laboratory
AF Aero Med Res L	Air Force Aerospace Medical Research Labs
AF Ballis Mis Div	Air Force Ballistic Missile Division
AF Flight Test C	Air Force Flight Test Center
AF Inst Technology	Air Force Institute of Technology
AF Logistics Comd	Air Force Logistics Command
AF Materials Lab	Air Force Materials Laboratory
AF Missile Devel C	Air Force Missile Development Center
AF Office Sci Res	Air Force Office of Scientific Research
AF Rocket Prop Lab	Air Force Rocket Propulsion Laboratory
AF Spec Weapons C	Air Force Special Weapons Center
AF Systems Comd	Air Force Systems Command
AF Weapons Lab	Air Force Weapons Laboratory
Air Materiel Comd	Air Materiel Command
Air Prod and Chem	Air Products and Chemicals, Inc.
Air Products	Air Products, Inc.
Air R+D Comd	Air Research and Development Command
Air Reduction	Air Reduction Company, Inc.
Air Tech Intell C	Air Technical Intelligence Center
Air University	Air University
	Airesearch Manufacturing Company, Division of the Garrett Corporation See: The Garrett Corporation, Airesearch Manufacturing Co. Division

Armed Forces SWP	Armed Forces Special Weapons Project
Armour Res Fdn	Armour Research Foundation
Army Ballistic MA	Army Ballistic Missile Agency
Army Chem Center	Army Chemical Center
Army Library	Army Library, Washington D.C.
Army Materials Res	Army Materials Research Agency
	Army Missile Command See: Redstone Arsenal
Army Missile Tes/C	Army Missile Test Center
Army Rocket GMA	Army Rocket and Guided Missile Agency See Also: Redstone Arsenal
Arnold Eng. Dev C	Arnold Engineering Development Center
ARO	ARO, Inc.
Arthur D. Little	Arthur D. Little, Inc.
Ashland Oil + Ref	Ashland Oil and Refining Company
Assist Sec: Def R+D	Office of the Assistant Secretary of Defense (Research and Development)
Assist Sec Def S+L	Office of the Assistant Secretary of Defense (Supply and Logistics)
ASTIA	Armed Services Technical Information Agency
ASTRO	Astro, a division of the Marquardt Corp.
Astrodyne	Astrodyne, Incorporated
Astropower	Astropower, Inc.
Astrosystems Int	Astrosystems International, Inc.
Atlantic Research	Atlantic Research Corp.
Atomic En Com	Atomic Energy Commission
Atom En Com/DTI	Atomic Energy Commission, Division of Technical Information
Atomics Int/NAA	Atomics International, North American Aviation

Alcoa Res Lab

Alcor

Allen B. Dumont L

Allied Chem + Dye

Allied Chemical

Allied Res Assocs

Allison/GMC

Alloyd Electronics

Althea Revere

Alum Co America

Aluminum Res Labs

Am Cyanamid

Am Mach + Foundry

Am Potash and Chem

Ancel Propulsion

Amer Rad+Std Sanit

Amer Rein Plastics

Amer Soc Mech Eng

Analytic Services

A O Smith

App Phys L J Hop U

Applied Science L

Arde Associates

Argonne National L

Arm Ser Explo Safe

Alcoa Research Laboratory

Alcor, Inc.

Allen B. Dumont Laboratories, Inc.

Allied Chemical + Dye Corp.

Allied Chemical Corp.

Allied Research Associates, Inc.

Allison Division of General Motors
Corporation

Alloyd Electronics Corporation

Althea Revere, Vineyard Haven, Mass.

Aluminum Company of America

Aluminum Research Laboratories

American Cyanamid Company

American Machine and Foundry Corp.

American Potash and Chemical Corp.

Ancel Propulsion, Inc.

American Radiator and Standard Sanitary
Corporation

American Reinforced Plastics Company

American Society of Mechanical Engineers

Analytic Services, Incorporated

A. O. Smith Corp.

Applied Physics Lab., Johns Hopkins
University

Applied Science Laboratories, Inc.

Arde Associates

Argonne National Laboratory

Armed Services Explosives Safety Board

Atom Weap Res Est	Atomic Weapons Research Establishment
Auburn U	Auburn University
Automation Ind	Automation Industries, Inc.
Autometric	Autometric Corporation
AVCO	AVCO Corporation See Also: Lycoming Division
AVCO-Everett Res L	AVCO-Everett Research Laboratory
Babcock Wilcox Res	Babcock and Wilcox Co., Research Center
Ballistic Res Lab	Ballistic Research Laboratories
Ballistic Sys Div	Ballistic Systems Division
Battelle Memorial	Battelle Memorial Institute See Also: Defense Metals Information Center, Radiation Effects Information Center
Battelle-Northwest	Battelle-Northwest (Pacific Northwest Laboratory operated by Battelle)
Becco Chemical/FMC	Becco Chemical Division, Food Machinery and Chemical Corp.
Beech Aircraft	Beech Aircraft Corporation
Beechcraft R+D	Beechcraft Research and Development
Bell Aerosystems	Bell Aerosystems Company
Bell Aircraft	Bell Aircraft Corporation
Bendix	The Bendix Corporation
Bendix Aviation	Bendix Aviation Corporation
Bermite Powder	Bermite Powder Company
Beryllium	The Beryllium Corporation
Bethlehem Steel	Bethlehem Steel Co.
Bettis Atomic Pow L	Bettis Atomic Power Laboratory, Pittsburgh, Pa.
Bjorksten Res Lab	Bjorksten Research Laboratories, Inc.

Columbia Radiat L

Combust+Explos Res

Comm Fuels + Lub

Comm Under Warfare

Commercial Solvent

Compo Tek

Conesco

Conn Hard Rubber

Convair Astro

Convair/Ft Worth

Convair/Thermo L

Coordinating Res C

U Copenhagen

Cornell Aeron Lab

Cornell U

Cosmodyne

Curtiss-Wright

Daniel Mann et al

U Dayton

U Dayton Res Inst

Debell + Richardson

Def Metals Info C

Defense Document C

Defense Research

Defense Research L

U Delaware

Columbia Radiation Laboratory

Combustion and Explosives Research, Inc.

Committee on Fuels and Lubricants,
Research Development Board

Committee on Undersea Warfare, National
Research Council

Commercial Solvents Corporation

Compo Tek Inc., Palo Alto

Conesco, Inc.

Connecticut Hard Rubber Company

Convair Astronautics
See also: General Dynamics/Convair

Convair, Fort Worth

Convair, Thermodynamics Laboratory

Coordinating Research Council, Inc.

University of Copenhagen

Cornell Aeronautical Laboratory, Inc.

Cornell University

Cosmodyne Corporation

Curtiss-Wright Corporation

Daniel, Mann, Johnson, and Mendenhall

University of Dayton

University of Dayton Research Institute

Debell and Richardson, Inc.

Defense Metals Information Center

Defense Documentation Center

Defense Research Corporation

Defense Research Laboratories

University of Delaware

Boeing	The Boeing Company
Bolt Beranek et al	Bolt Beranek and Newman, Inc.
Booz Allen + Ham	Booz, Allen + Hamilton
Borg-Warner	Borg-Warner Corporation See Also: Pesco Products Division
U British Columbia	University of British Columbia
British Oxygen	The British Oxygen Co.
Brown U	Brown University
Brunswick	Brunswick Corp.
Brush Beryllium	Brush Beryllium Company
U Brussels	University of Brussels
Bucyrus-Erie	Bucyrus-Erie Company
Buffalo Elect-Chem	Buffalo Electro-Chemical Company, Inc.
U Buffalo	University of Buffalo
Building Res Sta	Building Research Station Watford, England
Bureau Aeronautics	Bureau of Aeronautics
Bureau of Mines	Bureau of Mines
Bureau of Ships	Bureau of Ships
Calif Inst of Tech	California Institute of Technology See Also: Jet Propulsion Laboratory Guggenheim Aeronautical Labs Guggenheim Jet Propulsion Center
California Res	California Research Corp.
U California	University of California
U California L A	University of California at Los Angeles
Callery Chemical	Callery Chemical Company
Cambridge	Cambridge Corporation
Canadian Arm R+D	Canadian Armament Research and Development Establishment

Canadian R+D Estab	Canadian Research and Development Establishment
Carborundum	Carborundum Company
Carnegie Inst Tech	Carnegie Institute of Technology
Case Inst Tech	Case Institute of Technology
Catholic U America	Catholic University of America
Celestial Research	Celestial Research Corp.
Century Engineers	Century Engineers Inc.
Chance Vought	Chance Vought Corporation
Chem Def Exp Est	Chemical Defense Experimental Establishment (U.K.)
Chem Prop Info Ag	Chemical Propulsion Information Agency. Johns Hopkins University See Also: Liquid Propellant Information Agency, Solid Propellant Information Agency
Chicago Aerial Ind	Chicago Aerial Industries, Inc.
U Chicago	University of Chicago
Chrysler	Chrysler Corporation
U Cincinnati	University of Cincinnati
Clemson College	Clemson College
Cleveland Ind Res	Cleveland Industrial Research, Inc.
Clevite	Clevite Corporation
Climax Molyb/Mich	Climax Molybdenum Company of Michigan
Coated Text Mills	Coated Textile Mills, Inc.
College of Aero UK	College of Aeronautics (U.K.)
College Place Coun	College Placement Council, Inc.
Colo Sch Mines RE	Colorado School of Mines Research Foundation
U Colorado	University of Colorado

U Denver

Denver Research In

Dept Air Force

Dept of Defense

Diamond Alkali

Dir Advanced Sys T

Dir Aerospace Saf

Dir Rock Prop+Mis

Douglas Aircraft

Dow Chemical

Dow Corning

U Durham

Dynamic Science

Dynatech

E H Sargent

E I Du Pont de Nem

Edgewood Arsenal

Edwal Labs

Electro Jet

Electro-Mech Lab

Electro Optical Sy

Electro-Therm Inds

Electronic Sys Dev

Electronics Amer

Emerson Electric

University of Denver

Denver Research Institute

Department of the Air Force

Department of Defense, Washington, D.C.

Diamond Alkali Company

Directorate of Advanced Systems
Technology

Directorate of Aerospace Safety

Directorate of Rocket Propulsion
Missiles

Douglas Aircraft Company, Inc.

The Dow Chemical Company

Dow Corning Corporation

University of Durham

Dynamic Science Corporation

Dynatech Corporation

E. H. Sargent & Company

E. I. Du Pont de Nemours and Company

Edgewood Arsenal

The Edwal Laboratories, Inc.

Electro Jet Corporation

Electro-Mechanical Laboratory

Electro Optical Systems, Inc.

Electro-Thermal Industries, Inc.

Electronic Systems Development Corp

Electronics Corporation of America

Emerson Electric Co.

Esso Research + Eng.

Ethyl

Europe Atom En Com

Evans R+D

Excelco Develop

Experiment Incorp

Explosives R+D Est

Fairchild Cam+Inst

Fairchild Engine D

Fairchild Stratos

Fansteel Metallurg

Fine Organics

Firestone Tire+Rub

U Florida

Fluor

FMC

Food Machine+Chem

For Tech Div Edw

For Tech Div WPAFB

Forest Products L

Forest Service

Fram

Frank Inst Res Lab

Esso Research and Engineering Co.

Ethyl Corporation

European Atomic Energy Community

Evans Research and Development Corp

Excelco Development, Inc.

Experiment Incorporated

Explosives Research and Development
Establishment (U.K.)

Fairchild Camera and Instrument
Corporation

Fairchild Engine Division, Fairchild
Engine and Airplane Corp.

Fairchild Stratos Corporation

Fansteel Metallurgical Corporation

Fine Organics, Inc., New York

Firestone Tire + Rubber Company

University of Florida

The Fluor Corporation

FMC Corporation

Food Machinery and Chemical Corp

Foreign Technology Division,
Edwards AFB

Foreign Technology Division,
Wright-Patterson AFB

Forest Products Laboratory

Forest Service. U.S. Dept. of
Agriculture

Fram Corporation, Providence, R.I.

The Franklin Institute Research
Laboratory

Hercules Powder	Hercules Powder Company
Hexcel Products	Hexcel Products, Inc.
High Temp Material	High Temperature Materials, Inc.
Holloman Air Dev C	Holloman Air Development Center
Honeywell	Honeywell, Incorporated
Hooker Chemical	Hooker Chemical Corp.
Horizons	Horizons, Inc.
Houston Engineer	Houston Engineering Corporation
Houston Res Inst	Houston Research Institute, Inc.
Hughes Aircraft	Hughes Aircraft Corporation
Hughes-Fullerton	Hughes Aircraft Company, Fullerton
Hughes Research L	Hughes Research Laboratories
Hughes Tool	Hughes Tool Co.
Hycon Mfg	Hycon Mfg. Company
Hydro-Aire	Hydro-Aire Inc.
Hynes Chemical Res	Hynes Chemical Research Corp.
IBM/Elect Sys C	International Business Machines Corporation, Electronic Systems Center
U Illinois	University of Illinois
Illinois Inst Tech	Illinois Institute of Technology
Imperial Chemical	Imperial Chemical Industries Limited
Imperial Col Sci	Imperial College of Science and Technology (U.K.)
In Def Analyses	Institute for Defense Analyses
Ind Res Inst/UCHAT	Industrial Research Institute, University of Chattanooga
Indium Corp Amer	Indium Corporation of America

Gen Elect/Spacecr	General Electric Company, Spacecraft Department
Gen Elect/V Forge	General Electric Company, Valley Forge Space Technology
Gen Motors	General Motors Corporation
Gen Technologies	General Technologies Corporation
Gen Tel+Electron L	General Telephone and Electronics Lab.
General Kinetics	General Kinetics, Inc.
General Steel Ind	General Steel Industries, Inc.
Geophysics Res Dir	Geophysics Research Directorate (AFCRL)
Georgia Inst Tech	Georgia Institute of Technology
Goddard SFC (NASA)	Goddard Space Flight Center (NASA)
B F Goodrich	B. F. Goodrich Company
Goodyear Aerospace	Goodyear Aerospace Corporation
Goodyear Aircraft	Goodyear Aircraft Corporation
W R Grace	W. R. Grace and Company
Grand Central Rock	Grand Central Rocket Co.
Grumman Air Eng	Grumman Aircraft Engineering Corp.
Guggenheim Aero L	Guggenheim Aeronautical Laboratory
Guggenheim JPC	Guggenheim Jet Propulsion Center
H I Thomp Fiber Gl	H. I. Thompson Fiber Glass Company
Harry Diamond Labs	Harry Diamond Laboratories
Harshaw Chemical	The Harshaw Chemical Co.
Harvard U	Harvard University
Hayes Aircraft	Hayes Aircraft Corporation
Hefco Labs	Hefco Laboratories, Inc.
Hercules	Hercules Incorporated

Frankford Arsenal
Franklin Inst
Frebank
Fund Method Assoc
Garrett
Garrett/Airsearch

GC Marshall (NASA)
Gen American Trans
Gen Applied Sci L
General Atomic
Gen Dynamics/Astro
Gen Dynamics/Conv
Gen Dynamics/El B

Gen Dynamics/Ft Wo
Gen Elect
Gen Elect/Flight P

Gen Elect/Hanford

Gen Elect/Missile

Gen Elect/Nucl En

Gen Elect/Nucl M+P

Gen Elect R+D C

Gen Elect/Spa Sci

Frankford Arsenal
Franklin Institute
Frebank Company
Fundamental Methods Associates, Inc.
The Garrett Corp
The Garrett Corporation, Airsearch
Manufacturing Co. Division

George C. Marshall Space Flight Center
General American Transportation Corp
General Applied Science Laboratories
General Atomic Division, General Dynamics
General Dynamics/Astronautics
General Dynamics/Convair
General Dynamics Corporation Electric
Boat Division

General Dynamics/Fort Worth
General Electric Company
General Electric Company, Flight
Propulsion Division
General Electric Co., Hanford Atomic
Products Operation
General Electric Company, Missile
And Space Division
General Electric Company, Nuclear Energy
Division
General Electric Company, Nuclear Materials
and Propulsion Operation
General Electric Research and Development
Center
General Electric Company, Space Sciences
Laboratory

Ingersoll-K/Borg W

Inst Environ Sci

Institute Gas Tech

Inter-Bur Tech Com

Interagency CRPG

Intermountain R+E

Internat Nickel

Iowa State U Sci/T

ITT Research Inst

J C Carter

J P Stevens

Jet Prop C/Purdu U

Jet Propulsion L

Johns Hopkins U

Kaiser Aluminum

U Kansas

Kem-Tech Labs

Kennedy Indus Coat

Koppers

Ladish

Lamont Geol Observ

Ingersoll Kalamazoo Division,
Borg-Warner Corporation

Institute of Environmental Sciences

Institute of Gas Technology

Inter-Bureau Technical Committee,
Navy Dept.

Interagency Chemical Rocket
Propulsion Group

Intermountain Research and Engineering
Company, Inc.

The International Nickel Company, Inc.

Iowa State University of Science and
Technology

ITT Research Institute

J. C. Carter Company

J. P. Stevens and Company, Inc.

Jet Propulsion Center, Purdue
University

Jet Propulsion Laboratory,
California Institute of Technology

Johns Hopkins University
See Also: Chemical Propellant
Information Agency, Applied
Physics Lab.

Kaiser Aluminum

University of Kansas

Kem-Tech Laboratories, Inc.

Kennedy Industrial Coatings, Inc.

Koppers Company, Inc.

Ladish Company

Lamont Geological Observatory

Langley Res (NASA)

Lawrence Radiat L

Leeds and Northrop

Lehigh U

Lessells + Assocs

Lewis Res C (NASA)

Lexington Labs

Library of Cong

Linde

Linde Air Prod

Link Ord Div/GP

Liquid Prop Inf Ag

Liquid Rock Prop L

Litton Systems

Lockheed Aircraft

Lockheed-Calif

Lockheed-Georgia

Lockheed Mis+Space

Lockheed-Prop

Los Alamos Sci Lab

Louisiana State U

U Louvain

Langley Research Center (NASA)

Lawrence Radiation Lab, University
of California

Leeds and Northrop Company

Lehigh University

Lessells and Associates, Inc.

Lewis Research Center (NASA)

Lexington Laboratories, Inc.
Cambridge, Mass

Library of Congress

Linde Company

The Linde Air Products Company

Link Ordnance Division, General
Precision, Inc.

Liquid Propellant Information
Agency, Applied Physics Laboratory,
The Johns Hopkins University
See Also: Chemical Propellant
Information Agency

Liquid Rocket Propulsion Laboratory,
Picatinny Arsenal

Litton Systems Incorporated

Lockheed Aircraft Corporation

Lockheed-California Company

Lockheed-Georgia Company

Lockheed Missiles and Space Company

Lockheed Propulsion Company

Los Alamos Scientific Laboratory

Louisiana State University

University of Louvain

Lovelace Fdn

Loyola U/LA

LTV Aerospace

Lycoming/AVCO

M W Kellog

Magna

Magna Products

Manlabs

Manufacturing Lab

Marquardt

Marquardt Aircraft

Marquette U

Martin

Martin-Marietta

U Maryland

Mass Inst of Tech

Materials Advis Bd

Materials Res Lab

Mathieson Chemical

McDonnell Aircraft

McGill U

McGraw-Hill Book

Med Col Virginia

Mellon Institute

Melpar

Lovelace Foundation for Medical
Education and Research

Loyola University of Los Angeles

LTV Aerospace Corporation

Lycoming, Division of AVCO Corp.

The M. W. Kellogg Co.

Magna Corporation

Magna Products

Manlabs, Inc.

Manufacturing Laboratories, Inc.

The Marquardt Corporation

Marquardt Aircraft Co.

Marquette University

The Martin Company

Martin-Marietta Corporation

University of Maryland

Massachusetts Institute of
Technology

Materials Advisory Board

Materials Research Laboratory, Inc.

Mathieson Chemical Corporation

McDonnell Aircraft Corporation

McGill University

McGraw-Hill Book Co., Inc.

Medical College of Virginia

Mellon Institute

Melpar, Incorporated

Metal Hydrides	Metal Hydrides Incorporated
Metaelectro	Metaelectro Corp.
MHD Research	MHD Research, Inc.
U Michigan	University of Michigan
Michigan State U	Michigan State University
Midwest Res Inst	Midwest Research Institute
Mine Safety Appli	Mine Safety Appliance Co., Gallery, Pa.
Ministry of Avi UK	Ministry of Aviation (U.K.)
Ministry of Def UK	Ministry of Defense (U.K.)
Ministry of Sup UK	Ministry of Supply (U.K.)
Minneapolis-Honey	Minneapolis-Honeywell Regulator Company
U Minnesota	University of Minnesota
Minnesota Min+Mfg	Minnesota Mining and Manufacturing Company
Miss State U	Mississippi State University
Monsanto Chemical	Monsanto Chemical Company
Monsanto Chemicals	Monsanto Chemical Ltd.
Monsanto Research	Monsanto Research Corporation
U Munich	University of Munich
Narmco Research+D	Narmco Research and Development
Nat Acad Sciences	National Academy of Sciences
Nat Adv Comm Aero	National Advisory Committee for Aeronautics See Also: National Aeronautics and Space Administration
Nat Aero+Spa Admin	National Aeronautics and Space Administration See Also: George C. Marshall Space Flight Center, Goddard Space Flight Center, Langley Research Center, Lewis Research Center

Nat Bur Standards
Nat Cash Register
Nat Engineering Sc

Nat Gas Turbine Es

National Beryllia

National Carbon

National Research

Naval Air Devel C

Naval Air Mat C

Naval Air Mis TC

Naval Air Rock TS

Naval Air Test C

Naval Eng Exper S

Naval Gun Factory

Naval Missile C

Naval Ordnance Lab

Naval Ordnance Sta

Naval Ordnance TS

Naval Powder Fact

Naval Propellent P

Naval Proving Grd

Naval Rad Def Lab

Naval Research Lab

Naval Torpedo S

Naval Under Ord S

Naval Weapons Lab

National Bureau of Standards

National Cash Register Co.

National Engineering Science
Company

National Gas Turbine Establishment
(U.K.)

National Beryllia Corporation

National Carbon Company

National Research Corporation

Naval Air Development Center

Naval Air Material Center

Naval Air Missile Test Center

Naval Air Rocket Test Station

Naval Air Test Center

Naval Engineering Experiment Station

Naval Gun Factory

Naval Missile Center

Naval Ordnance Laboratory

Naval Ordnance Station

Naval Ordnance Test Station

Naval Powder Factory

Naval Propellant Plant

Naval Proving Ground, Dahlgren, Va.

Naval Radiological Defense Laboratory

Naval Research Laboratory

Naval Torpedo Station

Naval Underwater Ordnance Station

Naval Weapons Laboratory

New Eng Mat Lab	New England Materials Laboratory, Inc.
U New Mexico	University of New Mexico
New York Nav Ship	New York Naval Shipyard
New York U	New York University
Newark College Eng	Newark College of Engineering
Newmark Hans et al	Newmark, Hansen and Associates
North Am Aviation	North American Aviation, Inc. See Also: Atomics International Rocketdyne
North Atlantic Cl	North Atlantic Council
North Atlantic T O	North Atlantic Treaty Organization
North Carolina Col	North Carolina College
U North Dakota	University of North Dakota
Northern Ordnance	Northern Ordnance Incorporated
Northern Res+Eng	Northern Research and Engineering Corporation
Northrop	Northrop Corporation
Northrop Carolina	Northrop Carolina, Incorporated
Northrop Norair	Northrop Norair, A Division of Northrop Corporation
Northrop Space Lab	Northrop Space Laboratories
Northwestern U	Northwestern University
U Notre Dame	University of Notre Dame
Nuclear Util Serv	Nuclear Utility Services, Inc.
Nuclionics	Nuclionics
Oak Ridge Nat Lab	Oak Ridge National Laboratory
Off Aerospace Res	Office of Aerospace Research
Off Chief Naval Op	Office of the Chief of Naval Operations

Office Nav Res

Office Nav Res/Lon

Office Naval Intel

Ohio State U

Ohio State U Res F

Olin Industries

Olin Mathieson

Operat Anal Of/SAC

Ordnance Corps

Oregon State U

Owens-Corning Fib

Ozark-Mahoning

Packard-Bell Elect

Parker Aircraft

Parsons

Peninsular Chemres

Penn Salt Mfg

Pennsalt Chemicals

U Pennsylvania

Pennsylvania State

Perkin-Elmer

Pesco Prod/Borg-W

Philco

Philco-Ford

Office of Naval Research,
Washington

Office of Naval Research,
London

Office of Naval Intelligence

Ohio State University

Ohio State University Research
Foundation

Olin Industries, Inc.

Olin Mathieson Chemical Corp.

Operations Analysis Office,
Strategic Air Command

Ordnance Corps

Oregon State University

Owens-Corning Fiberglas Corp.

Ozark-Mahoning Company

Packard-Bell Electronics Corporation

Parker Aircraft Company

The Parsons Corporation

Peninsular Chemresearch Incorporated

Pennsylvania Salt Manufacturing
Company

Pennsalt Chemicals Corporation

University of Pennsylvania

Pennsylvania State University

The Perkin-Elmer Corporation

Pesco Products Division, Borg-
Warner Corporation

Philco Corporation

Philco-Ford Corporation

Phillips Petroleum

Picatinny Arsenal

Picker X-ray

Planning Research

Plasmadyne

Plast Tech Eval C

Polytech in Bklyn

Potter Pacific

Pratt-Whitney AC

Princeton U

Purdue Research Fdn

Purdue Research Inst

Purdue U

Pyrogenics

Pyronetics

Quantum

Queens College

Rad Effects Info C

RAI Research

Ramo-Woolridge

Rand

Raytheon

Raytheon Mfg

Phillips Petroleum Company

Picatinny Arsenal

See Also: Liquid Rocket
Propulsion Laboratory

Picker X-ray Corporation

Planning Research Corporation

Plasmadyne Corporation

Plastics Technical Evaluation Center

Polytechnic Institute of Brooklyn

Potter Pacific Corporation

Pratt and Whitney Aircraft

Princeton University

Purdue Research Foundation

Purdue Research Institute

Purdue University
See Also: Jet Propulsion
Center

Pyrogenics, Inc.

Pyronetics, Inc.

Quantum, Inc.

Queens College

Radiation Effects Information
Center, Battelle Memorial
Institute

RAI Research Corporation

The Ramo-Woolridge Corporation

The Rand Corp

Raytheon Company

Raytheon Manufacturing Company

RCA/Def Elect Prod

RCA/Electro Comp+D

RCA Laboratories

Reaction Motors

Red Sci Info C

Redel

Redstone Arsenal

Rensselaer Poly In

Republic Aviation

Republic Steel

Res+Tech Div/AFSC

Research Chemicals

Research Mgt Assoc

Resin Research L

Revere Laboratories

U Rhode Island

Rock Res L SSD Eaw

Rocket Power

Rocket Prop Estab

Rocket Prop Lab

Radio Corporation of America. Defense
Electronic Products

Radio Corporation of America. Electronic
Components and Devices

Radio Corporation of America Laboratories

Reaction Motors Division
See: Thiokol Chemical Corporation,
Reaction Motors Division

Reaction Motors, Incorporated

Redstone Scientific Information Center

Redel, Inc.

Redstone Arsenal, Army Missile Command
See Also: Army Rocket and Guided
Missile Agency

Rensselaer Polytechnic Institute

Republic Aviation Corp

Republic Steel Corporation

Research and Technology Division,
Air Force Systems Command

Research Chemicals

Research Labs., United Aircraft Corp.
See: United Aircraft Research Labs.

Research Management Associates, Inc.

Resin Research Laboratories, Inc.

Revere Laboratories

University of Rhode Island

Rocket Research Laboratory, Space
Systems Division, Edwards AFB

Rocket Power Incorporated

Rocket Propulsion Establishment (U.K.)

Rocket Propulsion Laboratory

Rocket Research

Rocketdyne/NAA

Rockwood Sprinkler

Rohm + Haas

Rome Air Develop C

Royal Aircraft Est

Royal Arm R+D Est

Saint Louis U

Sandia

Sandia Lab

Sciaky Bros

Sharpley Labs

Shell Development

Soc Aero M+P Eng

Socony Mobil Oil

Solar

Solid Prop Info Ag

U Southern Calif

Southern Method U

Southern Res Inst

Southwest Res Ins

Space-General

Rocket Research Corporation, Seattle

Rocketdyne, A Division of North
American, Inc.

Rockwood Sprinkler Company

Rohm and Haas Company

Rome Air Development Center

Royal Aircraft Establishment (U.K.)

Royal Armament Research and Development
Establishment (U.K.)

Saint Louis University

Sandia Corporation

Sandia Laboratory, Albuquerque,
N.M.

Sciaky Bros. Inc.

Sharpley Laboratories, Inc.

Shell Development Company

Society of Aerospace Material and
Process Engineers

Socony Mobil Oil Company, Inc.

Solar

Solid Propellant Information Agency,
Applied Physics Laboratory, The
Johns Hopkins University
See Also: Chemical Propulsion
Information Agency

University of Southern California

Southern Methodist University

Southern Research Institute

Southwest Research Institute

Space-General Corporation

Space Sys Div/AFSC

Space Sys Div Edw

Space Technology L

Sperry Products

Sperry Rand

Standard Oil/Ind

Stanford Res Inst

Stanford U

Starnes

Stauffer-Aerojet

Stauffer-Chemical

Stevens Inst Tech

Strategic Air Comd

Sundstrand Aviat

Sundstrand Turbo

Sunstrand Aviation

Sylvania Elec Prod

Syracuse U

Syracuse U Res In

Systems America

Systems Research L

Tapco/Thomp Ramo W

Tech Adv Pan F+L

Space Systems Fivision, Air Force
Systems Command

Space Systems Division, Edwards AFB
See Also: Rocket Research
Laboratory

Space Technology Laboratories

Sperry Products, Inc.

Sperry Rand Corporation

Standard Oil Company (Indiana)

Stanford Research Institute

Stanford University

The Starnes Company

Stauffer-Aerojet Chemical Company

Stauffer Chemical Company

Stevens Institute of Technology

Strategic Air Command

Sundstrand Aviation

Sundstrand Turbo

Sunstrand Aviation

Sylvania Electric Products, Inc.

Syracuse University

Syracuse University Research
Institute

Systems Corporation of America

Systems Research Laboratories, Inc.

Tapco, Division of Thompson Ramo
Wooldridge, Inc.

Technical Advisory Panel on Fuels
and Lubricants (Assistant Secretary
of Defense (R+D))

Technical Operat	Technical Operations Incorporated
Technidyne	Technidyne, Incorporated
Technology	Technology, Incorporated
Tem-Press Research	Tem-Press Research, Inc.
Temple U Res Inst	Temple University, Research Institute
Tempo/Gen Elect	Tempo General Electric Company
Tennessee	Tennessee Corporation
U Tennessee	University of Tennessee
Texaco	Texaco Incorporated
Texaco Experiment	Texaco Experiment Incorporated
Texaco Research C	Texaco Research Center
Texas Instruments	Texas Instruments Incorporated
Texas Metal+Mfg	Texas Metal and Manufacturing Co.
U Texas	University of Texas
Thiokol Chem	Thiokol Chemical Corporation See Also: Reaction Motors Division
Thiokol Chem/Alph	Thiokol Chemical Corporation, Alpha Division
Thiokol Chem/Brist	Thiokol Chemical Corporation, Bristol Division
Thiokol Chem/Chem	Thiokol Chemical Corporation, Chemical Operations
Thiokol Chem/Elkto	Thiokol Chemical Corporation, Elkton Division
Thiokol Chem/Hunts	Thiokol Chemical Corporation, Huntsville Division
Thiokol Chem/Nucl	Thiokol Chemical Corporation, Nuclear Development Center
Thiokol Chem/React	Thiokol Chemical Corporation, Reaction Motors Division

Thiokol Chem/Red	Thiokol Chemical Corporation, Redstone Division
Thiokol/Rock	Thiokol Chemical Corporation, Rocket Operations Center
Thiokol Chem/Space	Thiokol Chemical Corporation, Space Booster Division
Thiokol Chem/Wasat	Thiokol Chemical Corporation, Wasatch Division
Thompson Products	Thompson Products, Inc.
Thompson Ramo Wool	Thompson Ramo Wooldridge, Inc. See Also: Tapco
Titanium Met Amer	Titanium Metals Corporation of America
U Toronto	University of Toronto
Tracerlab	Tracerlab
Transducer Info C	Transducer Information Center
Transp Tech Res In	Transportation Technical Research Institute (Tokyo)
TRG	TRG Incorporated
TRW	TRW Incorporated
TRW Space Tech Lab	TRW Space Technology Labs
TRW Systems	TRW Systems, Inc.
Tufts U	Tufts University
Tulane U	Tulane University
Tyco Labs	Tyco Laboratories, Inc.
Un Car Res Assoc	Union Carbide European Research Associates (Brussels)
Union Carbide	Union Carbide Corporation
Union Carbide Chem	Union Carbide Chemicals Company
Union Car Res Inst	Union Carbide Research Institute

Uniroyal	Uniroyal, Incorporated
United Aircraft	United Aircraft Corporation
United Aircraft/RI.	United Aircraft Research Laboratories
United Technology	United Technology Corporation
UK Atomic Energy A	United Kingdom Atomic Energy Authority (U.K.)
Universal Chem Sys	Universal Chemical Systems, Inc.
Universal Match	Universal Match Corporation
Universal Oil Prod	Universal Oil Products Co.
URS	URS Corporation
	U.S. Atomic Energy Commission See: Atomic Energy Commission
	U.S. Forest Service See: Forest Service. U.S. Dept. of Agriculture
US Borax Research	U.S. Borax Research Corporation
US Industrial Chem	U.S. Industrial Chemicals Company
US Public Health S	United States Public Health Service
US Steel/App Res L	United States Steel Corporation, Applied Research Laboratory
US Stoneware	The United States Stoneware Company
U Utah	University of Utah
Value Engineering	Value Engineering Company
U Vermont	University of Vermont
Vidya/Itek	Vidya, Division of Itek Corporation
U Vienna	University of Vienna
U Virginia	University of Virginia
Visking	The Visking Corporation

Vitro Engineering
Vitro Laboratories
Walter Kidde
Warner + Swasey
U Washington
Watertown Arsenal
Welsbach
Western Gear
Western Reserve U
Westinghouse Ast L
Westinghouse Elec
Westinghouse Res L
White Sands Prov G
Willow Run Res C
U Wisconsin
Wright Air Devel C
Wright Air Devel D
Wyandotte Chemicals
Wyle
Young Development

Vitro Engineering Company
Vitro Laboratories
Walter Kidde and Company
The Warner and Swasey Company
University of Washington
Watertown Arsenal
The Welsbach Corp.
Western Gear Corporation
Western Reserve University
Westinghouse Astronuclear Laboratory
Westinghouse Electric Corporation
Westinghouse Research Laboratories
White Sands Proving Ground
Willow Run Research Center
University of Wisconsin
Wright Air Development Center
Wright Air Development Division
Wyandotte Chemical Corporation
Wyle Laboratories
Young Development Laboratories

2. CORPORATE SOURCE AUTHORITY LIST

Aberdeen Proving Ground	Aberdeen Prov Grd
Acoustica Associates	Acoustica Assocs
Ad Hoc Group on Solid-Propellant Instability of Combustion. Advisory Panel on Fuels and Lubricants	Advis Pan on Fuels
Ad Hoc Group on Solid-Propellant Instability of Combustion. Advisory Panel on Ordnance, Transport, and Supply	Advis Pan on Ord
Adaptronics, Incorporated	Adaptronics
Admiralty Materials Laboratory (U.K.)	Adm Mat Lab UK
Advanced Metals Research Corp.	Adv Metals Res Lab
Advisory Group for Aeronautical Research and Development	Advis Grp Aero R+D
Aerochem Research Laboratories	Aerochem Res Lab
Aerojet Engineering Corp	Aerojet Eng
Aerojet-General Corporation, Advanced Systems	Aerojet-Gen/Adv Sy
Aerojet-General Corporation, Aerovessels Division	Aerojet-Gen/Aerov
Aerojet-General Corporation, Astron-Covina Plant	Aerojet-Gen/Astron
Aerojet-General Corporation, Astrionics	Aerojet-Gen/Astri
Aerojet-General Corporation, Asusa	Aerojet-Gen/AZU
Aerojet-General Corporation, Chemical Division	Aerojet-Gen/Chem
Aerojet-General Corporation, Liquid Rocket Plant	Aerojet-Gen/Liquid
Aerojet-General Corporation, Nucleonics	Aerojet-Gen/Nucl
Aerojet-General Corporation, Ordnance Division	Aerojet-Gen/Ord
Aerojet-General Corporation, REON Division	Aerojet-Gen/REON
Aerojet-General Corporation, Research Division	Aerojet-Gen/Res

Aerojet-General Corporation, Rocket Engine Operations - Nuclear	Aerojet-Gen/Rocket
Aerojet-General Corporation, Sacramento	Aerojet-Gen/Sacra
Aerojet-General Corporation, Solid Rocket Plant	Aerojet-Gen/Solid
Aerojet-General Corporation, Von Karman Center	Aerojet-Gen/VonKar
Aeronautical Research Associates of Princeton, Inc.	Aeron Res Assocs P
Aeronautical Research Council (U.K.)	Aeron Res C UK
Aeronautical Systems Division	Aeronautical Sys D
Aeronca Manufacturing Corp.	Aeronca Mfg.
Aeronutronic, Division of Ford Motor Co.	Aeronutronic/Ford
Aerophysics Development Corporation	Aerophysics Dev
Aeroprojects, Inc.	Aeroprojects
Aeroquip Corporation	Aeroquip
Aerospace Chemical Systems, Inc.	Aerospace Chem Sys
Aerospace Corp.	Aerospace
Aerospace Research Associates	Aero Res Assocs
Aerospace Research Laboratories	Aero Res Labs
Aerospace Technical Intelligence Center	Aero Tech Intel C
Air Force Aero Propulsion Laboratory	AF Aero Prop Lab
Air Force Aerospace Medical Research Labs	AF Aero Med Res L
Air Force Ballistic Missile Division	AF Ballis Mis Div
Air Force Flight Test Center	AF Flight Test C
Air Force Institute of Technology	AF Inst Technology
Air Force Logistics Command	AF Logistics Comd
Air Force Materials Laboratory	AF Materials Lab
Air Force Missile Development Center	AF Missile Deval C
Air Force Office of Scientific Research	AF Office Sci Res

Air Force Rocket Propulsion Laboratory	AF Rocket Prop Lab
Air Force Special Weapons Center	AF Spec Weapons C
Air Force Systems Command	AF Systems Comd
Air Force Weapons Laboratory	AF Weapons Lab
Air Materiel Command	Air Materiel Comd
Air Products, Inc	Air Products
Air Products and Chemicals, Inc.	Air Prod and Chem
Air Reduction Company, Inc.	Air Reduction
Air Research and Development Command	Air R+D Comd
Air Technical Intelligence Center	Air Tech Intell C
Air University	Air University
Airesearch Manufacturing Company, Division of the Garrett Corporation. See: The Garrett Corporation, Airesearch Manufacturing Co. Division	
Alcoa Research Laboratory	Alcoa Res Lab
Alcor, Inc.	Alcor
Allen B. Dumont Laboratories, Inc.	Allen B. Dumont L
Allied Chemical Corp.	Allied Chemical
Allied Chemical & Dye Corp.	Allied Chem + Dye
Allied Research Associates, Inc.	Allied Res Assocs
Allison Division of General Motors Corporation	Allison/GMC
Alloyd Electronics Corporation	Alloyed Electronics
Althea Revere, Vineyard Haven, Mass.	Althea Revere
Aluminum Company of America	Alum Co. America
Aluminum Research Laboratories	Aluminum Res Labs
Amcel Propulsion, Inc.	Amcel Propulsion
American Cyanamid Company	Am Cyanamid
American Machine and Foundry Corp.	Am Mach + Foundry

American Potash and Chemical Corp.

American Radiator and Standard Sanitary
Corporation

American Reinforced Plastics Company

American Society of Mechanical Engineers

Analytic Services, Incorporated

A. O. Smith Corp.

Applied Physics Lab., Johns Hopkins
University

Applied Science Laboratories, Inc.

Arde Associates

Argonne National Laboratory

Armed Forces Special Weapons Project

Armed Services Explosives Safety Board

Armed Services Technical Information Agency

Armour Research Foundation

Army Ballistic Missile Agency

Army Chemical Center

Army Library, Washington D.C.

Army Materials Research Agency

Army Missile Command
See: Redstone Arsenal

Army Missile Test Center

Army Rocket and Guided Missile Agency
See Also: Redstone Arsenal

Arnold Engineering Development Center

ARO, Inc.

Arthur D. Little, Inc.

Ashland Oil and Refining Company

Am Potash and Chem

Amer Rad + Std Sanit

Amer Rein Plastics

Amer Soc Mech Eng

Analytic Services

A O Smith

App Phys L J Hop U

Applied Science L

Arde Associates

Argonne National L

Armed Forces SWP

Arm Ser Explo Safe

ASTIA

Armour Res Fdn

Army Ballistic MA

Army Chem Center

Army Library

Army Materials Res

Army Missile Test/C

Army Rocket GMA

Arnold Eng. Dev C

ARO

Arthur D. Little

Ashland Oil + Ref

Astro, a division of the Marguardt Corp.	ASTRO
Astrodyne, Incorporated	Astrodyne
Astropower, Inc.	Astropower
Astrosystems International, Inc.	Astrosystems Int
Atlantic Research Corp.	Atlantic Research
Atomic Energy Commission	Atomic En Com
Atomic Energy Commission, Division of Technical Information	Atom En Com/DTI
Atomic Weapons Research Establishment	Atom Weap Res Est
Atomics International, North American Aviation	Atomics Int/MAA
Auburn University	Auburn U
Automation Industries, Inc.	Automation Ind.
Autometric Corporation	Autometric
AVCO Corporation See Also: Lycoming Division	AVCO
AVCO-Everett Research Laboratory	AVCO-Everett Res L
Babcock and Wilcox Co., Research Center	Babcock Wilcox Res
Ballistic Research Laboratories	Ballistic Res Lab
Ballistic Systems Division	Ballistic Sys Div
Battelle Memorial Institute See Also: Defense Metals Information Center Radiation Effects Information Center	Battelle Memorial
Battelle-Northwest (Pacific Northwest Laboratory operated by Battelle)	Battelle-Northwest
Becco Chemical Division, Food Machinery and Chemical Corp.	Becco Chemical/FMC
Beech Aircraft Corporation	Beech Aircraft
Beechcraft Research and Development	Beechcraft R+D
Bell Aerosystems Company	Bell Aerosystems
Bell Aircraft Corporation	Bell Aircraft

Bendix Aviation Corporation	Bendix Aviation
The Bendix Corporation	Bendix
Bermite Powder Company	Bermite Powder
The Beryllium Corporation	Beryllium
Bethlehem Steel Co.	Bethlehem Steel
Bettis Atomic Power Laboratory, Pittsburgh, Pa.	Bettis Atomic Pow L
Bjorksten Research Laboratories, Inc.	Bjorksten Res Lab
The Boeing Company	Boeing
Bolt Beranek and Newman, Inc.	Bolt Beranek et al
Booz, Allen & Hamilton	Booz Allen + Ham
Borg-Warner Corporation See also: Pesco Products Division	Borg-Warner
University of British Columbia	U British Columbia
The British Oxygen Co.	British Oxygen
Brown University	Brown U
Brunswick Corp.	Brunswick
Brush Beryllium Company	Brush Beryllium
University of Brussels	U Brussels
Bucyrus-Erie Company	Bucyrus-Erie
Buffalo Electro-Chemical Company, Inc.	Buffalo Elect-Chem
University of Buffalo	U of Buffalo
Building Research Station, Watford, England	Building Res Sta
Bureau of Aeronautics	Bureau Aeronautics
Bureau of Mines	Bureau of Mines
Bureau of Ships	Bureau of Ships
California Institute of Technology See Also: Jet Propulsion Laboratory Guggenheim Aeronautical Labs Guggenheim Jet Propulsion Center	Calif Inst of Tech

California Research Corp.	California Res
University of California	U California
University of California at Los Angeles	U California L A
Callery Chemical Company	Callery Chemical
Cambridge Corporation	Cambridge
Canadian Armament Research and Development Establishment	Canadian Arm R+D
Canadian Research and Development Establishment	Canadian R+D Estab
Carborundum Company	Carborundum
Carnegie Institute of Technology	Carnegie Inst Tech
Case Institute of Technology	Case Inst Tech
Catholic University of America	Catholic U America
Celestial Research Corp.	Celestial Research
Century Engineers Inc.	Century Engineers
Chance Vought Corporation	Chance Vought
Chemical Defense Experimental Establishment (U.K.)	Chem Def Exp Est
Chemical Propulsion Information Agency. Johns Hopkins University. See Also: Liquid Propellant Information Agency Solid Propellant Information Agency	Chem Prop Info Ag
Chicago Aerial Industries, Inc.	Chicago Aerial Ind
University of Chicago	U Chicago
Chrysler Corporation	Chrysler
University of Cincinnati	U Cincinnati
Clemson College	Clemson College
Cleveland Industrial Research, Inc.	Cleveland Ind Res
Clevite Corporation	Clevite
Climax Molybdenum Company of Michigan	Climax Molyb/Mich
Coated Textile Mills, Inc.	Coated Text Mills

College of Aeronautics (U.K.)	College of Aero UK
College Placement Council, Inc.	College Place Coun
Colorado School of Mines Research Foundation	Colo Sch Mines RF
University of Colorado	U Colorado
Columbia Radiation Laboratory	Columbia Radiat L
Combustion and Explosives Research, Inc.	Combust + Explos Res
Commercial Solvents Corporation	Commercial Solvent
Committee on Fuels and Lubricants, Research Development Board	Comm Fuels + Lub
Committee on Undersea Warfare, National Research Council	Comm Under Warfare
Compo Tek Inc., Palo Alto	Compo Tek
Conesco, Inc.	Conesco
Connecticut Hard Rubber Company	Conn Hard Rubber
Convair Astronautics See also: General Dynamics/Convair	Convair Astro
Convair, Fort Worth	Convair/Ft Worth
Convair, Thermodynamics Laboratory	Convair/Thermo L
Coordinating Research Council, Inc.	Coordinating Res C
University of Copenhagen	U Copenhagen
Cornell Aeronautical Laboratory, Inc.	Cornell Aeron Lab
Cornell University	Cornell U
Cosmodyne Corporation	Cosmodyne
Curtiss-Wright Corporation	Curtiss-Wright
Daniel, Mann, Johnson, and Mendenhall	Daniel Mann et al
University of Dayton	U Dayton
University of Dayton Research Institute	U Dayton Res Inst
Debell and Richardson, Inc.	Debell + Richardson

Defense Documentation Center	Defense Document C
Defense Metals Information Center	Def Metals Info C
Defense Research Corporation	Defense Research
Defense Research Laboratories	Defense Research L
University of Delaware	U Delaware
University of Denver	U Denver
Denver Research Institute	Denver Research In
Department of the Air Force	Dept Air Force
Department of Defense, Washington D.C.	Dept of Defense
Diamond Alkali Company	Diamond Alkali
Directorate of Advanced Systems Technology	Dir Advanced Sys T
Directorate of Aerospace Safety	Dir Aerospace Saf
Directorate of Rocket Propulsion and Missiles	Dir Rock Prop+Mis
Douglas Aircraft Company, Inc.	Douglas Aircraft
The Dow Chemical Company	Dow Chemical
Dow Corning Corporation	Dow Corning
University of Durham	U Durham
Dynamic Science Corporation	Dynamic Science
Dynatech Corporation	Dynatech
E. H. Sargent & Co.	E H Sargent
E. I. Du Pont de Nemours and Company	E I Du Pont de Nem
Edgewood Arsenal	Edgewood Arsenal
The Edwal Laboratories, Inc.	Edwal Labs
Electro Jet Corporation	Electro Jet
Electro-Mechanical Laboratory	Electro-Mech Lab
Electro Optical Systems, Inc.	Electro Optical Sy

Electro-Thermal Industries, Inc.	Electro-Thermal Inds
Electronic Systems Development Corp	Electronic Sys Dev
Electronics Corporation of America	Electronics Amer
Emerson Electric Co.	Emerson Electric
Esso Research and Engineering Co.	Esso Research+Eng
Ethyl Corporation	Ethyl
European Atomic Energy Community	Europe Atom En Com
Evans Research and Development Corp	Evans R+D
Excelco Development, Inc.	Excelco Develop
Experiment Incorporated	Experiment Incorp
Explosives Research and Development Establishment (U.K.)	Explosives R+D Est
Fairchild Camera and Instrument Corporation	Fairchild Cam+Inst
Fairchild Engine Division, Fairchild Engine and Airplane Corp.	Fairchild Engine D
Fairchild Stratos Corporation	Fairchild Stratos
Fansteel Metallurgical Corporation	Fansteel Metallurg
Fine Organics, Inc., New York	Fine Organics
Firestone Tire & Rubber Company	Firestone Tire+Rub
University of Florida	U. Florida
The Fluor Corporation	Fluor
FMC Corporation	FMC
Food Machinery and Chemical Corp.	Food Machine+Chem
Foreign Technology Division, Edwards AFB	For Tech Div Edw
Foreign Technology Division, Wright-Patterson AFB	For Tech Div WPAFB
Forest Products Laboratory	Forest Products L
Forest Service. U.S. Dept. of Agriculture	Forest Service

Fram Corporation, Providence, R. I.	Fram
Frankford Arsenal	Frankford Arsenal
Franklin Institute	Franklin Inst
The Franklin Institute Research Laboratories	Frank Inst Res Lab
Frebank Company	Frebank
Fundamental Methods Associates, Inc.	Fund Method Assocs
The Garrett Corp	Garrett
The Garrett Corporation, Aircsearch Manufacturing Co. Division	Garrett/Aircsearch
General American Transportation Corp.	Gen American Trans
General Applied Science Laboratories	Gen Applies Sci L
General Atomic Division, General Dynamics	General Atomic
General Dynamics/Astronautics	Gen Dynamics/Astro
General Dynamics/Convair	Gen Dynamics/Conv
General Dynamics Corporation Electric Boat Division	Gen Dynamics/El Bo
General Dynamics/Fort Worth	Gen Dynamics/Ft Wo
General Electric Company	Gen Elect
General Electric Company, Flight Propulsion Division	Gen Elect/Flight P
General Electric Co, Hanford Atomic Products Operation	Gen Elect/Hanford
General Electric Company, Missile and Space Division	Gen Elect/Missile
General Electric Company, Nuclear Energy Division	Gen Elect/Nucl En
General Electric Company, Nuclear Materials and Propulsion Operation	Gen Elect/Nucl M+P
General Electric Research and Development Center	Gen Elect R+D C
General Electric Company, Space Sciences Laboratory	Gen Elect/Spa Sci

General Electric Company, Spacecraft Department	Gen Elect/Spacecr
General Electric Company, Valley Forge Space Technology	Gen Elect/V Forge
General Kinetics, Inc.	General Kinetics
General Motors Corporation	Gen Motors
General Steel Industries, Inc.	General Steel Ind
General Technologies Corporation	Gen Technologies
General Telephone and Electronics Lab	Gen Tel+Electron L
Geophysics Research Directorate (AFGRL)	Geophysics Res Dir
George C. Marshall Space Flight Center	GC Marshall (NASA)
Georgia Institute of Technology	Georgia Inst. Tech
Goddard Space Flight Center (NASA)	Goddard SFC (NASA)
B. F. Goodrich Company	B F Goodrich
Goodyear Aerospace Corporation	Goodyear Aerospace
Goodyear Aircraft Corporation	Goodyear Aircraft
W. R. Grace and Company	W R Grace
Grand Central Rocket Co.	Grand Central Rock
Grumman Aircraft Engineering Corp.	Grumman Air Eng
Guggenheim Aeronautical Laboratory	Guggenheim Aero L
Guggenheim Jet Propulsion Center	Guggenheim JPC
H. I. Thompson Fiber Glass Company	H I Thomp Fiber Gl
Harry Diamond Laboratories	Harry Diamond Labs
The Harshaw Chemical Co.	Harshaw Chemical
Harvard University	Harvard U
Hayes Aircraft Corporation	Hayes Aircraft
Hefco Laboratories, Inc.	Hefco Labs
Hercules Incorporated	Hercules

Hercules Powder Company	Hercules Powder
Hexcel Products, Inc.	Hexcel Products
High Temperature Materials, Inc.	High Temp Material
Holloman Air Development Center	Holloman Air Dev C
Honeywell, Incorporated	Honeywell
Hooker Chemical Corp.	Hooker Chemical
Horizons, Inc.	Horizons
Houston Engineering Corporation	Houston Engineer
Houston Research Institute, Inc.	Houston Res Inst
Hughes Aircraft Company, Fullerton	Hughes-Fullerton
Hughes Aircraft Corporation	Hughes Aircraft
Hughes Research Laboratories	Hughes Research L
Hughes Tool Co.	Hughes Tool
Hycron Mfg. Company	Hycron Mfg
Hydro-Aire Inc	Hydro-Aire
Hynes Chemical Research Corp.	Hynes Chemical Res
University of Illinois	U Illinois
Illinois Institute of Technology	Illinois Inst Tech
Imperial Chemical Industries Limited	Imperial Chemical
Imperial College of Science and Technology (U.K.)	Imperial Col Sci
Indium Corporation of America	Indium Corp Amer
Industrial Research Institute, University of Chattanooga	Ind Res Inst/UCHAT
Ingersoll Kalamasco Division, Borg-Warner Corporation	Ingersoll-K/Borg W
Institute for Defense Analyses	In Def Analyses
Institute of Environmental Sciences	Inst Environ Sci
Institute of Gas Technology	Institute Gas Tech

Inter-Bureau Technical Committee, Navy Dept.	Inter-Bur Tech Com
Interagency Chemical Rocket Propulsion Group	Interagency CRPG
Intermountain Research and Engineering Company, Inc.	Intermountain R+E
International Business Machines Corporation Electronic Systems Center	IBM/Elect Sys C
The International Nickel Company, Inc.	Internat Nickel
Iowa State University of Science and Technology	Iowa State U Sci/T
ITT Research Institute	ITT Research Inst
J. C. Carter Company	J C Carter
J. P. Stevens and Company, Inc.	J P Stevens
Jet Propulsion Center, Purdue University	Jet Prop C/Purdu U
Jet Propulsion Laboratory, California Institute of Technology	Jet Propulsion L
Johns Hopkins University See Also: Chemical Propellant Information Agency Applied Physics Lab	Johns hopkins U
Kaiser Aluminum	Kaiser Aluminum
University of Kansas	U Kansas
Kem-Tech Laboratories, Inc.	Kem-Tech Labs
Kennedy Industrial Coatings, Inc.	Kennedy Indus Coat
Koppers Company, Inc.	Koppers
Ladish Company	Ladish
Lamont Geological Observatory	Lamont Geol Observ
Langley Research Center (NASA)	Langley Res (NASA)
Lawrence Radiation Lab, University of California	Lawrence Radiat L
Leeds and Northrop Company	Leeds and Northrop
Lehigh University	Lehigh U
Lessells and Associates, Inc.	Lessells+Assoc
Lewis Research Center (NACA)	Lewis Res C (NASA)

Lexington Laboratories, Inc. Cambridge, Mass.	Lexington Labs
Library of Congress	Library of Cong
The Linde Air Products Company	Linde Air Prod
Linde Company	Linde
Link Ordnance Division, General Precision, Inc.	Link Ord Div/GP
Liquid Propellant Information Agency Applied Physics Laboratory, The Johns Hopkins University See Also: Chemical Propellant Information Agency	Liquid Prop Inf Ag
Liquid Rocket Propulsion Laboratory, Picatinny Arsenal	Liquid Rock Prop L
Litton Systems Incorporated	Litton Systems
Lockheed Aircraft Corporation	Lockheed Aircraft
Lockheed-California Company	Lockheed-Calif
Lockheed-Georgia Company	Lockheed-Georgia
Lockheed Missiles and Space Company	Lockheed Mis+Space
Lockheed Propulsion Company	Lockheed-Prop
Los Alamos Scientific Laboratory	Los Alamos Sci L
Louisiana State University	Louisiana State U
University of Louvain	U Louvain
Lovelace Foundation for Medical Education and Research	Lovelace Fdn
Loyola University of Los Angeles	Loyola U/LA
LTV Aerospace Corporation	LTV Aerospace
Lycoming, Division of AVCO Corp.	Lycoming/AVCO
The M. W. Kellog Co.	M W Kellog
Magna Corporation	Magna
Magna Products	Magna Products
Manlabs, Inc.	Manlabs

Manufacturing Laboratories, Inc.	Manufacturing Lab
Marquardt Aircraft Co.	Marquardt Aircraft
The Marquardt Corporation	Marquardt
Marquette University	Marquette U
The Martin Company	Martin
Martin-Marietta Corporation	Martin-Marietta
University of Maryland	U Maryland
Massachusetts Institute of Technology	Mass Inst of Tech
Materials Advisory Board	Materials Advis Bd
Materials Research Laboratory, Inc.	Materials Res Lab
Mathieson Chemical Corporation	Mathieson Chemical
McDonnell Aircraft Corporation	McDonnell Aircraft
McGill University	McGill U
McGraw-Hill Book Co., Inc.	McGraw-Hill Book
Medical College of Virginia	Med Col Virginia
Mellon Institute	Mellon Institute
Melpar, Incorporated	Melpar
Metal Hydrides Incorporated	Metal Hydrides
Metalectro Corps.	Metalectro
MHD Research, Inc.	MHD Research
University of Michigan	U Michigan
Michigan State University	Michigan State U
Midwest Research Institute	Midwest Res Inst
Mine Safety Appliances Co., Callery, Pa.	Mine Safety Appli
Ministry of Aviation (U.K.)	Ministry of Avi UK
Ministry of Defense (U.K.)	Ministry of Def UK
Ministry of Supply (U.K.)	Ministry of Sup UK

Minneapolis-Honeywell Regulator Company	Minneapolis-Honey
University of Minnesota	U Minnesota
Minnesota Mining and Manufacturing Co.	Minnesota Min+Mfg
Mississippi State University	Miss State U
Monsanto Chemical Company	Monsanto Chemical
Monsanto Chemicals Ltd.	Monsanto Chemicals
Monsanto Research Corporation	Monsanto Research
University of Munich	U Munich
Narmco Research and Development	Narmco Research+D
National Academy of Sciences	Nat Acad Sciences
National Advisory Committee for Aeronautics See Also: National Aeronautics and Space Administration	Nat Adv Comm Aero
National Aeronautics and Space Administration See Also: George C. Marshall Space Flight Center, Goddard Space Flight Center Langley Research Center Lewis Research Center	Nat Aero+Spa Admin
National Beryllia Corporation	National Beryllia
National Bureau of Standards	Nat Bur Standards
National Carbon Company	National Carbon
National Cash Register Co.	Nat Cash Register
National Engineering Science Company	Nat Engineering Sc
National Gas Turbine Establishment (U.K.)	Nat Gas Turbine Es
National Research Corporation	National Research
Naval Air Development Center	Naval Air Devel C
Naval Air Material Center	Naval Air Mat C
Naval Air Missile Test Center	Naval Air Mis TC
Naval Air Rocket Test Station	Naval Air Rock TS
Naval Air Test Center	Naval Air Test C

Naval Engineering Experiment Station
 Naval Gun Factory
 Naval Missile Center
 Naval Ordnance Laboratory
 Naval Ordnance Station
 Naval Ordnance Test Station
 Naval Powder Factory
 Naval Propellant Plant
 Naval Proving Ground, Dahlgren, Va.
 Naval Radiological Defense Laboratory
 Naval Research Laboratory
 Naval Torpedo Station
 Naval Underwater Ordnance Station
 Naval Weapons Laboratory
 New England Materials Laboratory, Inc.
 University of New Mexico
 New York Naval Shipyard
 New York University
 Newark College of Engineering
 Newmark, Hansen and Associates
 North American Aviation, Inc.
 See Also: Atomics International
 Rocketdyne
 North Atlantic Council
 North Atlantic Treaty Organization
 North Carolina College
 University of North Dakota
 Northern Ordnance Incorporated

Naval Eng Exper S
 Naval Gun Factory
 Naval Missile C
 Naval Ordnance Lab
 Naval Ordnance Sta
 Naval Ordnance TS
 Naval Powder Fact
 Naval Propellant P
 Naval Proving Grd
 Naval Rad Def Lab
 Naval Research Lab
 Naval Torpedo S
 Naval Under Ord S
 Naval Weapons Lab
 New Eng Mat Lab
 U New Mexico
 New York Nav Ship
 New York U
 Newark College Eng
 Newmark Hans et al

 North Am Aviation
 North Atlantic Cl
 North Atlantic T O
 North Carolina Col
 U North Dakota
 Northern Ordnance

Northern Research and Engineering Corporation	Northern Res+Eng
Northrop Carolina, Incorporated	Northrop Carolina
Northrop Corporation	Northrop
Northrop Norair, A Division of Northrop Corporation	Northrop Norair
Northrop Space Laboratories	Northrop Space Lab
Northwestern University	Northwestern U
University of Notre Dame	U Notre Dame
Nuclear Utility Services, Inc.	Nuclear Util Serv
Nuclionics	Nuclionics
Oak Ridge National Laboratory	Oak Ridge Nat Lab
Office of Aerospace Research	Off Aerospace Res
Office of Naval Intelligence	Office Naval Intel
Office of Naval Research, Washington	Office Nav Res
Office of Naval Research, London	Office Nav Res/Lon
Office of the Assistant Secretary of Defense (Research and Development)	Assist Sec Def R+D
Office of the Assistant Secretary of Defense (Supply and Logistics)	Assist Sec Def S+L
Office of the Chief of Naval Operations	Off Chief Naval Op
Ohio State University	Ohio State U
Ohio State University Research Foundation	Ohio State U Res F
Olin Industries, Inc.	Olin Industries
Olin Mathieson Chemical Corp.	Olin Mathieson
Operations Analysis Office, Strategic Air Command	Operat Anal Of/SAC
Ordnance Corps	Ordnance Corps
Oregon State University	Oregon State U
Owens-Corning Fiberglas Corp.	Owens-Corning Fib

Ozark-Mahoning Company
 Packard-Bell Electronics Corporation
 Parker Aircraft Company
 The Parsons Corporation
 Peninsular Chemresearch Incorporated
 Pennsalt Chemicals Corporation
 University of Pennsylvania
 Pennsylvania Salt Manufacturing Company
 Pennsylvania State University
 The Perkin-Elmer Corporation
 Pesco Products Division, Borg-Warner
 Corporation
 Philco Corporation
 Philco-Ford Corporation
 Phillips Petroleum Company
 Picatinny Arsenal
 See Also: Liquid Rocket Propulsion
 Laboratory
 Picker X-ray Corporation
 Planning Research Corporation
 Plasmadyne Corporation
 Plastics Technical Evaluation Center
 Polytechnic Institute of Brooklyn
 Potter Pacific Corporation
 Pratt and Whitney Aircraft
 Princeton University
 Purdue Research Foundation
 Purdue Research Institute

Ozark-Mahoning
 Packard-Bell Elect
 Parker Aircraft
 Parsons
 Peninsular Chemres
 Pennsalt Chemicals
 U Pennsylvania
 Penn Salt Mfg
 Pennsylvania State
 Perkin-Elmer
 Pesco Prod/Borg-W
 Philco
 Philco-Ford
 Phillips Petroleum
 Picatinny Arsenal
 Picker X-ray
 Planning Research
 Plasmadyne
 Plast Tech Eval C
 Polytech In Bklyn
 Potter Pacific
 Pratt-Whitney AC
 Princeton U
 Purdue Research Fd
 Purdue Research In

Purdue University	Purdue U
See Also: Jet Propulsion Center	
Pyrogenics, Inc.	Pyrogenics
Pyronetics, Inc.	Pyronetics
Quantum, Inc.	Quantum
Queens College	Queens College
Radiation Effects Information Center, Battelle Memorial Institute	Rad Effects Info C
Radio Corporation of America, Defense Electronic Products	RCA/Def Elect Prod
Radio Corporation of America. Electronic Components and Devices	RCA/Electro Comp+D
Radio Corporation of America Laboratories	RCA Laboratories
RAI Research Corporation	RAI Research
The Ramo-Woolridge Corporation	Ramo-Woolridge
The Rand Corp.	Rand
Raytheon Company	Raytheon
Raytheon Manufacturing Company	Raytheon Mfg.
Reaction Motors Division See: Thiokol Chemical Corporation, Reaction Motors Division	
Reaction Motors, Incorporated	Reaction Motors
Redel, Inc.	Redel
Redstone Arsenal, Army Missile Command See Also: Army Rocket and Guided Missile Agency	Redstone Arsenal
Redstone Scientific Information Center	Red Sci Info C
Rensselaer Polytechnic Institute	Rensselaer Poly In
Republic Aviation Corp	Republic Aviation
Republic Steel Corporation	Republic Steel
Research Chemicals	Research Chemicals

Research Labs., United Aircraft Corp.
See: United Aircraft Research Labs.

Research Management Associates, Inc.

Research and Technology Division
Air Force Systems Command

Resin Research Laboratories, Inc.

Revere Laboratories

University of Rhode Island

Rocket Power Incorporated

Rocket Propulsion Establishment (U.K.)

Rocket Propulsion Laboratory

Rocketdyne, A Division of North American, Inc.

Rocket Research Corporation, Seattle

Rocket Research Laboratory, Space Systems
Division, Edwards AFB

Rockwood Sprinkler Company

Rohm and Haas Company

Rome Air Development Center

Royal Aircraft Establishment (U.K.)

Royal Armament Research and Development
Establishment (U.K.)

Saint Louis University

Sandia Corporation

Sandia Laboratory, Albuquerque, N.M.

Sciaky Bros. Inc.

Sharpley Laboratories, Inc.

Shell Development Company

Society of Aerospace Material + Process
Engineers

Research Mgt Assoc

Res+Tech Div/AFSC

Resin Research L

Revere Laboratories

U Rhode Island

Rocket Power

Rocket Prop Estab

Rocket Prop Lab

Rocketdyne/NAA

Rocket Research

Rocket Res L SSD Edw

Rockwood Sprinkler

Rohm + Haas

Rome Air Develop C

Royal Aircraft Est

Royal Arm R+D Est

Saint Louis U

Sandia

Sandia Lab

Sciaky Bros

Sharpley Labs

Shell Development

Soc Aero M+P Eng

Socony Mobil Oil Company, Inc.

Solar

Solid Propellant Information Agency,
Applied Physics Laboratory, The Johns
Hopkins University
See Also: Chemical Propulsion Information
Agency

University of Southern California

Southern Methodist University

Southern Research Institute

Southwest Research Institute

Space-General Corporation

Space Systems Division, Air Force
Systems Command

Space Systems Division, Edwards AFB
See Also: Rocket Research Laboratory

Space Technology Laboratories

Sperry Products, Inc.

Sperry Rand Corporation

Standard Oil Company (Indiana)

Stanford Research Institute

Stanford University

The Starnes Company

Stauffer-Aerojet Chemical Company

Stauffer Chemical Company

Stevens Institute of Technology

Strategic Air Command

Sundstrand Aviation

Sundstrand Turbo

Sunstrand Aviation

Socony Mobil Oil

Solar

Solid Prop Info Ag

U Southern Calif

Southern Method U

Southern Res Inst

Southwest Res Ins

Space-General

Space Sys Div/AFSC

Space Sys Div Edw

Space Technology L

Sperry Products

Sperry Rand

Standard Oil/Ind

Stanford Res Inst

Stanford U

Starnes

Stauffer-Aerojet

Stauffer-Chemical

Stevens Inst Tech

Strategic Air Comd

Sundstrand Aviat

Sundstrand Turbo

Sunstrand Aviation

Sylvania Electric Products, Inc.	Sylvania Elec Prod
Syracuse University	Syracuse U
Syracuse University Research Institute	Syracuse U Res In
Systems Corporation of America	Systems America
Systems Research Laboratories, Inc.	Systems Research L
Tapco, Division of Thompson Ramo Wooldridge, Inc.	Tapco/Thomp Ramo W
Technical Advisory Panel on Fuels and Lubricants (Assistant Secretary of Defense (R+D))	Tech Adv Pan F+I
Technical Operations Incorporated	Technical Operat
Technidyne, Incorporated	Technidyne
Technology, Incorporated	Technology
Tem-Press Research, Inc.	Tem-Press Research
Temple University, Research Institute	Temple U Res Inst
Tempo General Electric Company	Tempo/Gen Elect
Tennessee Corporation	Tennessee
University of Tennessee	U Tennessee
Texaco Experiment Incorporated	Texaco Experiment
Texaco Incorporated	Texaco
Texaco Research Center	Texaco Research C
Texas Instruments Incorporated	Texas Instruments
Texas Metal and Manufacturing Co.	Texas Metal+Mfg
University of Texas	U Texas
Thiokol Chemical Corporation See Also: Reaction Motors Division	Thiokol Chem
Thiokol Chemical Corporation, Alpha Division	Thiokol Chem/Alph
Thiokol Chemical Corporation, Bristol Division	Thiokol Chem/Brist
Thiokol Chemical Corporation, Chemical Operations	Thiokol Chem/Chem

Thiokol Chemical Corporation, Elkton Division	Thiokol Chem/Elkto
Thiokol Chemical Corporation, Huntsville Division	Thiokol Chem/Hunts
Thiokol Chemical Corporation, Nuclear Development Center	Thiokol Chem/Nucl
Thiokol Chemical Corporation, Reaction Motors Division	Thiokol Chem/React
Thiokol Chemical Corporation, Redstone Division	Thiokol Chem/Red
Thiokol Chemical Corporation, Rocket Operations Center	Thiokol Chem/Rock
Thiokol Chemical Corporation, Space Booster Division	Thiokol Chem/Space
Thiokol Chemical Corporation, Wasatch Division	Thiokol Chem/Wasat
Thompson Products, Inc.	Thompson Products
Thompson Ramo Wooldridge, Inc. See Also: Tapco	Thompson Ramo Wool
Titanium Metals Corporation of America	Titanium Met Amer
University of Toronto	U Toronto
Tracerlab	Tracerlab
Transducer Information Center	Transducer Info C
Transportation Technical Research Institute (Tokyo)	Transp Tech Res In
Trg Incorporated	TRG
TRW Incorporated	TRW
TRW Space Technology Labs	TRW Space Tech Lab
TRW Systems, Inc.	TRW Systems
Tufts University	Tufts U
Tulane University	Tulane U
Tyco Laboratories, Inc.	Tyco Labs
Union Carbide Chemicals Company	Union Carbide Chem

Union Carbide Corporation	Union Carbide
Union Carbide European Research Associates (Brussels)	Un Car E Res Assoc
Union Carbide Research Institute	Union Car Res Inst
Uniroyal, Incorporated	Uniroyal
United Aircraft Corporation	United Aircraft
United Aircraft Research Laboratories	United Aircraft/RL
United Kingdom Atomic Energy Authority (U.K.)	UK Atomic Energy A
United States Public Health Service	US Public Health S
United States Steel Corporation, Applied Research Laboratory	US Steel/App Res L
The United States Stoneware Company	US Stoneware
United Technology Corporation	United Technology
Universal Chemical Systems, Inc.	Universal Chem Sys
Universal Match Corporation	Universal Match
Universal Oil Products Co.	Universal Oil Prod
URS Corporation	URS
U.S. Atomic Energy Commission See: Atomic Energy Commission	
U.S. Borax Research Corporation	US Borax Research
U.S. Forest Service See: Forest Service, U.S. Dept. of Agriculture	
U.S. Industrial Chemicals Company	US Industrial Chem
University of Utah	U Utah
Value Engineering Company	Value Engineering
University of Vermont	U Vermont
Vidya, Division of Itek Corporation	Vidya/Itek
University of Vienna	U Vienna

University of Virginia	U Virginia
The Visking Corporation	Visking
Vitro Engineering Company	Vitro Engineering
Vitro Laboratories	Vitro Laboratories
Walter Kidde and Company	Walter Kidde
The Warner and Swasey Company	Warner + Swasey
University of Washington	U Washington
Watertown Arsenal	Watertown Arsenal
The Welsbach Corp	Welsbach
Western Gear Corporation	Western Gear
Western Reserve University	Western Reserve U
Westinghouse Astronuclear Laboratory	Westinghouse Ast L
Westinghouse Electric Corporation	Westinghouse Elec
Westinghouse Research Laboratories	Westinghouse Res I.
White Sands Proving Ground	White Sands Prov G
Willow Run Research Center	Willow Run Res C
University of Wisconsin	U Wisconsin
Wright Air Development Center	Wright Air Devel C
Wright Air Development Division	Wright Air Devel D
Wyandotte Chemicals Corporation	Wyandotte Chemical
Wyle Laboratories	Wyle
Young Development Laboratories	Young Development

3. ABBREVIATIONS USED IN CORPORATE SOURCE DESIGNATIONS

Admiralty	=	ADM
Advanced	=	ADV
Aeronautic (s)	=	AERO
Aeronautical	=	AERON
Agency	=	AG
Air Force	=	AF
Aircraft	=	AC
American	=	AM
Associates	=	ASSOCS
Astronautic (s)	=	ASTRO
Center	=	C
Command	=	COMD
Contract	=	CONTR
Commercial	=	COM
Defence)	=	DEF
Defense)	=	DEF
Engineering	=	ENG
Europe - ean	=	E
Foundation	=	FDN
Guided Missile Agency	=	GMA
Imperial	=	IMP
Industries	=	INDS
Institute	=	IN or INST
International	=	INT
Jet Propulsion Center	=	JPC
Laboratory	=	L or LAB
Management	=	MGT
Manufacturing	=	MFG
Material	=	MATL
Ministry	=	MIN
Motors	=	MTRS
Products	=	PROD
Propulsion	=	PROP

Research	=	RES
Research and Development	=	R+D
Research and Engineering	=	R+E
Rocket	=	ROCK
Science	=	SCI
Systems	=	SY or SYS
Test Center	=	TC
Test Station	=	TS
United Kingdom	=	UK
University	=	U
Various Pages	=	VP

Section III

THESAURUS

Approximately 6,500 unique terms were generated in the permuted-title indexing of some 8,280 documents. These terms, related to the general field of propulsion, have been extensively cross-referenced to produce this thesaurus.

The full range of terminology, associated with propellants and propulsion, was not encountered in the documents indexed. The thesaurus is therefore, merely the basis for further work. However, it does afford vocabulary control over a large portion of terms in the propulsion field. It also provides the framework of terms and cross-references for the addition of new terms.

To meet format requirements of the computer produced book catalog, terms have been standardized on a maximum length of 18 characters. Descriptors of greater length are presented in full, with a "See" reference to the 18 character reduction. A "Refer From" reference is provided from the 18 character reduction back to the complete descriptor.

Straight word order has been employed throughout the thesaurus. Thus some specific terms do not follow the associated broader term. In reverse word order, PROPULSION-HYBRID and PROPULSION-ION would follow the broader term PROPULSION. In this thesaurus HYBRID-PROPULSION and ION-PROPULSION are alphabetically separated from each other and the related broader term. However, "See Also" references draw these terms together.

Cross-references are indicated by SA, RF, and S.

SA (See Also) leads from a broad term to related narrower and more specific terms.

RF (Refer From) leads back from either a "See Also" or "See" reference.

S (See) directs the user from a synonym or variant form of a term to the term that is used.

These cross-references are intended to lead the user from any term he selects to any other terms which may be of interest.

ABC-Cordite

S: Cordite

ABL-X-254-A1

S: Rocket-Motr-ABL

ABL-X-254-Z2

S: Rocket-Motor-ABL

ABLATION

ABLATION-CHARS

RF: Ablative-Plastic-Chars
Chars
Plastic-Chars

ABLATION-MATERIALS

SA: Coatings
Composites
Heat-Shield-Matls
Nozzle-Materials
Phenolic-Polymers
Plastics
Refractories
Reinforced-Plastic
RF: Ablative-Materials
Ablators
Combustion-Chamber
Thrust-Chamber

Ablative-Materials

S: Ablation-Materials

Ablative-Plastic-Chars

S: Ablation-Chars
Chars

Ablators

S: Ablation-Materials

ABLE-1-MISSILE

RF: Missile

ABLE-1-PROJECT

RF: Space-Probes

ABNORMAL-BURNING

RF: Burning

ABORT

SA: Landing-Impact
Recovery
Safety

ABRASION

SA: Erosion
Organic-Coatings
RF: Erosion

Absorbance

S; Absorptance

ABSORBENT

SA: Shield-Materials

ABSORBER

SA: Acoustic-Liners
Scatterers
Shield-Materials
Shock-Absorber

ABSORPTANCE

SA: Optical-Absorbance
Reflectance
Transmittance
RF: Absorbance

ABSORPTION

RF: Sorption

ABSORPTION-CELLS

ABSTRACTS

SA: Bibliography
Indexes
RF: Bibliography
Indexes

ACCELERATED-AGING

RF: Aging

ACCELERATED-TESTS

RF: Tests

ACCELERATION

SA: High-Acceleration
Linear-Acceleration

A-Glucose
S: Alpha-d-glucose

ABC-Cordite
S: Cordite

ABL-X-254-A1
S: Rocket-Motor-ABL

ABL-X-254-A2
S: Rocket-Motor-ABL

ABLATION

ABLATION-CHARS
RF: Ablative-Plastic-Chars
Chars
Plastic-Chars

ABLATION-MATERIALS
SA: Coatings
Composites
Heat-Shield-Matls
Nozzle-Materials
Phenolic-Polymers
Plastics
Refractories
Reinforced-Plastic
RF: Ablative-Materials
Ablators
Combustion-Chamber
Thrust-Chamber

Ablative-Materials
S: Ablation-Materials

Ablative-Plastic-Chars
S: Ablation-Chars
Chars

Ablators
S: Ablation-Materials

ABLE-1-MISSILE
RF: Missile

ABLE-1-PROJECT
RF: Space-Probes

ABNORMAL-BURNING
RF: Burning

ABORT
SA: Landing-Impact
Recovery
Safety

Absorbance
S: Absorptance

ABSORBENT
SA: Shield-Materials

ABSORBER
SA: Acoustic-Liners
Scatterers
Shield
Shield-Materials
Shock-Absorber

ABSORPTANCE
SA: Optical-Absorbance
Reflectance
Transmittance
RF: Absorbance

ABSORPTION
RF: Sorption

ABSORPTION-CELLS

ABSTRACTS
SA: Bibliography
Indexes
RF: Bibliography
Indexes

ACCELERATED-AGING
RF: Aging

ACCELERATED-TESTS
RF: Tests

ACCELERATION
SA: High-Acceleration
Linear-Accelerat

ACCELERATION-FIELD

ACCELERATION-FLOWS

ACCELERATION-LOADS

SA: Load-Relief-System

RF: Loads

ACCELERATION-RANGE

ACCELERATION-TESTS

RF: Tests

ACCELEROMETER

SA: Gyroscopes

Inertial-Navigation

RF: Flight-Instruments

Indicators

Instruments

ACCIDENT-HAZARDS

SA: Safety-Precautions

WS-Hazards

RF: Hazards

Safety-Precautions

ACCIDENT-INVEST

SA: Airplane-X-2

RF: Accident-Investigation

Accident-Investigation

S: Accident-Invest

Accidental-Explosions

S: Explosion

ACCIDENTAL-FIRING

RF: Accidents

Launching-Hazards

Missile-Safety

WS-Hazards

ACCIDENTS

SA: Accidental-Firing

Crash-Fires

Damage-Control

Explosion

Fires

Safety

ACCOMMODATION-COEF

RF: Accommodation Coefficients
Coefficients

Accommodation-Coefficients

S: Accommodations-Coef

Accumulator

S: Calculator

Data-Accumulator

ACCURACY

SA: Microsecond

Millimicrosecond

Monte-Carlo-Method

Rocket-Accuracy

Time-Intervals

ABRASION

SA: Erosion

Organic-Coatings

RF: Erosion

ACE-ENGINE

RF: Engine

ACETALAZINE

SA: Azine

Hydrazine

Hydrazone

ACETALDAZINE

ACETAMIDE

RF: Amides

Fluoro-Nitro-Comp

ACETIC-ACID

ACETIC-ANHYDRIDE

RF: Acetic-Oxide

Acetyl-Oxide

Ethanoic-Anhydride

Acetic-Oxide

S: Acetic-Anhydride

ACETONE

RF: Dimethyl-Ketone
Ketone-Propane
Ketones
Propoanone

ACETONE-CYANHYDRIN

RF: Acetone-Cyanhydrin
Oxyisobutyric-Nitrile

Acetone-Cyanhydrin

S: Acetone-Cyanhydrin

ACETONITRILE

RF: Ethane-Nitrile
Methyl-Cyanide
Oxidizer-Binders

ACETYL-CHLORIDE

RF: Ethanoyl-Chloride

Acetyl-Oxide

S: Acetic-Anhydride

ACETYLACETONATE-CR

RF: Acetylacetonate-of-Chromium
Chromium-Acetyl-Ocetonate

Acetylacetonate-of-Chromium

S: Acetylacetonate-Cr

ACETYLACETONE

RF: Ketones

ACETYLATION-METHOD

ACETYLENE

SA: Carbon-Formation
Diacetylene
Flame-Propagation
Flame-Speed
Metalic-Acetylenes
Methylacetylene
Schoch-Process
Specific-Impulse

RF: Ethyne

ACETYLENE-ADDITIVE

ACETYLENE-ANALYSIS

RF: gas-analysis

ACETYLENE-COMPOUND

RF: Acetylenic-Compounds
Compounds

ACETYLENE-DERIV

RF: Acetylenic-Derivative

ACETYLENE-DIBORANE

ACETYLENE-HAZARD

RF: gaseous-Hazard

ACETYLENE-MATERIAL

RF: Acetylenic-Materials
Materials

ACETYLENE-PROCESS

ACETYLENE-PROPEL

RF: Acetylene-Propellants
Acetylenic-Liquid-Propellants
Acetylenic-Monopropellants
Acetylenic-Propellants
Propellants

Acetylene-Propellants

S: Acetylene-Propel

ACETYLENE-REACTION

ACETYLENE-RESEARCH

RF: Research

ACETYLENE-TESTS

RF: Tests

Acetylenic-Compounds

S: Acetylene-Compounds

Acetylenic-Derivative

S: Acetylene-Deriv

Acetylenic-Liquid-Propellants

S: Acetylene-Propell

Acetylenic-Materials
S: Acetylene-Material

Acetylenic-Monopropellants
S: Acetylene-Propell

Acetylenic-Propellants
S: Acetylene-Propell

ACETYLIDES
SA: Sodium-Acetylide
RF: Metal-Carbides
Metallic-Carbides

ACID-CONTAMINATION
RF: Contamination

ACID-HANDLING

ACID-HAZARDS
SA: Nitric-Acid-Hazard
RF: Liquid-Hazards

ACID-PREPARATION

ACID-PROPERITIES

ACID-REACTION

Acid-Resistant-Coatings
S: Protective-Coating

ACID-STORAGE
RF: Storage

ACID-TANKS
RF: Tanks

ACID-VOLATILITY
RF: Volatile-Liquids

ACIDS
SA: Acrylic-Acid
Boric-Acid
Butyric-Acid
Chromic-Acid
Hydrazoic-Acid
Hydrofluoric-Acid
IRFNA
IWFNA

Lewis-Acid
Meta-Boric-Acid
Mixed-Acid
Nitric-Acid
Ortho-Boric-Acid
Perchloric-Acid
RFNA
Stearic-Acid
Sulfuric-Acid
WFNA

ACOUSTIC-LINERS
RF: Absorber
Liners

ACOUSTIC-LOSSES
RF: Losses

ACOUSTICS
RF: Sound

ACRYLAMIDE
SA: Polyacrylamide
RF: Amides

Acrylate
S: Acrylic-Resin

Acrylate-Resin
S: Acrylic-Resin

ACRYLIC-ACID
RF: Acids
Acroleic-Acid
Propene-Acid

ACRYLIC-RESIN
RF: Acrylate
Acrylate-Resin
Binders
Resin-Binders

ACTIVATED-CARBON
RF: Activated-Charcoal
Charcoal-Activated

Activated-Charcoal
S: Activated-Carbon

ACTIVATION-ENERGY

RF: Energy

ACTIVE-DEFENSE

SA: Antimissiles
Countermeasures
Evasive-Satellite
Space-Patrols
Surveillance
RF: Defense
Missile Defense

ACTIVE-METALS

SA: Alkali-Metals
RF: Alloys
Metal-Additives
Metals

ACTUATION-SYSTEMS

SA: Actuators

ACTUATORS

SA: Explosive-Actuator
RF: Actuation-Systems
Propellant-Actuated-Devices

Adaptive-Control-Systems

S: Adaptive-Controls

ADAPTIVE-CONTROLS

RF: Adaptive-Control-Systems
Controls

ADDITIVE-EFFECTS

RF: Burning-Rate
Propellant-Burning

ADDITIVE-PROGRAM

ADDITIVES

SA: Al-Additives
Catapysts
Chemical-Additives
Fuel-Additives
Metal-Additives
Propellant-Add
Silicon-Additives
RF: Catalysts
Propellant-Add

ADDITIVES-RESEARCH

RF: Research

ADDUCTS

RF: Chemical-Reaction
Molecular-Reaction
Reaction

ADHESIVES

SA: Bonding
Case-Bonding
Metal-Bonds
Polymer-Adhesives
Sealants

Adiabatic-Compression

S: Adiabatic-Compress

ADIABATIC-EXPANS

RF: Adiabatic-Expansion
Expansion

Adiabatic-Expansion

S: Adiabatic-Expans

ADIABATIC-FLOW

RF: Flow
gas-Flow

ADMITTANCE

SA: Impedance
RF: Impedance

ADMITTANCE-THEORY

Admixture

S: Compound
Mixture

ADSORPTION

SA: Borane-Adsorption
gas-Adsorption
RF: Sorption

ADVANCED-BASES

RF: Bases
Logistics

AERATION

RF: Liquids

AERODYNAMIC-CONFIG

RF: Aerodynamic-Configuration
Configuration

Aerodynamic-Configurations
S: Aerodynamic-Config

AERODYNAMIC-DESIGN

RF: Design

AERODYNAMIC-FORCES

RF: Forces

AERODYNAMIC-FORMU

RF: Aerodynamic-Formulas

Aerodynamic-Formulas

S: Aerodynamic-Formu

AERODYNAMIC-HEAT

RF: Aerodynamic-Heating
Heating

Aerodynamic-Heating

S: Aerodynamic-Heat

AERODYNAMIC-NOMEN

RF: Aerodynamic-Nomenclature

Aerodynamic-Nomenclature

S: Aerodynamic-Nomen

AERODYNAMIC-RES

RF: Aerodynamic-Research
Research

Aerodynamic-Research

S: Aerodynamic-Res

AERODYNAMICS

SA: Combustion-Aero-dy
Drag
Friction
Shipstream

AEROELASTIC-ANAL

RF: Aeroelastic-Analysis
Analysis

Aeroelastic-Analysis

S: Aeroelastic-Anal

AEROGENS

RF: gas-generation

AEROSOL-GENERATORS

RF: generators

AEROSOLS

RF: Atomization
Atomizers
Sprays

Aerospace-Environment

S: Space-Environment

AEROSPACE-GD-EQUIP

RF: Aerospace-ground-Equipment
ground-Support

Aerospace-ground-Equipment

S: Aerospace-gd-Equip

AEROSPACE-METALS

SA: Aluminum
Light-Metals
RF: Alloys
Metals

Aerospace-Plane

S: Aerospace-Vehicles

AEROSPACE-PROPULS

RF: Aerospace-Propulsion
Propulsion

Aerospace-Propulsion

S: Aerospace-Propuls

AEROSPACE-RESEARCH

RF: Research
Space-Sciences

AEROSPACE-STPUCTUR

RF: Aerospace-Structures
Structures

Aerospace-Structures

S: Aerospace-Structur

AEROSPACE-VEHICLES

SA: Aspen
Launch-Vehicles
Manned-Vehicles
Orbital-Carrier
Orbital-Vehicles
Reentry-Vehicles
Spacecraft
RF: Aerospace-Plane
Aerospaceplane
Aircraft
Vehicles

Aerospaceplane
S: Aerospace-Vehicles

AEROSPIKE-ENGINE

RF: Engine

AEROTHERMODYNAMICS

SA: Thermodynamics
RF: Thermodynamics

AEROZINE

AFTERBURNER

RF: Engine
Thrust-Augment

AFTERBURNING

AFTERCOOLING

RF: Cooling

AFTERGLOW

AFTERGLOW-COOLING

RF: Cooling

AFTERHEATER

AGED-PROPELLANTS

RF: Propellants

AGING

SA: Accelerated-Aging
Degradation
Safe-Life
Strain-Aging
RF: Missile-Storage

AGING-CHARACTERIST

RF: Aging-Characteristics

Aging-Characteristics

S: Aging-Characterist

AGING-EFFECTS

AGING-PROPERTIES

AGING-STUDY

RF: Studies

AICBM

RF: Antimissiles

AIM-X

RF: Airplane-F-104
Big-Q
Missile

AIR

SA: Compressed-Air
Compressible-Flow
Quiescent-Air
Thermal-Conduct

AIR-AUGMENTED

RF: Rocket-Engine

AIR-BREATHING

RF: Engine

AIR-DISPERSION

RF: Meteorology

AIR-FORCE

AIR-FUEL-COMBUST

RF: Air-Fuel-Combustion
Combustion

Air-Fuel-Combustion

S: Air-Fuel-Combust

AIR-LAUNCHED

SA: Skybolt
RF: Air-Launched-Missile
Missile

Air-Launched-Missiles	Aircraft & Model Number
S: Air-Launched	S: Airplane -
AIR-MIXTURES	Aircraft-Crash-Fires
RF: Mixture	S: Crash-Fires
AIR-PERMEABILITY	AIRCRAFT-ENGINES
RF: Permeability	SA: JATO
AIR-POLLUTION	Power-Plants
AIR-STREAM	Rocket-Propelled
SA: Slipstream	RF: Engine
AIR-TEMPERATURE	AIRCRAFT-FUEL-TANK
RF: Temperature	RF: Fuel-Tanks
AIR-TO-AIR	AIRCRAFT-FUELS
SA: Sparrow	SA: gasoline
Typhon	RF: Aviation-gasoline
RF: Missile	Fuels
Rocket	Propellants
	Solid-Propellants
AIR-TO-SURFACE	AIRCRAFT-INDUSTRY
SA: Rascal	AIRCRAFT-LUBRICANTS
Shrike	RF: Lubricants
RF: Missile	AIRCRAFT-METALS
Rocket	RF: Aircraft-Skins
AIR-TURBOROCKET	Metals
RF: Turborocket	AIRCRAFT-ROCKET
AIR-TURBULENCE	RF: Rocket
RF: Atmosphere	AIRCRAFT-SKINS
Turbulent-Air	SA: Aircraft-Metals
AIRBORNE	AIRCRAFT-STRUCTURE
AIRBORNE-ALERT	SA: Airframe
RF: Weapon-System	RF: Structures
AIRCRAFT	AIRFRAME
SA: Aerospace-Vehicles	SA: Missile-Airframe
Helicopters	RF: Aircraft-Structure
Hypersonic-Vehicle	AIRPLANE-F-86
SST	AIRPLANE-F-104
Transonic-Aircraft	SA: AIM-X
RF: Airplanes	
Conventional-Aircraft	

AIRPLANE-X-2
RF: Accident-Invest

AIRPLANE-X-15

AIRPLANE-XB-47

Airplanes
S: Aircraft

AL-61ST6
RF: Aluminum-Alloy

AL-1100-0
RF: Aluminum-Alloy

AL-2024-T4
RF: Aluminum-Alloy

AL-2219-T87
RF: Aluminum-Alloy

AL-6061
RF: Aluminum-Alloy

AL-7075
RF: Aluminum-Alloy

AL-ADDITIVES
RF: Additives

AL-ALLOY-FATIGUE
RF: Aluminum-Alloy-Fatigue
Fatigue

AL-BORIDE
RF: Borides

AL-BOROHYDRIDE
RF: Borohydrides

AL-CARBIDE
RF: Carbides

AL-CASTING
RF: Casting

AL-CHLORIDE
RF: Chlorides

AL-COMBUSTION
SA: Al-Hazards
RF: Combustion

AL-CORROSION
SA: AL-REFNA-Corrosion
RF: Corrosion
FNA-Storage

AL-CREEP
RF: Creep

AL-CRYOGENIC-PROP
RF: Al-Properties

AL-CRYOGENIC-USSES

AL-DETERMINATION

AL-DETONATION
SA: Al-Hazards
RF: Detonation

AL-FORMABILITY
RF: Formability

AL-HAZARDS
SA: Fire-Hazards
RF: Al-Combustion
Al-Detonation

AL-HYDRIDE
RF: Hydrides

AL-HYDRIDE-PREP
RF: Aluminum-Hydride-Preparation

AL-HYDRIDE-PROP
RF: Aluminum-Hydride-Properties

AL-IMPACT-STRENGTH
RF: Impact-Strength

AL-JOINING
SA: Al-Welding
RF: Joining

AL-NITRIDE

AL-POWDER

RF: Powder

AL-PROPERTIES

SA: Al-Cryogenic-Prop

AL-RECOVERY

RF: Recovery

AL-RFNA-CORROSION

RF: Al-Corrosion
Aluminum-Red-Fuming-Nitric
-Acid-Corrosion
FNA-Storage
RFNA-Corrosion

AL-SILICATE

AL-SLUDGE

AL-TANKS

RF: FNA-Storage
Tanks

AL-TENSILE-TESTS

RF: Tests

AL-TUBING

RF: Tube

AL-WELDING

RF: Al-Joining
Welding

AL-WELDING-INSPECT

RF: Welding-Inspection

ALABASTER

RF: gypsum

ALCOHOL

SA: Allyl-Alcohol
Butyl-Alcohol
Diacetone-Alcohol
Ether-Alcohol
Ethyl-Alcohol
Furfuryl-Alcohol
Isopropyl-Alcohol
Methyl-Alcohol
Propargyl-Alcohol
Propyl-Alcohol

ALCOHOL-ACRYLATES

SA: Resin-Binders

ALCOHOL-FUEL-TESTS

RF: Fuel-Tests

ALCOHOL-MOTOR

RF: Motors

ALDEHYDES

SA: Formaldehyde
Furfural
glyoxal
RF: Ketones

Aliphatic-Hydrocarbons

S: Alkanes

ALKALI-METALS

SA: Cesium
Lithium
Potassium
Rubidium
Sodium
Virginium
RF: Active-Metals

ALKANES

RF: Aliphatic-Hydrocarbons
Hydrocarbons

ALKOXIDES

ALKYLATION

SA: Boron-Alkylation

ALKYLCHLOROBORANE

RF: Dialkylchloroborane

ALKYLBORANE

ALKYLBORATE

RF: Borates

ALKYLBOROXINE

ALKYLDIAMINE

ALKYLDIBORANE

ALKYLDIHALIDE

ALKYLHYDRAZINE

ALKYLTHIOPHOSPHITE

Allene

S: Propadiene

ALLOY-MACHINING

SA: Titanium-Machining

RF: Machining

ALLOY-PROPERTIES

ALLOY-WELDABILITY

RF: Weldability

ALLOYING-PROCESS

SA: Sintering

ALLOYS

SA: Active-Metals

Aerospace-Metals

Aluminum-Alloy

Be-Al-Alloys

Chromium-Alloy

Columbium-Alloy

Copper-Alloy

Corrosion

Ductile-Alloys

Ferrous-Alloys

Hafnium-Alloys

Highstrength-Alloys

Invar

Iridium-Alloys

Iran-Nickel-Alloy

Law-Alloy-Steel

Molybdenum-Alloy

Nickel-Base-Alloy

Nonferrous-Alloys

Refractory-Alloys

Sheet-Alloys

Stainless-Steel

Steels

ALLYL-ALCOHOL

RF: Alcohol

ALLYAMINE

RF: Amines

ALLYL-CHLORIDE

RF: Chlorides

ALPHA-D-GLUCOSE

SA: Beta-d-glucose
glucose

Pentaacetate

RF: A-glucose

Beta-d-glucose
glucose

ALPHA-TITANIUM

RF: Titanium-Alloy

ALTITUDE

SA: High-Altitude

Low-Altitude

ALTITUDE-CELLS

RF: Test-Cells

ALTITUDE-COMPENS

RF: Altitude-Compensation

Altitude-Compensation

S: Altitude-Compens

ALTITUDE-CONTROL

RF: Flight-Control

ALTITUDE-EVAL

RF: Altitude-Evaluation

Altitude-Evaluation

S: Altitude-Eval

ALTITUDE-FACILITY

SA: Altitude-Test-Cell

Altitude-Test-Cham

Altitude-Tests

RF: Research-Facility

Test-Facility

ALTITUDE-EFFECT

ALTITUDE-INVESTIGA

RF: Altitude-Investigation

Altitude-Investigation

S: Altitude-Investiga

ALTITUDE-PERFORM
RF: Altitude-Performance

Altitude-Performance
S: Altitude-Perform

ALTITUDE-SIMULAT
RF: Altitude-Simulation
Simulation

Altitude-Simulation
S: Altitude-Simulat

ALTITUDE-TEST-CELL
RF: Altitude-Facility
Test-Equipment

ALTITUDE-TEST-CHAM
RF: Altitude-Test-Chamber
Altitude-Facility
Chambers
Test-Equipment

Altitude-Test-Chamber
S: Altitude-Test-Cham

ALTITUDE-TESTS
RF: Altitude-Facility
Tests

ALUMINA
RF: Aluminum-Oxide
Refractories

ALUMINA-WHISKERS
RF: Whiskers

ALUMINUM
SA: Headings under Al.
Metallic-Aluminum
Trimethyl-Al-Hydra
Triethylaluminum
RF: Aerospace-Metals
Light-Metals

ALUMINUM-ALLOY
SA: Al-61ST6
Al-1100-0
Al-2024-T4
Al-2219-T87

Al-6061
Al-7075
RF: Alloys

Aluminum-Alloy-Fatigue
S: Al-Alloy-Fatigue

Aluminum-Hydride-Preparation
S: Al-Hydride-Prep

Aluminum-Hydride-Properties
S: Al-Hydride-Prop

Aluminum-Oxide
S: Alumina

Aluminum-Red-Fuming-Nitric-Acid-
Corrosion
S: AL-RFNA-Corrosion

ALUMIZINE

ALUMIZINE-FROPEL
RF: Alumizine-Propellants
Propellants

Alumizine-Propellants
S: Alumizine-Propel

AMBIENT-PRESSURE
RF: Pressure

AMBIENT-TEMP
RF: Ambient-Temperature
Temperature

Ambient-Temperature
S: Ambient-Temp

AMIDES
SA: Acetamide
Acrylamide
Formamide
guanidines
Nylon
Sodium-Amide

AMINE-NITRATES

AMINE-ROCKET-FUELS
RF: Rocket-Fuels

AMINE-SALTS

RF: Salts

AMINES

SA: Allyamine
Aniline
Benzylamine
Butylamine
Diamine
Dibutylamine
Diethanolamine
Diethylamine
Dimethylamine
Diphenylamine
Ethanolamine
Ethylamine
Fluoramine
Methylamine
Orthotoluidine
Polyamines
Propargyl-Amine
Propylamine

Aminobenzene

S: Aniline

AMMONIA

SA: Anhydrous-Ammonia
Liquid-Ammonia
RFNA-Ammonia

AMMONIA-COMBUSTION

RF: Combustion

AMMONIA-COMPOUNDS

RF: Compounds

AMMONIA-DECOMPOSIT

RF: Ammonia-Decomposition
Decomposition

Ammonia-Decomposition

S: Ammonia-Decomposit

AMMONIA-FUELS

RF: Rocket-Fuels

AMMONIA-HAZARD

RF: gaseous-Hazard

AMMONIA-IGNITION

RF: Ignition

AMMONIA-PHOTOLYSIS

RF: Photolysis

AMMONIA-TOXICITY

RF: Toxicity

AMMONIUM-AZIDE

RF: Azides

AMMONIUM-BOROHYD

RF: Ammonium-Borohydride
Borohydrides

Ammonium-Borohydride

S: Ammonium-Bo.ohyd

AMMONIUM-NITRATE

RF: Burning-Rate
Nitrate
Propellants
Solid-Oxidizers

AMMONIUM-PENTABORA

RF: Ammonium-Pentaborate

Ammonium-Pentoborate

S: Ammonium-Pentabora

AMMONIUM-PERCHLOR

RF: Ammonium-Perchlorate
JPL-X500
Perchlorates
Solid-Oxidizers

Ammonium-Perchlorate

S: Ammonium-Perchlor

AMMUNITION

SA: Case-Materials
Ignition-Systems
Tracers

RF: Ballistics

AMMUNITION-ANAL

RF: Ammunition-Analysis
Analysis

Ammunition-Analysis
S: Ammunition-Anal

AMPLIFIERS

SA: Feedback
Fluid-Amplifiers
Parametric-Amp

AN-F-58-FUEL
RF: Fuels

ANALOG-COMPUTERS
RF: Computers

Analyses
S: Analysis

ANALYSIS

SA: Aeroelastic-Anal
Ammunition-Anal
Chemical-Analysis
Combustion-Anal
Cost-Analysis
Failure-Analysis
Flight-Analysis
Flow-Analysis
Gas-Analysis
Heat-Transfer-Anal
Igniter-Analysis
Infrared-Analysis
Instability-Anal
Mission-Analysis
Performance-Anal
Physical-Analysis
Propellant-Anal
Quantitative-Anal
Radiation-Analysis
Safety-Analysis
Spectral-Analysis
Spectrometric-Anal
Stability-Analysis
Stress-Analysis
Structural-Anal
Systems-Analysis
Tensor-Analysis
Theoretical-Anal
Thermal-Analysis
Thermodynamic-Anal
Ultraviolet-Anal
Vehicle-Analysis
Weight-Analysis

ANALYSIS-TECHNIQUE

SA: Differential-Anal
gas-Chromatography

ANALYTICAL-CHEM

RF: Analytical-Chemistry
Chemistry

Analytical-Chemistry
S: Analytical-Chem

ANALYTICAL-MODELS
RF: Models

ANALYZERS

SA: Spectrum-Analyzer
RF: Instruments

ANHYDROUS-AMMONIA

RF: Ammonia

Anhydrous-Nitric-Acid

S: IRFNA
IWFNA
Nitric-Acid
RFNA
WFNA

ANILINE

RF: Amines
Aminbenzene
Phenylamine

ANIMAL-STUDIES

RF: Studies

ANNEALING

RF: Ductility
Metalworking

ANNULAR-NOZZLES

RF: Nozzles

ANODIZED-COATINGS

RF: Coatings

ANTENNAS

RF: Radio-Propagation

ANTI-COKING

SA: Carbon
RF: Fuel-Additives

ANTIDOTES

RF: Health-Hazards
Safety-Precautions
Toxicity

ANTIMISSILES

SA: AICBM
Wizard
RF: Active-Defense
Missile-Defense

ANTIMONY-SULFIDE

RF: Sulfides

Antisubmarine-Missile

S: ASW-Missile

APOLLO

SA: Command-Module
LEM
Saturn
RF: Spacecraft

APOLLO-PROPULSION

RF: Propulsion

APPLIED-RESEARCH

RF: Research

ARC-IGNITION

RF: Ignition

ARC-IMAGE-FURNACE

RF: Arc-Imaging-Furnace
Furnaces
Ignition-Tests

Arc-Imaging-Furnace

S: Arc-Image-Furnace

ARC-PROCESS

ARC-WELDING

RF: Welding

ARCITE-368

RF: Solid-Propellants

ARCOCEL-333E

RF: Solid-Propellants

ARCOCEL-368

RF: Solid-Propellants

ARCON

RF: Sounding-Rockets

ARDC-Model-Atmosphere

S: Standard-Atmos

ARGON

RF: gases

ARGUS-EFFECT

RF: Nuclear-Radiation
Van-Allen-Belt

ARMAMENT

RF: Weapon-System

ARMS-CONTROL

RF: Weapon-System

AROMATIC-COMPOUNDS

SA: Aromatic-Hydrocarb
RF: Compounds

AROMATIC-HYDROCARB

RF: Aromatic-Compounds
Aromatic-Hydrocarbons
Hydrocarbons

Aromatic-Hydracarbons

S: Aromatic-Hydrocarb

ARROW-TYPE-MOTOR

RF: Motors

ARTIFICIAL-ENVIRON

RF: Artificial-Environment
Environment
Simulation

Artificial-Environment

S: Artificial-Environ

ARTILLERY

RF: Weapons

ARTILLERY-PRIMERS
SA: Black-Powder
RF: Igniters

ARTILLERY-ROCKETS
SA: Little-John
RF: Rocket

AS-WELDED-JOINTS
RF: Joints

ASBESTOS
RF: Insulation

ASPEN
RF: Aerospace-Vehicles
Nuclear-Engines

ASPHALT
SA: GALCIT-65
RF: Solid-Propellants

ASROC
RF: ASW-Missile

ASSET-VEHICLE
RF: Reentry-Vehicles

ASW-MISSILE
SA: ASROC
RF: Antisubmarine-Missile
Missile

ATLAS
SA: WS-107A
RF: Ballistic-Missile

ATMOSPHERE
SA: Air-Turbulence
Atmospheric-Press
CAT
Clouds
HI-CAT
Humidity
Ionosphere
Meteorology
Quiescent-Air
Standard-Atmos
Upper-Atmosphere

RF: Meteorology
Turbulence

ATMOSPHERIC-PRESS
RF: Atmosphere
Atmospheric-Pressure
Pressure
Superatmospheric-Pressure

Atmospheric-Pressure
S: Atmospheric-Press

ATMOSPHERIC-PROP
RF: Atmospheric-Properties

Atmospheric-Properties
S: Atmospheric-Prop

ATOM
SA: Molecule
RF: Molecule

ATOMIC-HYDROGEN
RF: Hydrogen

ATOMIC-WEAPONS
RF: Weapons

ATOMIZATION
SA: Aerosols
Droplets
RF: Spray-Formation

ATOMIZED-FUEL
RF: Fuels
Sprays

ATOMIZERS
SA: Aerosols

ATTITUDE-CONTROL
SA: Mass-Expulsion
RF: Control-Systems
Flight-Control
Satellite-Control

AUTODECOMPOSITION
RF: Decomposition

AUTOPILOT
RF: Flight-Control

AUXILIARY-POWER
SA: Power-Supplies
SNAP
RF: generators
Power-Plants

AUXILIARY-TANKS
RF: Tanks

Aviation-gasoline
S: Aircraft-Fuels

AXIAL-FLOW
RF: Flow

AXIAL-FORCES
RF: Forces

AXIAL-LOADS
RF: Loads

AZIDES
SA: Ammonium-Azide
Sodium-Azide
RF: Hydrazoic-Acid

AZINE
SA: Triazine
RF: Acetalazine

AZODIFORMAMIDINE

B-H-C-N-COMPOUNDS
RF: Compounds

B-N-PROPELLANTS
RF: Propellants

B-N-H-PROPELLANTS
RF: Solid-Propellants

BALL-PROPELLANTS
RF: Propellants

Ballistic-Centrifuge
S: Centrifuge

BALLISTIC-DATA

BALLISTIC-MISSILE
SA: Atlas
Basing-Concept
Boosters
ICBM-Systems
Intercept-X
Rover
RF: Missile

Ballistic-Missile-Defense
S: Missile-Defense

BALLISTIC-MODIFIER

BALLISTIC-PERFORM
RF: Ballistic-Performance
Performance

Ballistic-Performance
S: Ballistic-Perform

BALLISTIC-PROP
RF: Ballistic-Properties

Ballistic-Properties
S: Ballistic-Prop

BALLISTIC-STUDIES
RF: Studies

BALLISTIC-SYSTEM

BALLISTIC-TEST
RF: Tests

BALLISTICS
SA: Ammunition
External-Ballistic
gun-Firings
Interior-Ballistic
Terminal-Ballistic
RF: Weapons

BAR-MAGNETS
RF: Magnets

BARIUM	BE-FORGING
	RF: Forging
BARIUM-HYDROXIDE	BE-FORMING
RF: Hydroxides	RF: Forming
BARIUM-NITRATE	BE-HAZARD
RF: Nitrate	RF: Health-Hazards
BARIUM-PERCHLORATE	BE-HYDRIDE
RF: Perchlorates	RF: Metal-Hydrides
BARIUM-PEROXIDE	BE-JOINING
	RF: Joining
BARIUM-TITANATE	BE-MACHINING
	RF: Machining
BARRIER-MATERIALS	Be-Oxide
RF: Heat-Shield-Matls	S: Beryllia
BASE-HEATING	BE-PROPERTIES
RF: Heating	
BASE-PRESSURE	BE-RESEARCH
RF: Pressure	RF: Research
BASES	BE-SHEETS
SA: Advanced-Bases	RF: Sheets
Lunar-Bases	
Satellite-Bases	BE-STRUCTURES
	RF: Structures
BASING-CONCEPT	BE-TOXICITY
RF: Ballistic-Missile	RF: Toxicity
Bayonet-Type-Igniter	BELL-MODEL-8048
S: Igniters	RF: Propulsion-System-Bell-Model
	-8048
BE-AL-ALLOYS	BELL-MODEL-8181
RF: Alloys	RF: Propulsion-System-Bell-Model
BE-BORCHYDRIDE	-8181
RF: Borchhydrides	BELLOWS
BE-COMPOUNDS	BENZENE
RF: Compounds	
BE-CORROSION	BENZYLAMINE
RF: Corrosion	RF: Amines
BE-EROSION	
RF: Erosion	

BERYLLIA

RF: Be-Oxide
Refractories

BERYLLIUM

SA: Headings under BE
RF: glucinum
High-Temp-Materials
Light-Metals

BETA-D-GLUCOSE

SA: Alpha-d-glucose
glucose
Pentaacetate
RF: Alpha-d-glucose
glucose

BETA-TITANIUM

SA: TI-3AL-11CR-13V
RF: Titanium-Alloy

BI-METALLIC-COMP

RF: Bi-Metallic-Compounds
Compounds

Bi-Metallic-Compounds

S: Bi-Metallic-Comp.

BI-METALLIC-POWDER

RF: Metal-Powder
Powder

BI-METALLICS

RF: Metals

BI-PROPELLANTS

RF: Bipropellants
Propellants

BIAXIAL-STRESS

RF: Stress

BIBLIOGRAPHY

SA: Abstracts
Indexes
References
RF: Abstracts
Indexes
Publications

Big-Q

S: Air-X

BINDERS

SA: Acrylic-Resin
Elastomeric-Binder
Fuel-Binders
Nitrocellulose
Nitrogen-Rich-Bind
Oxidizer-Binders
Resin-Binders

BIOASTRONAUTICS

SA: Human-Factors
Space-Biology
Weightlessness
RF: Space-Sciences

BIOLOGICAL-EFFECTS

PF: Health-Hazards

Biprollents

S: Bi-Propellants

BLACK-POWDER

RF: Artillery-Primers
Powder
Explosives

BLADDER-CELL

SA: Bladders
RF: Cells
Kel-F-Bladder-Cell

BLADDERS

SA: Cryogenic-Bladders
Expulsion-Bladders
RF: Bladder-Cell
Fuel-Tanks

BLAST-CHARACTER

RF: Blast-Characteristics

Blast-Characteristics

S: Blast-Character

BLAST-HAZARD

RF: Explosion-Hazards

BLOOD-SERUM

RF: Safety-Precautions
Toxicity

BLOWDOWN-TUNNEL

RF: Wind-Tunnel

BLUFF-BODIES

RF: Bodies

BODIES

SA: Bluff-Bodies
Many-Body-Problem
Three-Body-Problem
Two-Body-Problem

BODIES-OF-REVOLUT

SA: Shells-of-Revolut
RF: Bodies-of-Revolution

Bodies-of-Revolution

S: Bodies-of-Revolut

BOILING-FLUORINE

RF: Fluorine

BOILING-HEAT-TRANS

RF: Boiling-Heat-Transfer
Heat-Transfer

Boiling-Heat-Transfer

S: Boiling-Heat-Trans

BOILING-HYDRAZINE

RF: Hydrazine

BOILING-OXYGEN

RF: Oxygen

BOILING-POINT

BOND-ENERGY

RF: Energy

BONDING

SA: Case-Bonding
Diffusion-Bonding
Hydrogen-Bonding
Metal-Bonds
RF: Adhesives
Joining

BOOST-PUMPS

RF: Pumps

BOOST-TANKS

RF: Cryogenic-Boost-Tanks
Fuel-Tanks

BOOSTER-COSTS

RF: Costs

BOOSTER-IGNITER

RF: Igniters

BOOSTER-PROPULSION

RF: Propulsion

BOOSTER-ROCKET

RF: Rocket

BOOSTER-SUSTAINER

BOOSTER-SYSTEM

BOOSTER-TANK

RF: Fuel-Tanks

Booster-Vehicles

S: Boosters

BOOSTERS

SA: Missile-Boosters
Modular-Boosters
Payload
Recoverable-Boost
Saturn
Scout
Terrier-Booster
Thor-Agena
Torpedo-Booster
RF: Ballistic-Missile
Booster-Vehicles

BORANE

SA: Decaborane
Diborane
gaseous-Borane
Nonvolatile-Borane
Organoboranes
Solid-Borane
Tetraborane

RF: Boron-Hydride
Diborane

BORANE-ADSORPTION
RF: Adsorption

BORANE-ANALYSIS
RF: Chemical-Analysis

BORANE-COMBUSTION
RF: Combustion

BORANE-CONTAMINANT
RF: Contaminants

BORANE-CONVERSION
RF: Conversion

BORANE-DERIVATIVES

BORANE-DETECTOR
RF: Detector

BORANE-POLYMER
RF: Polymers

BORANE-PREPARATION

BORANE-REACTIONS
RF: Chemical-Reaction

BORANE-SPECTRA
RF: Spectra

BORANE-STUDIES
RF: Studies

BORANE-TOXICITY
RF: Toxicity

BORATES
SA: Alkylborate
Ca-Borate
Metaborate
Methyl-Borate
Sodium-Borate
Trimethyl-Borate

BORAX

BORIC-ACID
SA: Acid subheadings
Meta-Boric-Acid
Ortho-Boric-Acid
RF: Acids

BORIC-OXIDE

BORIDE-COMPOUNDS
RF: Compounds

BORIDES
SA: Al-Boride
Ca-Boride
Chromium-Boride
Columbium-Boride
Molybdenum-Boride
Silicon-Boride
Tantalum-Boride
Tetraboride
Titanium-Boride
Tungsten-Boride
Zirconium-Boride
RF: Metal-Borides

Boroethane
S: Diborane

BOROHYDRIDE-PREP
RF: Borohydride-Preparation

Borohydride-Preparation
S: Borohydride Prep

BOROHYDRIDE-RES
RF: Borohydride-Preparation
Research

Borohydride-Research
S: Borohydride Res

BOROHYDRIDES
SA: Al-Borohydride
Ammonium-Borohyd
Be-Borohydride
Ca-Borohydride
Li-Borohydride
Mg-Borohydride
Sodium-Borohydride
RF: Reducing-Agents

BORON	Boundary-Layer-Control
RF: Light-Metals	S: Boundary-Layer-Con
BORON-ALKYLATION	BRASS
RF: Alkylation	RF: Copper-Alloy
BORON-ANALYSIS	BRAZING
RF: Chemical-Analysis	RF: Joining
BORON-CARBIDE	Bridgewire
RF: Carbides	S: Metal-Wire
BORON-CARBON-COMP	BROMIDES
RF: Boron-Carbon-Compunds	SA: Hydrogen-Bromide
Compounds	Potassium-Bromide
Boron-Carbon-Compounds	BROMINE
S: Boron-Carbon-Comp	BROMOETHYL-ETHERS
BORON-COATINGS	RF: Ether
RF: Coatings	BRONZE
BORON-COMBUSTION	RF: Copper-Alloy
RF: Combustion	BUBBLE-DYNAMICS
BORON-COMPOSITION	BUBBLE-FORMATION
BORON-COMPOUNDS	RF: Formation
RF: Compounds	BULK-DENSITY
BORON-HALIDE	RF: Density
RF: Halides	BULLPUP
Boron-Hydride	RF: Missile
S: Borane	WS-321A
BORON-NITRIDE	BUMBLEBEE-PROJECT
BORON-OXIDE	SA: Talos
BORON-TRICHLORIDE	BURN-LEACH-PROCESS
BORON-TRIFLUORIDE	SA: Rover-Fuel
BOUNDARY-LAYER	Uranium-Recovery
RF: Turbulence	BURNER
BOUNDARY-LAYER-CON	SA: Plug-Burner-Tech
RF: Boundary-Layer-Control	BURNER-STUDIES
Control-Systems	RF: Studies

BURNER-TIP-TEMP

RF: Burner-Tip-Temperature
Temperature

Burner-Tip-Temperature

S: Burner-Tip-Temp

BURNING

SA: Abnormal-Burning
Decomposition-Burn
Diffusive-Burning
Double-Burning
Erosive-Burning
Optimum-Burning
Rapid-Burning
Resonant-Burning
Restricted-Burning
Steady-State-Burn
Uncontrolled-Burn
Unstable-Burning
Wormhole-Burning

BURNING-CHARACTER

RF: Burning-Characteristics

Burning-Characteristics

S: Burning-Character

BURNING-MECHANISMS

BURNING-PROCESS

BURNING-RATE

SA: Additive-Effects
Ammonium-Nitrate
Consumption-Rate
High-Burning-Rate
Propellant-Burning
RF: Consumption-Rate

BURNING-RATE-CON

SA: Run-Away-Phenomena
RF: Burning-Rate-Control
Control-Systems

Burning-Rate-Control

S: Burning-Rate-Con

BURNING-SPRAYS

RF: Sprays

BURNING-TEMPS

RF: Burning-Temperatures
Temperature

Burning-Temperatures

S: Burning-Temps

BURNING-VELOCITY

RF: Velocity

BUTADIENE

SA: Polybutadiene

BUTADIENE-DIOXIDE

RF: Dioxides

BUTANE

RF: Fluoro-Nitro-Comp

Butanol

S: Butyl-Alcohol

BUTENE

RF: Butylene

BUTYL-ALCOHOL

RF: Alcohol
Butanol
N-Butanol
N-Butyl-Alcohol

BUTYLAMINE

RF: Amines

Butylene

S: Butene

BUTYRIC-ACID

RF: Acids
Fluoro-Nitro-Comp

CADMIUM

CA-BORATE

RF: Borates

CA-BORIDE

RF: Borides

CA-BOROHYDRIDE

RF: Borohydrides

CA-CARBIDE

RF: Carbides

CA-CHLORIDE

RF: Chlorides

CA-FLUORIDE

RF: Fluoride

CA-HYDRIDE

RF: Hydrides

CA-PEROXIDE

CA-RECOVERY

RF: Recovery

CA-RESINATE

RF: Resins

CALCIUM

SA: Headings under Ca.

RF: Light-Metals

CALCULATOR

SA: Computers

RF: Accumulator
Computers

CALORIMETER

RF: Instruments
Temperature-Meas

CALORIMETRY

CAMERAS

SA: High-Speed-Camera
Strobe-Control

RF: Photography

CANDELILLA-WAX

RF: Wax

CANNONBALL-PROJECT

CARBAMITE

RF: Plasticizers

CARBIDE-COATINGS

SA: Metal-Carbides

RF: Coatings

CARBIDE-COMPOSITES

RF: Composites

CARBIDE-CORE

RF: Nuclear-Engines
Reactor-Cores

CARBIDE-NOZZLES

RF: Nozzles

CARBIDES

SA: Al-Carbide

Boron-Carbide

Ca-Carbide

Chromium-Carbide

Iron-Carbide

Manganese-Carbide

Silicon-Carbide

Sodium-Carbide

Tantalum-Carbides

Titanium-Carbide

Zirconium-Carbide

RF: Carbon

CARBON

SA: Carbides

Castable-Carbon

Fluorocarbons

Pyrolytic-Carbon

RF: Anti-Coking

Charcoal

CARBON-ARC-LAMPS

RF: Solar-Simulation

CARBON-BLACK

RF: Gas-Combustion

CARBON-COATINGS

SA: Pyrolytic-Carbon

RF: Coatings

CARBON-COMBUSTION
RF: Combustion

CARBON-COMPOUNDS
RF: Compounds

CARBON-DETERM
RF: Carbon-Determination

Carbon-Determination
S: Carbon-Determ

CARBON-DIFLUORIDE

CARBON-DIOXIDE
RF: Dioxides

CARBON-DISULFIDE

CARBON-FIBERS
RF: Fibers
Whiskers

CARBON-FORMATION
SA: Chars
RF: Acetylene
Formation

CARBON-MONOXIDE

CARBON-PROPERTIES

CARBON-STEEL
RF: Steels

CARBON-SUBOXIDE

CARBON-TETRACHLOR
RF: Carbon-Tetrachloride

Carbon-Tetrachloride
S: Carbon-Tetrachlor

CARBONATES
SA: Sodium-Carbonate

CARBONYL-COMPOUNDS
RF: Compounds
Ketones

Cartridge-Case-Materials
S: Case-Materials

CASE-BONDED-PROPEL
RF: Case-Bonded-Propellants
Propellants

CASE-BONDING
RF: Adhesives
Bonding

CASE-MATERIALS
SA: Combustible-Cases
RF: Ammunition

Cases
S: Combustible-Cases
Motor-Cases

CASABLE-CARBON
RF: Carbon

CASTING
SA: Al-Casting
Steel-Casting
RF: Forming
Metalworking

CASTING-POWDER
RF: Powder

CASTING-TECHNIQUES

CAT
RF: Atmosphere
Clear-Air-Turbulence
Turbulent-Air

CATALYSIS
RF: Chemical-Reaction

CATALYST-DEVELOP
RF: Catalyst-Development

Catalyst-Development
S: Catalyst-Develop

CATALYST-EFFECT

CATALYST-PERFORM
RF: Catalyst-Performance

Catalyst-Performance
S: Catalyst-Perform

CATALYSTS
SA: Additives
Iron-Catalyst
Lewis-Acid
Silver-Catalyst
RF: Additives
Reaction-Rate

CATALYTIC-CONVERS
RF: Catalytic-Conversion
Conversion

Catalytic-Conversion
S: Catalytic-Convers

CATALYTIC-METHOD

CATALYTIC-PROCESS

CATAPULT-PROPEL
RF: Catapult-Propellant
Propellants

Catapult-Propellant
S: Catapult-Propel

CATAPULT-XC-9

CATAPULTS

CAVITATION
SA: Cavitating-Cond
Noncavitating-Cond

CAVITATION-CHARACT
RF: Cavitation-Characteristics

Cavitation-Characteristics
S: Cavitation-Charact

CAVITATION-DETECT
RF: Cavitation-Detection
Detection

Cavitation-Detection
S: Cavitation-Detect

CAVITATION-STUDIES
RF: Studies

CAVITATING-COND
RF: Cavitating-Conditions
Cavitation

Cavitating-Conditions
S: Cavitating-Cond

CELLS
SA: Bladder-Cell
Electrolytic-Cell
Infrared-Cell
Kerr-Cell
Load-Cells
Mercury-Cell
Photocells
Photovoltaic-Cells

CELLS-1000-AMP

CELLS-30000-AMP

CELLULOSE
SA: Ethyl-Cellulose
Nitrocellulose
RF: Cellulosic-Materials

CELLULOSE-ACETATE
SA: Ethyl-Cellulose
RF: Coatings
Inhibitor-Material
Insulation

Cellulose-Nitrate
S: Nitro-Cellulose

Cellulosic-Materials
S: Cellulose

CENTRALITES
SA: Ethyl-Centralite

CENTRIFUGAL-PUMPS
RF: Pumps

CENTRIFUGE

RF: Ballistic-Centrifuge

CENTRIFUGING

SA: Filtration

CERAMIC-COATINGS

RF: Coatings

CERAMIC-EROSION

RF: Erosion

CERAMIC-LINERS

RF: Liners

Ceramic-Materials

S: Ceramics

CERAMICS

RF: Ceramic-Materials
Materials
Porous-Ceramics
Reactor-Fuels

CERAMICS-RESEARCH

RF: Research

CERMETS

RF: Refractories

CESIUM

RF: Alkali-Metals
Light Metals
Light-Metal-Fuels

CHAMBER-ASSEMBLY

CHAMBER-MATERIALS

RF: Materials

CHAMBER-PRESSURES

SA: High-Chamber-Press
RF: Pressure

CHAMBER-SEALS

RF: Seals

CHAMBER-TECHNOLOGY

CHAMBERS

SA: Altitude-Test-Cham
Combustion-Chamber
Environmental-Cham
Heated-Chamber
Low-Pressure-Cham
Reaction-Chamber
Rocket-Chamber
Tartar-Plenum-Cham
Thrust-Chamber

CHANNEL

SA: Tapered-Channel
Towing-Channel

CHANNEL-CAPACITY

CHANNELED-FLOW

RF: Flow

Charcoal

S: Carbon

Charcoal-Activated

S: Activated-Carbon

CHARS

SA: Ablation-Chars
RF: Carbon-Formation

CHEMICAL-ADDITIVES

RF: Additives

CHEMICAL-ANALYSIS

SA: Borane-Analysis
Boron-Analysis
Ethyl-Analysis
FNA-Analysis
RF: Analysis

Chemical-Approaches

S: Chemical-Method

CHEMICAL-CONVERS

RF: Chemical-Conversion

Chemical-Conversion

S: Chemical-Convers

CHEMICAL-CORROSION

RF: Corrosion

CHEMICAL-FACTORS

CHEMICAL-HAZARDS

SA: Contamination
Decomposition
Explosion-Hazards
Fire-Hazards
Gaseous-Hazards
Health-Hazards
Liquid-Hazards

RF: Hazards
Military-Chemicals

CHEMICAL-IGNITERS

RF: Igniters

CHEMICAL-KINETICS

RF: Kinetics

CHEMICAL-METHOD

RF: Chemical-Approaches

CHEMICAL-MILLING

RF: Forming
Metalworking
Milling

CHEMICAL-PHENOMENA

CHEMICAL-PREP

RF: Chemical-Preparation

Chemical-Preparation

S: Chemical-Prep

CHEMICAL-PROCESSES

CHEMICAL-PROCESSING

RF: Processing

CHEMICAL-REACTION

SA: Adducts
Borane-Reactions
Catalysis
Diborane-Reaction
Heat-of-Reaction
Hydrogen-Reaction

Sodium-Reactions

RF: Reaction

CHEMICAL-RESEARCH

RF: Chemical-Studies
Research

CHEMICAL-SAFETY

RF: Safety
Toxicity

CHEMICAL-SCRUBBING

RF: Scrubbing

CHEMICAL-SOLUTIONS

SA: Heat-of-Solution
RF: Solutions

CHEMICAL-STABILITY

RF: Stability

CHEMICAL-STRUCTURE

RF: Structures

Chemical-Studies

S: Chemical-Research

CHEMICAL-SYNTHESIS

SA: Decane
Diborane-Synthesis
RF: Synthesis

CHEMICAL-SYSTEMS

CHEMICAL-TECHNIQUE

CHEMISTRY

SA: Analytical-Chem
Combustion-Chem
Difluoramine-Chem
Flame-Chemistry
Fluorine-Chemistry
High-Pressure-Chem
Inorganic-Chem
Ion-Chemistry
Military-Chemicals
Organic-Chemistry
Oxidizer-Chemistry
Photochemistry
Physical-Chemistry

Propellant-Chem	CHROMITE
Rare-Gas-Chem	RF: Refractories
Synthetic-Chem	
Thermochemistry	CHROMIUM
	RF: Refractory-Metals
CHLORIDES	
SA: Al-Chloride	Chromium-Acetyl-Acetate
Allyl-Chloride	S: Acetylacetate-Cr
Ca-Chloride	
Copper-Chloride	CHROMIUM-ALLOY
Cyanuric-Chloride	RF: Alloys
Ethyl-Chloride	CHROMIUM-BORIDE
Ferric-Chloride	RF: Borides
Hydrogen-Chloride	CHROMIUM-CARBIDE
Isopropyl-Chloride	RF: Carbides
Li-Chloride	CHROMIUM-COMPOSITE
Mercuric-Chloride	RF: Composites
Methyl-Chloride	CHROMIUM-COMPOUNDS
Methylene-Chloride	RF: Compounds
Polyvinyl-Chloride	CHROMIUM-DETERM
Potassium-Chloride	RF: Chromium-Determination
Propargyl-Chloride	
Sodium-Chloride	Chromium-Determination
Titanous-Chloride	S: Chromium-Determ
Trichlorides	
Vinyl-Chloride	CHROMIUM-OXIDE
Zinc-Chloride	RF: Refractories
CHLORINATED-RUBBER	
RF: Rubber	CIRCULAR-ORBITS
CHLORINE	RF: Orbits
CHLORINE-COMPOUNDS	CLADDING
RF: Compounds	SA: Coatings
CHLORINE-STORAGE	CLEANING
RF: Storage	SA: Descaling
CHLORINE-TRIFLUOR	Clear-Air-Turbulence
RF: Chlorine-Trifluoride	S: CAT
Liquid-Oxidizers	CLOUDS
Chlorine-Trifluoride	SA: Exhaust-Clouds
S: Chlorine-Trifluor	RF: Atmosphere
CHROMIC-ACID	
RF: Acids	

CLUSTERING-STRUCT	Refractory-Coating
RF: Clustering-Structure	Thermal-Protection
Structures	Vacuum-Deposition
	Zinc-Coatings
Clustering-Structure	RF: Ablation-Materials
SA: Clustering-Struct	Cladding
	Encapsulation
CLUSTERING-TECH	Finishes
RF: Clustering-Technique	
	Coatings-for-Aerospace-Environment
Clustering-Technique	S: Reflective-Coating
S: Clustering-Tech	Vacuum-Effects
CLUSTERS	COAXIAL-FLOW
SA: Plug-Cluster	RF: Flow
Rocket-Cluster	
	COAXIAL-INJECTION
COATED-THIN-SHEETS	RF: Fuel-Injection
RF: Thin-Sheets	Injection
COATING-MATERIALS	COAXIAL-JET-MIXING
RF: Materials	RF: Jet-Mixing
COATING-STUDIES	COBALT
RF: Studies	
	COBALT-60
COATING-SYSTEMS	
	COBALT-ALLOYS
COATING-TECHNIQUES	
	COBALT-AMMINE
COATINGS	
SA: Anodized-Coatings	COBALT-IGNITION
Boron-Coatings	RF: Ignition
Carbide-Coatings	
Carbon-Coatings	COBALT-PROPERTIES
Cellulose-Acetate	
Ceramic-Coatings	COEFFICIENT-DETERM
Corrosion-Protect	RF: Coefficient-Determination
Deposits	
Electrocoatings	Coefficient-Determination
Electrodeposition	S: Coefficient-Determ
Extrusion-Coatings	
Ignition-Coatings	COEFFICIENTS
Insulation	SA: Accommodation Coef
Iridium-Coatings	Discharge-Coef
Organic-Coatings	Temperature-Coef
Oxidation-Protect	
Paints	COLD-FLOW
Protective-Coating	RF: Flow
Reflective-Coating	

COLD-VALVES	COLUMBIUM-TECH
RF: Valves	RF: Columbium-Technology
COLD-WELDING	Columbium-Technology
RF: Welding	S: Columbium-Tech
COLD-WORKED-STEELS	COLUMBIUM-WELDING
RF: Steels	RF: Welding
COLEMANITE	COMBUSTIBLE-CASES
COLLOIDAL-PROPEL	RF: Consumable-Cases
RF: Colloidal-Propellants	Materials
Colloidal-Propellants	COMBUSTIBLES
S: Colloidal-Propel	RF: Fuels
Colloidal-Suspensions	Materials
S: Suspensions	COMBUSTION
COLUMBIUM	SA: Air-Fuel-Combust
RF: Niobium	Al-Combustion
Refractory-Metals	Ammonia-Combustion
COLUMBIUM-ALLOY	Borane-Combustion
RF: Alloys	Boron-Combustion
COLUMBIUM-BORIDE	Carbon-Combustion
RF: Borides	Deflagration
COLUMBIUM-OXIDAT	Gas-Combustion
RF: Columbium-Oxidation	Heat-of-Combustion
Columbium-Oxidation	Hybrid-Combustion
S: Columbium-Oxidat	Hydrocarbon-Combustion
COLUMBIUM-PROP	Light-Metal-Combustion
RF: Columbium-Properties	Nuclear-Combustion
Columbium-Properties	Precombustion
S: Columbium-Prop	Slow-Combustion
COLUMBIUM-PROTECT	Spray-Combustion
RF: Columbium-Protection	Staged-Combustion
Columbium-Protection	RF: Deflagration
S: Columbium-Protect	COMBUSTION-AERODY
	RF: Aerodynamics
	Combustion-Aerodynamics
	Combustion-Aerodynamics
	S: Combustion-Aerody
	COMBUSTION-ANAL
	RF: Analysis
	Combustion-Analysis
	Combustion-Analysis
	S: Combustion-Anal

COMBUSTION-CHAMBER

SA: Ablation-Materials

RF: Chambers

COMBUSTION-CHARACT

RF: Combustion-Characteristics

Combustion-Characteristics

S: Combustion-Charact

COMBUSTION-CHEM

SA: Flame-Chemistry

RF: Chemistry

Combustion-Chemistry

Combustion-Chemistry

S: Combustion-Chem

COMBUSTION-DATA

COMBUSTION-EFFIC

RF: Combustion-Efficiency

Combustion-Efficiency

S: Combustion-Effic

COMBUSTION-GASES

RF: gases

COMBUSTION-INSTAB

SA: Unstable-Combust

RF: Combustion-Instability

Instability

Unstable-Combust

Combustion-Instability

S: Combustion-Instab

COMBUSTION-KINETIC

RF: Kinetics

COMBUSTION-PHENOM

RF: Combustion-Phenomena

Combustion-Phenomena

S: Combustion-Phenom

COMBUSTION-PRESS

RF: Combustion-Pressure

Pressure

Combustion-Pressure

S: Combustion-Press

COMBUSTION-PROBLEM

COMBUSTION-PROCESS

COMBUSTION-PRODUCT

COMBUSTION-RATES

COMBUSTION-REACT

RF: Combustion-Reactions

Reaction

Combustion-Reactions

S: Combustion-React

COMBUSTION-REQUIRE

RF: Combustion-Requirements

Combustion-Requirements

S: Combustion-Require

COMBUSTION-SAFETY

RF: Safety

COMBUSTION-STUDIES

RF: Studies

COMBUSTION-SYSTEMS

COMBUSTION-TEMP

RF: Combustion-Temperature

Temperature

Combustion-Temperature

S: Combustion-Temp

COMBUSTION-TESTS

RF: Tests

COMBUSTION-WAVES

RF: Waves

COMBUSTORS

COMMAND-CONTROL

RF: Control-Systems

COMMAND-GUIDANCE

RF: guidance

COMMAND-MODULE

SA: LEM

RF: Apollo

COMMUNICATIONS

SA: Telemetry

COMPONENT-TESTS

RF: Tests

COMPONENTS

SA: Electrodes

Engine-Components

Fittings

Missile-Components

Rocket-Components

Composite-Materials

S: Composites

COMPOSITE-PROPEL

RF: Composite-Propellants
Propellants

Composite-Propellants

S: Composite-Propel

COMPOSITES

SA: Carbide-Composites

Chromium-Composite

Fiber-Composites

Refractory-Composites

RF: Ablation-Materials

COMPOUNDS

SA: Acetylene-Compound

Ammonia-Compounds

Aromatic-Compounds

B-H-C-N-Compounds

Be-Compounds

Bi-Metallic-Comp

Fluoride-Compounds

Boron-Carbon-Comp

Boron-Compounds

Carbon-Compounds

Carbonyl-Compounds

Chlorine-Compounds

Chromium-Compounds

Cyano-Compounds

Deuterium-Compound

Difluoramine-Comp

Dimers

Domino-Compounds

Elastomeric-Comp

Explosive-Compound

Fluorine-Compounds

Fluoro-Nitro-Comp

Halogen-Compounds

High-Energy-Comp

Hydrazine-Compound

Intermetallic-Comp

Lead-Compounds

Lithium-Compounds

N-F-Compounds

Nitrogen-Compounds

Organic-Compounds

Potassium-Compound

Rare-Gas-Compounds

Rubber-Compounds

Sulfur-Compounds

RF: Admixture

COMPRESSED-AIR

RF: Air

COMPRESSED-GASES

RF: gases

COMPRESSED-GAS-GUN

RF: guns

COMPRESSIBLE-FLOW

RF: Air

Flow

COMPRESSION

SA: Adiabatic-Compress

COMPRESSION-INVEST

RF: Compression-Investigations

Compression-Investigations

S: Compression-Invest

COMPRESSION-METHOD

COMPRESSION-SENSIT	Condensation-Kinetics
RF: Compression-Sensitivity	S: Condensation-Kinet
Compression-Sensitivity	CONDOR
S: Compression-Sensit	RF: Tactical-Missiles
COMPRESSION-TESTS	CONDUCTION
RF: Tests	SA: gas-Conduction
COMPRESSIVE-CREEP	CONDUCTIVE-FILM
SA: Creep-Buckling	RF: Film
RF: Creep	Igniters
COMPRESSIVE-STRENG	CONDUCTIVITY
RF: Compressive-Strength	SA: Resistance
Strength	Semiconductivity
Compressive-Strength	CONDUCTORS
S: Compressive-Streng	SA: Superconductors
COMPRESSORS	CONE-CHARGES
COMPUTATION	SA: Cylinder-Charges
SA: Numerical-Solution	RF: Shaped-Charges
COMPUTER-PROGRAMS	CONES
SA: Fortran-Programs	SA: Exit-Cones
Programming	Insulated-Cones
COMPUTERS	CONFIGURATION
SA: Analog-Computers	SA: Aerodynamic-Config
Calculators	CONFIGURATION-MGT
Digital-Computers	RF: Configuration-Management
RF: Calculators	Management
CONDENSATION	Configuration-Management
RF: Liquid-Phase	S: Configuration-Mgt
CONDENSATION-EFFEC	CONFINED-VORTEX
RF: Condensation-Effects	RF: Vortex
Condensation-Effects	CONICAL-NOZZLES
S: Condensation-Effec	RF: Nozzles
CONDENSATION-KINET	CONNECTOR-DESIGN
RF: Condensation-Kinetics	RF: Design
Kinetics	CONNECTOR-SYSTEM

CONNECTOS

RF: Leakage
Mechanical-Fitting

Considerations

S: Design-Consid
Kinetic-Consid
System-Consid

CONSTANTS

SA: Dielectric-Const
Elastic-Constants
Equilibrium-Const
Force-Constants

Consumable-Cases

S: Combustible-Cases

CONSUMPTION-RATE

SA: Burning-Rate
RF: Burning Rate

CONTACT-RESISTANCE

RF: Electrical-Contact
Resistance

CONTAINERS

RF: Tanks

CONTAMINANTS

SA: Borane-Contaminant
FNA-Contaminants
Inorganic-Contam
Metallic-Contam
Microbial-Contam
RF: Corrosion

CONTAMINATION

SA: Acid-Contamination
Decontamination
RF: Chemical-Hazards
Decomposition
Decontamination

CONTROL-APPLICAT

RF: Control-Applications

Control-Applications

S: Control-Applicat

CONTROL-SYSTEMS

SA: Attitude-Control
Boundary-Layer-Con
Burning-Rate-Con
Command-Control
Damage-Control
Detonation-Control
Diffusion-Control
Engine-Control
Feedback
Flight-Control
Flow-Control
Fluid-Power-Con
gravity-Control
guidance
Jet-Control-Vanes
Launch-Control
Satellite-Control
Spacecraft-Control
Temperature-Con
Thermal-Control
Vector-Control
Zero-G-Control

CONTROL-TECHNIQUES

SA: Hot-gas-Injection

CONTROL-THEORY

CONTROLS

SA: Adaptive-Controls
Impulse-Control
Manual-Control
Peripheral-Control
Reaction-Control
Servomechanisms
Strobe-Control
Thrust-Control
Vortex-Control

CONTROLS-RESEARCH

RF: Research

Conventional-Aircraft

S: Aircraft

Convergent-Divergent-Nozzles

S: Nozzles

CONVERSION

SA: Borane-Conversion
Catalytic-Conversion
Energy-Conversion

CONVERSION-FACTORS

CONVERSION-KINETIC

RF: Kinetics

CONVERSION-TIMES

Convolutional-Mapping

S: Mapping

COOLANTS

SA: Nozzle-Coolants
Reactor-Coolant
RF: Cryocooler-Tech

COOLING

SA: Aftercooling
Afterglow-Cooling
Film-Cooling
Motor-Cooling
Radiation-Cooling
Regenerative-Cool
Spray-Cooled
Sweat-Cooling
Transpiration-Cool
Wall-Cooling

COOLING-DATA

COOLING-TESTS

RF: Tests

COPPER-ALLOY

SA: Brass
Bronze
RF: Alloys

COPPER-CHLORIDE

RF: Chlorides

CORDITE

SA: Macerated-Cordite
RF: ABC-Cordite

CORPORAL-MISSILE

RF: Missile

CORPORAL-PROPEL

RF: Corporal-Propellant
Propellants

Corporal-Propellant

S: Corporal-Propel

CORROSION

SA: Al-Corrosion
Be-Corrosion
Chemical-Corrosion
Contaminants
FNA-Corrosion
TRFNA-Corrosion
Metal-Corrosion
Protective-Coatings
Stress-Corrosion
Titanium-Corrosion

RF: Alloys
Metals

CORROSION-DATA

CORROSION-EFFECTS

CORROSION-FATIGUE

RF: Fatigue

CORROSION-INHIBIT

RF: Corrosion-Inhibition
Corrosion-Inhibitors

Corrosion-Inhibition

S: Corrosion-Inhibit

Corrosion-Inhibitors

S: Corrosion-Inhibit

CORROSION-PRODUCTS

CORROSION-PROP

RF: Corrosion-Properties

Corrosion-Properties

S: Corrosion-Prop

CORROSION-PROTECT

RF: Coatings
Corrosion-Protection
Protection

Corrosion-Protection

S: Corrosion-Protect

CORROSION-RATES

CORROSION-RESIST

RF: Corrosion-Resistance
Resistance

Corrosion-Resistance

S: Corrosion-Resist

CORROSION-STUDIES

RF: Studies

CORROSION-TESTING

RF: Tests

COST-ANALYSIS

RF: Analysis
Management

COST-COMPARISON

COST-EFFECTIVENESS

COST-ESTIMATE

COST-FACTORS

COSTING-METHODS

COSTS

SA: Booster-Costs
Engine-Costs
Low-Cost
Payload-Cost
Production-Costs
Propulsion-Costs
Saturn-Costs
Spacecraft-Costs
System-Costs
Tooling-Costs

COUNTERMEASURES

SA: Interceptors
RF: Active-Defense
Missile-Defense

CRACK-PROPAGATION

RF: Fatigue

CRASH-FIRES

RF: Accidents
Aircraft-Crash-Fires
Fire-Hazards
Fires

CREEP

SA: Al-Creep
Compressive-Creep
Fatigue-Creep
Intermittent-Creep
Short-Time-Creep

CREEP-BUCKLING

RF: Buckling
Compressive-Creep

CREEP-BEHAVIOR

CREEP-DATA

CREEP-PROPERTIES

CREEP-RUPTURE

RF: Fracture

CRITICAL-PRESSURE

RF: Pressure

CRITICAL-TEMP

RF: Critical-Temperature
Temperature

Critical-Temperatures

S: Critical-Temp

CROSS-WIND-DEFLECT

RF: Cross-Wind-Detection
Wind

Cross-Wind-Deflection
S: Cross-Wind-Deflect

CRUCIFORM-GRAINS
RF: grains
Star-grains

CRYOCOOLER-TECH
SA: Coolants
Refrigerants
RF: Cryocooler-Technology

Cryocooler-Technology
S: Cryocooler-Tech

CRYOGENIC-BLADDERS
RF: Bladders

Cryogenic-Boost-Tanks
S: Boost-Tanks

Cryogenic-Containers
S: Cryogenic-Tanks

CRYOGENIC-DATA

CRYOGENIC-ENVIRON
RF: Cryogenic-Environments
Environments

Cryogenic-Environment
S: Cryogenic-Environ

Cryogenic-Fluids
S: Cryogenic-Liquids

Cryogenic-Hydrogen
S: Liquid-Hydrogen

CRYOGENIC-LIQUIDS
RF: Cryogenic-Fluids
Liquid-Hazards

CRYOGENIC-MATERIAL
RF: Materials

CRYOGENIC-PROPEL
RF: Cryogenic-Propellants
Liquid-Propellants

Cryogenic-Propellants
S: Cryogenic-Propel

CRYOGENIC-PUMPS
RF: Pumps

CRYOGENIC-RESEARCH
RF: Research

CRYOGENIC-SEALS
RF: Seals

CRYOGENIC-TANKS
RF: Cryogenic-Containers
Tanks

CRYOGENIC-TEMP
SA: Low-Temperatures
RF: Low-Temperature
Temperature

Cryogenic-Temperatures
S: Cryogenic-Temp

CRYOGENICS
SA: Low-Temperature

CRYSTALLINE-EXPLOS
RF: Crystalline-Explosives
Explosives

Crystalline-Explosives
S: Crystalline-Explor

CRYSTAL-STRUCTURE
RF: Structures

CRYSTALLIZATION

CRYSTALS

CUCKOO-MOTOR
RF: Motors

CURING
SA: Propellant-Curing

CURING-CYCLE

CURVES
SA: Performance-Curves

CUTTING-FLUIDS
RF: Fluids
Lubricants

CYANAMIDE

CYANIDE

CYANO-COMPOUNDS
RF: Compounds

CYANURIC-CHLORIDE
RF: Chlorides

CYCLIC-LOADS
RF: Loads

CYCLIC-TEMPERATURE
RF: Temperature

CYLINDER-CHARGES
RF: Cone-Charges

CYLINDER-STRUCTURE
RF: Structures

CYLINDERS
SA: Hollow-Cylinders
Sandwich-Cylinder
Thrust-Cylinders

CYLINDRICAL-SHELL
RF: Shells

CYLINDRICAL-TANKS
RF: Tanks

DACRON
RF: Fibers

DAMAGE-CONTROL
RF: Accidents
Control-Systems

DAMPING
SA: Moments-of-Inertia

DATA-ACCUMULATOR
RF: Accumulator

DATA-ACQUISITION

DATA-COLLECTION

DATA-HANDLING

DATA-PROCESSING
SA: Documentaion

DATA-REDUCTION
RF: Reduction

DATA-SHEETS
RF: Sheets

DECABORANE
RF: Borane

DECANE
RF: Chemical-Synthesis

DECODING

DECOMPOSITION
SA: Ammonia-Decomposit
Autodecomposition
Contamination
FNA-Decomposition
Thermal-Decomp
RF: Chemical-Hazards

DECOMPOSITION-BURN
RF: Burning
Decomposition-Burning

Decomposition-Burning
S: Decomposition-Burn

DECOMPOSITION-CHAM
RF: Decomposition-Chamber

Decomposition-Chamber
S: Decompositior-Cham

DECOMPOSITION-MECH

RF: Decomposition-Mechanisms

Decomposition-Mechanisms

S: Decomposition-Mech

DECOMPOSITION-PRES

RF: Decomposition-Pressure

Decomposition-Pressure

S: Decomposition-Pres

DECOMPOSITION-PROD

RF: Decomposition-Products

Decomposition-Products

S: Decomposition-Prod

DECONTAMINATION

SA: Contamination

Propellant-Spills

RF: Chemical-Hazards

Contamination

Hazard-Control

Safety-Precautions

DECTYS

RF: Missile-Defense

DEFENSE

SA: Active-Defense

Early-Warning-Sys

FAADS

Missile-Defense

DEFENSE-METALS

RF: Metals

DEFLAGRATION-WAVE

RF: Waves

DEFLAGRATION

SA: Combustion

RF: Combustion

DEFLECTION

SA: Exhaust-Deflection

Flame-Deflector

Jet-Deflection

DEFORMATION

SA: Metal-Deformation

RF: Buckling

DEGASSING

SA: Vacuum-Degassing

RF: gas-Film

DEGRADATION

SA: Deterioration

Thermal-Degradat

RF: Aging

Deterioration

DEHYDRATION

DEKAZENE

DELTA-WINGS

RF: Wings

DEMONSTRATION-TEST

RF: Tests

DENSITY

SA: Bulk-Density

Flux-Density

High-Density

Loading-Density

Power-Density

Propellant-Density

Radiation-Density

DENSITY-RANGE

DEPOSITION

SA: Electrodeposition

Energy-Deposition

Vacuum-Deposition

DEPOSITS

RF: Coatings

DEPRESSANTS

DESCALING

RF: Cleaning

DESENSITIZATION

RF: Sensitivity

DESIGN

SA: Aderodynamic-Design
Connector-Design
Engine-Design
Grain-Design
Igniter-Design
Injector-Design
Mechanical-Design
Minuteman-Design
Motor-Design
Nozzle-Design
Optimum-Design
Parametric-Design
Reactor-Design
Saturn-Design
Seal-Design
Statistical-Design
Structural-Design
System-Design
Tank-Design
Vehicle-Design

DESIGN-CALCULATION

DESIGN-CONCEPT

DESIGN-CONSID

RF: Considerations
Design-Considerations
Human-Factors

Design-Considerations
S: Design-Consid

DESIGN-CRITERIA

DESIGN-DATA

DESIGN-GUIDE

DESIGN-PARAMETERS

DESIGN-PROGRAM

DESIGN-SELECTION

RF: Planning

DESIGN-STUDIES

RF: Studies

DESIGN-TECHNIQUES

DESIGNATIONS

DETECTION

SA: Cavitation-Detect
Fire-Detection
Flaw-Detection
Infrared-Detection
Leak-Detection
Vapor-Detection

DETECTION-SYSTEM

DETECTOR

SA: Borane-Detector
Emission-Detectors
Flame-Detector
Flaw-Detector

DETERIORATION

SA: Degradation
RF: Degradation

DETONATING-CORD

RF: Igniters

DETONATING-GASES

RF: gases

DETONATION

SA: Al-Detonation
Explosion
Shock-Attenuation
Vapor-Detonation
RF: Explosion

DETONATION-BEHAV

RF: Detonation-Behavior

Detonation-Behavior

S: Detonation-Behav

DETONATION-CHARACT

RF: Detonation-Characteristics

Detonation-Characteristics

S: Detonation-Charact

DETONATION-CONTROL

RF: Control-Systems

DETONATION-HAZARD

RF: Explosion-Hazards

DETONATION-PARAM

RF: Detonation-Parameters

Detonation-Parameters

S: Detonation-Param

DETONATION-PREVENT

RF: Detonation-Prevention

Detonation-Prevention

S: Detonation-Prevent

DETONATION-REACT

RF: Detonation-Reaction
Reaction

Detonation-Reaction

S: Detonation-React

DETONATION-SENSIT

RF: Detonation-Sensitivity
Sensitivity

Detonation-Sensitivity

S: Detonation-Sensit

DETONATION-SPEED

RF: Speed

DETONATION-STUDIES

RF: Studies

DETONATION-TESTS

RF: Tests

DETONATION-WAVES

RF: Waves

Detonators

S: Igniters

DEUTERIUM

RF: Hydrogen-Isotope

DEUTERIUM-COMPOUND

RF: Compounds

DEUTERIUM-FUEL

RF: Nuclear-Fuels

DEUTEROMETHANES

DIACETONE-ALCOHOL

RF: Alcohol

DIACETYL

RF: Ketones

DIACETYLENE

RF: Acetylene

Dialkylchloroborane

S: Alkylchloroborane

DIAMINE

RF: Amines

DIAMINOBTENE

DIAPHANOUS-II-SYS

RF: Diaphanous-II-System
Fortran-Programs

Diaphanous-II-System

S: Diaphanous-II-Sys

DIAPHRAGMS

SA: Metal-Diaphragms
Tantalum-Diaphragm
RF: Fuel-Tanks

DIATOMIC-GASES

RF: gases

DIAZIRINE

DIAZO-COUPUNG

DIAZODINITROPHENOL

DIBORANE

SA: Borane
RF: Boroethane
Borane

DIBORANE-HAZARD

RF: gaseous-Hazard

DIBORANE-OXIDATION	Dielectric-Constants S: Dielectric-Const
DIBORANE-PREP RF: Diborane-Preparation	DIELECTRIC-HEATING RF: Heating
Diborane-Preparation S: Diborane-Prep	DIESEL-FUELS RF: Fuel-Oil Fuels
DIBORANE-PURIFICAT RF: Diborane-Purification	DIETHANOLAMINE RF: Amines
Diborane-Purification S: Diborane-Purificat	DIETHYLAMINE RF: Amines
DIBORANE-PVT-PROP RF: Diborane-Pressure-Volume- Temperature-Properties	DIFFERENTIAL-ANAL RF: Analysis-Technique Differential-Analysis
Diborane-Pressure-Volume-Temperature- Properties S: Diborane-PVT-Prop	Differential-Analysis S: Differential-Anal
DIBORANE-PYROLYSIS	DIFFRACTION SA: X-Ray-Diffraction
DIBORANE-REACTIONS RF: Chemical-Reaction	DIFFUSER-STUDIES RF: Studies
DIBORANE-RECOVERY RF: Recovery	DIFFUSERS SA: Dump-Diffuser Exhaust-Diffusers
DIBORANE-SOLUBIL RF: Diborane-Solubility Solubility	DIFFUSION SA: gaseous-Diffusion Thermal-Diffusion
Diborane-Solubility S: Diborane-Solubil	DIFFUSION-BONDING RF: Bonding
DIBORANE-SYNTHESIS RF: Chemical-Synthesis	DIFFUSION-CONTROL RF: Control-Systems
DIBUTYL-PHTHALATES RF: Phthalates	DIFFUSION-EFFECT
DIBUTYLAMINE RF: Amines	DIFFUSION-FLAMES RF: Flames
DIBUTYLBORATE	DIFFUSIVE-BURNING RF: Burning
DIELECTRIC-CONST RF: Constants Dielectric-Constants	

DIFLUORAMINE
RF: Fluoro-Nitro-Comp.

DIFLUORAMINE-CHEM
RF: Chemistry
Difluoramine-Chemistry

Difluoramine-Chemistry
S: Difluoramine-Chem

DIFLUORAMINO-COMP
RF: Compounds
Difluoramino-Compounds

Difluoramino-Compounds
S: Difluoramino-Comp

DIGITAL-COMPUTERS
RF: Computers

DIGITAL-SYSTEMS
RF: Flight-Control

DIGITAL-TRANSDUCER
RF: Transducers

DIHALIDES
RF: Halides

Dihydropentaborane
S: Pentaborane

DIISOCYANATE

DILUENTS

DIMERS
RF: Compounds

Dimethyl-Carbinol
S: Isopropyl-Alcohol

DIMETHYL-ESTER
RF: Esters

Dimethyl-Ether
S: Methyl-Ether

DIMETHYL-HYDRAZINE
SA: UDMH
RF: Hydrazine

Dimethyl-Ketone
S: Acetone

DIMETHYL-SULFATE

DIMETHYLAMINE
RF: Amines

Dimethylene-Methane
S: Propadiene

DINITRO-ETHANE

DIOXIDES
SA: Butadiene-Dioxide
Carbon-Dioxide
Hydrogen-Dioxide
Nitrogen-Dioxide

DIPHENYLAMINE
RF: Amines

DISCHARGE
SA: Electric-Discharge
gas-Discharge

DISCHARGE-COEF
RF: Coefficients
Discharge-Coefficients

Discharge-Coefficients
S: Discharge-Coef

DISTILLATES
SA: Kerosene

DISTILLATION
SA: Evaporation
Fractional-Distill

DOCKING
RF: Orbital-Mechanics
Rendezvous
Space-Docking
Space-Maneuvering

DOCUMENT-RETRIEVAL
SA: Indexes
RF: Documentation
Information-Retrieval

DOCUMENTATION

SA: Document-Retrieval
Literature
RF: Data-Processing
Indexes

DOMINO-COMPOUNDS

RF: Compounds

DOPPLER-NAVIGATION

RF: Navigation

DOUBLE-BASE-PROPEL

RF: Double-Base-Propellants
Propellants

Double-Base-Propellants

S: Double-Base-Propel

DOUBLE-BURNING

RF: Burning

DRAG

SA: Low-Drag
Supersonic-Drag
RF: Aerodynamics
Projectiles
Streamlined-Bodies

DRAG-FUNCTIONS

RF: Functions

DRAG-REDUCTION

RF: Reduction

DROP-TANK

RF: Tanks

DROPLETS

SA: Fuel-Droplets
RF: Atomization
Liquid-Droplet

DRUMS

SA: Fuel-Drums
Storage-Drums
RF: Tanks

DUAL-GRAIN-SYSTEMS

RF: grains

DUAL-THRUST-MOTOR

RF: Motors
Thrust

DUCTILE-ALLOYS

RF: Alloys

DUCTILITY

SA: Annealing

DUMP-DIFFUSER

RF: Diffusers

DYNAMIC-FLOW

RF: Flow

DYNAMIC-LOADS

RF: Loads

DYNAMIC-RESPONSE

RF: Structures

DYNAMIC-STABILITY

R: Stability

EARLY-WARNING-SYS

RF: Defense
Early-Warning-Systems

Early-Warning Systems

S: Early-Warning-Sys

EARTH-ORBITS

RF: Orbits

EARTH-SATELLITES

RF: Satellites

EDGE-LOADING

RF: Loading

EIMITE

RF: Primers

EJECTION-SEAT

RF: Safety-Devices

EJECTORS

SA: Nozzle-Ejectors
Rocket-Ejector

ELASTIC-CONSTANTS

RF: Constants

ELASTIC-FILAMENTS

RF: Fibers

ELASTIC-MODULI

SA: Youngs-Modulus

ELASTIC-SEALS

RF: Seals

ELASTIC-SHELLS

RF: Shells

ELASTIC-STABILITY

RF: Stability

ELASTIC-STRUCTURES

RF: Structures

ELASTIC-SYSTEMS

RF: Shock-Isolation

ELASTICITY

SA: Viscoelasticity
Youngs-Modulus

ELASTOMERIC-BINDER

RF: Binders
Elastomers

ELASTOMERIC-COMP

SA: Rubber-Compounds
RF: Compounds
Elastomeric-Compounds

Elastomeric-Compounds

S: Elastomeric-Comp

ELASTOMERS

SA: Elastomeric-Binder
Polyurethane-Elast
Rubber
RF: Materials

ELECTRIC-DISCHARGE

RF: Discharge

ELECTRIC-HAZARDS

RF: Electromagnetic-Hazard
Hazards

ELECTRIC-PRIMERS

RF: Primers

ELECTRIC-PROPULS

RF: Electric-Propulsion
Propulsion

Electric-Propulsion

S: Electric-Propuls

ELECTRIC-SPARKS

RF: Sparks

ELECTRICAL-CONTACT

SA: Contact-Resistance

ELECTRICAL-CONTIN

RF: Electrical-Continuity

Electrical-Continuity

S: Electrical-Contin

ELECTRICAL-MEAS

RF: Electrical-Measurements

Electrical-Measurements

S: Electrical-Measure

ELECTRICAL-PHENOM

SA: Piezoelectricity

RF: Electrical-Phenomena

Electrical-Phenomena

S: Electrical-Phenom

ELECTRICAL-PROPERT

RF: Electrical-Properties

Electrical-Properties

S: Electrical-Propert

ELECTRICAL-RESISTRF: Electrical-Resistance
Resistance**Electrical-Resistance**

S: Electrical-Resist

ELECTRICAL-SYSTEMSSA: Redundant-Circuits
Resistance-Networks**ELECTROCOATINGS**

RF: Coatings

ELECTRODEPOSITIONRF: Coatings
Deposition**ELECTRODES**

RF: Components

ELECTROEXPLOSIVES

RF: Explosives

ELECTROLYSIS**ELECTROLYTIC-CELL**RF: Cells
Power-Sources**Electromagnetic-Hazard**

S: Electric-Hazards

ELECTRON-BEAM**ELECTRON-DONORS**

RF: Energy-Sources

ELECTRON-BEAM-WELD

RF: Welding

ELECTRON-MICROSCOP

SA: Fractography

RF: Electron-Microscope

Electron-Microscope

S: Electron-Microscop

ELECTROSTATIC**ELEVATED-TEMP**RF: Elevated-Temperature
Temperature**Elevated-Temperature**

S: Elevated-Temp

ELLIPSOIDAL-SHELLS

RF: Shells

EMISSION**EMISSION-DETECTORS**

RF: Detector

EMISSION-SPECTRA

RF: Spectra

EMISSIVITY

SA: Reflectivity

RF: Radiation

EMITTANCE

SA: Spectral-Emittance

EMULSIONS

RF: Suspensions

ENAMELS

RF: Paints

ENCAPSULATION

SA: Coatings

Oxidizer-Encapsul

END-BURNING-MOTOR

RF: Motors

ENERGETIC-OXIDIZER

RF: Oxidizers

ENERGY

SA: Activation-Energy
Bond-Energy
Ignition-Energy
Radiant-Energy
Reaction-Energy
Solar-Energy
Sonic-Energy
Specific-Energy
Ultrasonic-Energy

ENERGY-CONVERSION

SA: Photovoltaic-Cells
RF: Conversion
Radiant-Energy-Conversion

ENERGY-DEPOSITION

RF: Deposition

ENERGY-RELEASE**ENERGY-SOURCES**

SA: Electron-Donors
RF: Power-Sources
Source

ENERGY-TRANSFER**ENGINE**

SA: Ace-Engine
Aerospike-Engine
Afterburner
Air-Breathing
Aircraft-Engines
Hybrid-Engine
Jet-Engine
Manifold
Motors
Nuclear-Engines
Plasma-Engine
Ramjet-Engine
Research-Engines
Rocket-Engine
Spacecraft-Engines
Static-Test-Firing
Thermojet-Engine
Turbo-rocket-Engine

RF: Motors

Power-Sources

ENGINE-COMPONENTS

RF: Components

ENGINE-COSTS

RF: Costs

ENGINE-CYCLES**ENGINE-DESIGN**

RF: Design

ENGINE-DYNAMICS**ENGINE-PARAMETERS****ENGINE-PERFORMANCE**

RF: Performance

ENGINE-STUDIES

RF: Studies

ENGINE-SUBASSEMBLY

RF: Subassemblies

ENGINE-SUBSYSTEM

RF: Subsystem

ENGINE-SYSTEM**ENGINE-TESTING**

RF: Tests

ENGINE-WEIGHTS

RF: Weight

ENGINEERING**ENTHALPY**

RF: Heat-Content

ENTRAINED-GASES

RF: Gases

ENTROPY

RF: Thermodynamics

ENVIRONMENT

SA: Artificial-Environ
Cryogenic-Environ
Flow-Environment
Flox-Environment
High-G-Environment
Hyper-Environment
Low-G-Environment
Missile-Environ

Reactive-Environ
 Space-Environment
 Thermal-Environ
 Vacuum-Environment

ENVIRONMENT-EFFECT

ENVIRONMENTAL-CHAM
 RF: Chambers
 Environmental-Chamber
 Simulators

Environmental-Chamber
 S: Environmental-Cham

ENVIRONMENTAL-TEST
 RF: Tests

ENZYME-STUDIES
 RF: Studies

EPOXIDE-RESIN
 RF: Resins

Epoxide-Resin-Binders
 S: Resin-Binders

EQUILIBRIUM-CONST
 RF: Constants
 Equilibrium-Constants

Equilibrium-Constants
 S: Equilibrium-Const

EROSION
 SA: Abrasion
 Be-Erosion
 Ceramic-Erosion
 Nozzle-Erosion
 Organic-Coatings
 Powder-Gas-Erosion
 Rain-Erosion
 Thermal-Erosion
 Throat-Erosion
 RF: Abrasion

EROSION-BURNING
 RF: Burning

ERROR-SOURCES
 RF: Source

ESTERS
 SA: Dimethyl-Ester
 Nitrate-Esters
 Phthalate-Ester

ETHANE
 Ethane-Nitrile
 S: Acetonitrile

Ethanoic-Anhydride
 S: Acetic-Anhydride

Ethanol
 S: Ethyl-Alcohol

ETHANOLAMINE
 RF: Amines

Ethanoyl-Chloride
 S: Acetyl-Chloride

ETHER
 SA: Bromoethyl-Ethers
 Ethyl-Ether
 Methyl-Ether

ETHER-ALCOHOL
 RF: Alcohol

ETHYL-ACETATE

ETHYL-ALCOHOL
 RF: Alcohol
 Ethanol
 Methyl-Carbinol

ETHYL-ANALYSIS
 RF: Chemical-Analysis

Ethyl-Carbinol
 S: Propyl-Alcohol

ETHYL-CELLULOSE
 RF: Cellulose
 Cellulose-Acetate
 Inhibitor-Material

ETHYL-CENTRALITE
 RF: Centralite

ETHYL-CHLORIDE
 RF: Chlorides

ETHYL-DECABORANE

ETHYL-DIBORANE

ETHYL-ETHER

RF: Ether

ETHYL-NITRATE

RF: Nitrate

ETHYLAMINE

RF: Amines

ETHYLENE

SA: Polyethylene

ETHYLENE-DIAMINE

ETHYLENE-GLYCOL

RF: Glycols

ETHYLENE-OXIDE

ETHYLENE-REACTIONS

RF: Gas-Reactions

Ethyne

S: Acetylene

EUTECTIC-MELT

RF: Melting-Point

EVAPORATION

SA: Fuel-Evaporation

RF: Distillation

EVASIVE-SATELLITE

RF: Active-Defense
Satellites

EXHAUST

SA: Rocket-Exhaust

EXHAUST-CLOUDS

RF: Clouds

EXHAUST-DEFLECTION

RF: Deflection

EXHAUST-DIFFUSERS

RF: Diffusers

EXHAUST-DUCTING

EXHAUST-FLAME

RF: Flames

EXHAUST-GAS

RF: Gases

EXHAUST-GAS-EFFECT

EXHAUST-GAS-STREAM

EXHAUST-JETS

RF: Jets

EXHAUST-NOZZLE

RF: Nozzles

EXHAUST-PLUME

RF: Plumes

EXHAUST-PRODUCTS

EXHAUST-SPECIES

EXHAUST-STREAM

EXHAUST-VELOCITY

RF: Velocity

EXIT-CONES

RF: Cones

EXIT NOZZLES

RF: Nozzles

EXPANSION

SA: Adiabatic-Expans
Internal-Expansion
Jet-Expansion
Thermal-Expansion

Exploding-Bridgewire

S: Metal-Wire-Combust

Exploding-Wire

S: Metal-Wire-Combust

EXPLOSION

SA: Detonation
Heat-of-Explosion

Helium-Explosion
 Manifold-Explosion
 Nuclear-Explosion
 Thermal-Explosions
 RF: Accidental-Explosions
 Accidents
 Detonation

EXPLOSION-HAZARDS
 SA: Blast-Hazard
 Detonation-Hazard
 RF: Chemical-Hazards
 Fuel-Hazards
 Hazards
 Launching-Hazards
 Propellant-Hazards
 WS-Hazards

EXPLOSION-LIMITS

EXPLOSION-RESEARCH
 RF: Research

EXPLOSIVE-ACTUATOR
 RF: Actuators

EXPLOSIVE-CHARACT
 RF: Explosive-Characteristics

Explosive-Characteristics
 S: Explosive-Charact

EXPLOSIVE-COMPOUND
 RF: Compounds
 Explosives

EXPLOSIVE-FORMING
 SA: Shock-Hardening
 RF: Forming
 Metalworking

EXPLOSIVE-INSTABIL
 RF: Explosive-Instability
 Instability

Explosive-Instability
 S: Explosive-Instabil

EXPLOSIVE-LOADED
 RF: Loading

EXPLOSIVE-OXIDAT
 RF: Explosive-Oxidation
 Oxidation

Explosive-Oxidation
 S: Explosive-Oxidat

EXPLOSIVE-PHENOM
 RF: Explosive-Phenomena

Explosive-Phenomena
 S: Explosive-Phenom

EXPLOSIVE-REACTION
 RF: Reaction

EXPLOSIVE-SENSIT
 RF: Explosive-Sensitivity
 Sensitivity

Explosive-Sensitivity
 S: Explosive-Sensit

EXPLOSIVE-TESTS
 RF: Tests

EXPLOSIVES
 SA: Black-Powder
 Crystalline-Explos
 Electroexplosives
 Explosive-Compound
 High-Explosives
 Liquid-Explosives
 Plastisol-Explos
 Pliable-Explosive
 Trinitrotoluene
 Underwater-Explos

EXPULSION
 SA: Fuel-Expulsion
 Mass-Expulsion
 Propellant-Expuls

EXPULSION-BLADDERS
 RF: Bladders

EXPULSION-SYSTEMS

EXPULSION-TANK
 RF: Tanks

EXPULSION-TECH

RF: Expulsion-Techniques
Positive-Expulsion-Techniques

Expulsion-Techniques

S: Expulsion-Tech

EXTERNAL-BALLISTIC

RF: Ballistics

EXTERNAL-FLOW

RF: Flow

EXTERNAL-FORCES

RF: Forces

EXTERNAL-PRESSURE

RF: Pressure

EXTRUSION-COATING

RF: Coatings

FAADS

RF: Defense
Forward-Area-Air-Defense-
System

FABRICATION

SA: Forging
Forming
Machining

FAILURE

SA: Fracture
Motor-Failure
Reliability

FAILURE-ANALYSIS

RF: Analysis
Reliability

FAILURE-MODES**FARADAY-METHOD****FAST-REACTORS**

RF: Reactors

FATIGUE

SA: Al-Alloy-Fatigue
Corrosion-Fatigue
Crack-Propagation
Fracture
Notch-Sensitivity
Panel-Fatigue

FATIGUE-BEHAVIOR**FATIGUE-CREEP**

RF: Creep

FATIGUE-EVALUATION

RF: Quality-Control

FATIGUE-MECHANISMS**FATIGUE-PROBLEMS****FATIGUE-PROPERTIES**

RF: Metal-Properties

FATIGUE-STRENGTH

RF: Strength

FATIGUE-TESTS

RF: Tests

FEASIBILITY-TEST

RF: Tests

FEED-MATERIALS

RF: Materials

FEED-PUMPS

RF: Pressure-Fed
Pumps

FEED-SYSTEMS

SA: Gravity-Fed-Rocket
Propellant-Feed

FEED-TANKS

RF: Tanks

FEEDBACK

RF: Amplifiers
Control-Systems

FERRIC-CHLORIDE
RF: Chlorides

FERRIC-IONS
RF: Ions

FERRIC-OXIDE

FERROCENE
SA: Vinyl-Ferrocene

FERROUS-ALLOYS
RF: Alloys

FERROUS-SULFATE

FIBER-COMPOSITES
RF: Composites

FIBERGLASS
RF: Glass
Glass-Fibers

FIBERGLASS-CASES

FIBERS
SA: Carbon-Fibers
Dacron
Elastic-Filaments
Glass-Fibers
High-Modulus-Fiber
Nylon
Refractory-Fibers
Reinforced-Fibers

FIBROUS-INSULATION
RF: Insulation

FILAMENT-WINDING

FILAMENT-WOUND

FILAMENTS
SA: Low-Cost-Filaments
Whiskers

FILM
SA: Conductive-Film
Gas-Film
Saran-Film

FILM-COOLED-NOZZLE
RF: Film-Cooling
Nozzles

FILM-COOLING
SA: Film-Cooled-Nozzle
RF: Cooling

FILTERS
SA: Glass-Filters

FILTRATION
SA: FNA-Filtration
RF: Centrifuging

FIN-ASSEMBLIES

FIN-ATTACHMENTS

FINENESS-RATIO

Finishes
S: Coatings
Organic-Coatings

FINS
SA: Longitudinal-Fins
Rectangular-Fins

FIRE-DETECTION
RF: Detection

Fire-Extinguishment
S: Firefighting

FIRE-HAZARDS
SA: Crash-Fires
RF: Al-Hazards
Chemical-Hazards
Fires
Friction-Spark-Ignition-Hazards
Fuel-Hazards
Hazards
Launching-Hazards
Propellant-Hazards

FIRE-PROTECTION
RF: Protection
Safety-Precautions

FIREFIGHTING

RF: Fire-Extinguishment

FIRESSA: Crash-Fires
Fire-Hazard
Hydrogen-Fires
RF: Accidents**FISSION**

SA: Gaseous-Fission

FISSION-HEATING

RF: Heating

FISSION-POWERRF: Nuclear-Propulsion
Power**FISSION-PRODUCTS****FISSION-REACTOR**

RF: Reactors

FITTINGSSA: Mechanical-Fitting
Welded-Fittings
RF: Components**FLAME-ATTENUATION****FLAME-CHEMISTRY**RF: Chemistry
Combustion-Chem**FLAME-DEFLECTOR**

RF: Deflection

FLAME-DETECTOR

RF: Detector

FLAME-FRONT**FLAME-INHIBITION****FLAME-PHENOMENA****FLAME-PLASMA**

RF: Plasmas

FLAME-FROPGATION

RF: Acetylene

FLAME-SPECTRA

RF: Spectra

FLAME-SPECTROSCOPY

RF: Spectroscopy

FLAME-SPEEDRF: Acetylene
Speed**FLAME-STABILITY**

RF: Stability

FLAME-STUDIES

RF: Studies

FLAME-TEMPERATURE

RF: Temperature

FLAME-TUBE

RF: Tube

FLAMESSA: Diffusion-Flames
Exhaust-Flame
Flash-Back
Hydrogen-Flames
Laminar-Flames
Metahne-Air-Flames
Propane-Air-Flames
Turbulent-Flame**FLAMMABILITY****FLAMMABILITY-LIMIT****FLARES**

RF: Pyrotechnics

FLASH-BACK

RF: Flames

FLASH-WELDING

RF: Welding

FLAT-PLATES

SA: Porous-Flat-Plate

RF: Plates

FLAW-DETECTION

RF: Detection

Inspection

FLAW-DETECTOR

RF: Detector

FLIGHT

SA: Free-Flight

High-Speed-Flight

Hypersonic-Flight

Long-Range-Flight

Missile-Flight

Orbital-Flight

Supersonic-Flight

Tow-Flight

FLIGHT-ANALYSIS

RF: Analysis

FLIGHT-CONTROL

SA: Altitude-Control

Autopilot

Digital-Systems

Hot-Gas-Systems

RF: Control-Systems

Flight-Control

Guidance

Navigation

Flight-Control-Systems

S: Flight-Control

FLIGHT-INSTRUMENTS

SA: Accelerometer

Gyroscopes

RF: Inertial-Navigation

Instruments

Navigation

FLIGHT-MECHANICS

RF: Mechanics

FLIGHT-OPERATIONS

FLIGHT-SAFETY-PROG

RF: Flight-Safety-Program

Safety-Programs

Flight-Safety-Program

S: Flight-Safety-Prog

FLIGHT-SIMULATION

RF: Simulation

FLIGHT-TESTS

RF: Tests

FLOW

SA: Adiabatic-Flow

Axial-Flow

Channeled-Flow

Coaxial-Flow

Cold-Flow

Compressible-Flow

Dynamic-Flow

External-Flow

Fluid-Flow

Gas-Flow

Hypersonic-Flow

Jet-Driven-Flows

Laminar-Flow

Oscillatory-Flow

Plastic-Flow

Potential-Flow

Primary-Flow

Propellant-Flow

Radial-Flow

Reverse-Flow

Secondary-Flow

Shear-Flow

Starting-Flow

Subsonic-Flow

Supersonic-Flow

Transonic-Flow

Turbulent-Flow

Two-Phase-Flow

Vortex-Flows

FLOW-ANALYSIS

RF: Analysis

FLOW-CONTROL

RF: Control-Systems

FLOW-ENVIRONMENTS

RF: Environment

FLOW-FIELD

FLOW-PATTERNS

FLOW-RATE**FLOW-SEPARATION****FLOW-STABILITY**

RF: Stability

FLOW-STUDIES

RF: Studies

FLOW-SYSTEM**FLOW-THEORY**

RF: Theoretical-Flow

FLOW-VELOCITIES

SA: Viscosity

RF: Velocity

FLOW-VISUALIZATION**FLOWMETERS**

RF: Instruments

FLOXRF: Fluorine-Liquid-Oxygen
Oxidizers**FLOX-ENVIRONMENT**

RF: Environment

FLOX-MIXTURES**FLUID-AMPLIFIERS**RF: Amplifiers
Fluidic-Generator**FLUID-BED-PROCESS****FLUID-FLOW**

SA: Reynolds-Number

RF: Flow

FLUID-INJECTION

RF: Injection

FLUID-MECHANICS

RF: Mechanics

FLUID-NAVIGATIONRF: Accelerometers
Navigation
Navigation-Fluid**FLUID-OSCILLATIONS**RF: Oscillations
Sloshing**FLUID-POWER-CON**RF: Control-Systems
Fluid-Power-Control**Fluid-Power-Control**

S: Fluid-Power-Con

FLUID-SYSTEMS**Fluid-Slosh**

S: Sloshing

FLUIDIC-GENERATORRF: Fluid-Amplifiers
Generators**FLUIDS**SA: Cryogenic-Liquids
Cutting-Fluids
Hydraulic-Fluids
Liquids
Starting-Fluid
RF: Liquids**FLUOBORATE**

SA: Sodium-Fluoborate

FLUORAMINE

RF: Amines

FLUORIDESA: Ca-Fluoride
Hydrogen-Fluoride
Li-Fluoride
Mercuric-Fluoride
Nitrogen-Fluoride
Pentafluoride
Potassium-Fluoride
Rare-Gas-Fluorides
Tetrafluoride
Trifluoride

FLUORINATION-TECH
RF: Fluorination-Techniques

Fluorination-Techniques
S: Fluorination-Tech

FLUORINE
SA: Boiling-Fluorine
Gaseous-Fluorine
Liquid-Fluorine

FLUORINE-CHEMISTRY
RF: Chemistry

FLUORINE-COMPOUNDS
RF: Compounds

FLUORINE-HAZARD
RF: Gaseous-Hazards
Oxidizer-Hazards

FLUORINE-OXIDIZERS
RF: Liquid-Oxidizers

Fluorine-Liquid-Oxygen
S: Flox

FLUORO-NITRO-COMP
SA: Acetamide
Butane
Butyric-Acid
Difluoramine
Pentane
RF: Compounds
Fluoro-Nitro-Compounds

Fluoro-Nitro-Compounds
S: Fluoro-Nitro-Comp

FLUOROCARBONS
RF: Carbon

FLUX
SA: Heat-Flux

FLUX-DENSITY
RF: Density

FNA-ANALYSIS
RF: Chemical-Analysis
Fuming-Nitric-Acid

FNA-CONTAMINANTS
RF: Contaminants
Fuming-Nitric-Acid

FNA-CORROSION
RF: Corrosion
Fuming-Nitric-Acid

FNA-DECOMPOSITION
RF: Decomposition
Fuming-Nitric-Acid

FNA-FILTRATION
RF: Filtration
Fuming-Nitric-Acid

FNA-VAPOR-PRESSURE
RF: Fuming-Nitric-Acid
Vapor-Pressure

FNA-PROPERTIES
RF: Fuming-Nitric-Acid

FNA-STORAGE
SA: Al-Corrosion
Al-RFNA-Corrosion
Al-Tanks
RF: Storage

FOAMS
SA: Sealed-Foam

FOLDING-FIN-ROCKET
RF: Rocket

FORCE-CONSTANTS
RF: Constants

FORCE-GAGES
RF: Gages

FORCE-MEASUREMENT
RF: Measurement

FORCE-TRANSDUCER
RF: Transducers

FORCES
SA: Aerodynamic-Forces
Axial-Forces
External-Forces
Shear

FORCING-FUNCTIONS

RF: Functions

FORGINGSA: Be-Forging
Metal-Deformation
RF: Fabrication**FORMABILITY**SA: Al-Formability
RF: Forming**FORMALDEHYDE**

RF: Aldehydes

FORMAMIDE

RF: Amides

FormationS: Bubble-Formation
Carbon-Formation
Heat-of-Formation
Sludge-Formation
Spray-Formation**FORMING**SA: Be-Forming
Casting
Chemical-Milling
Explosive-Forming
Formability
Hot-Forming
Metalworking
Rolling
Stretch-Forming
RF: Fabrication**FORTTRAN-PROGRAMS**SA: Diaphanous-II-Sys
RF: Computer-Programs**Forward-Area-Air-Defense-System**

S: FAADS

FRACTIONAL-DISTILLRF: Distillation
Fractional-Distillation**Fractional-Distillation**

S: Fractional-Distill

FRACTOGRAPHY

RF: Electron-Microscop

FRACTURESA: Creep-Rupture
Stress-Rupture
RF: Failure
Fatigue**FRACTURE-MECHANICS**

RF: Mechanics

FRACTURE-TOUGHNESSRF: Metal-Properties
Strength**FREE-FLIGHT**

RF: Flight

FREE-JETS

RF: Jets

FREE-MOLECULE

RF: Molecule

FREE-RADICALS

RF: Radicals

FREEZING

SA: Low-Freezing

FREEZING-POINT

SA: Low-Freezing-Point

FRICTIONSA: Internal-Friction
Skin-Friction
RF: Aerodynamics
Wear**Friction-Spark-Ignition-Hazards**

S: Fire-Hazards

FUEL-ADDITIVESSA: Anti-Coking
RF: Additives**FUEL-BINDERS**

RF: Binders

FUEL-BLENDS

FUEL-BUCKLING

RF: Buckling

FUEL-CAPSULE

FUEL-CELLS

RF: Power-Sources

FUEL-COMPOSITION

FUEL-DROPLETS

RF: Droplets

FUEL-DRUMS

SA: Rubber-Fuel-Drums

RF: Drums

FUEL-ELEMENTS

FUEL-EVALUATION

RF: Qualification-Test

FUEL-EVAPORATION

RF: Evaporation

FUEL-EXPULSION

RF: Expulsion

FUEL-HAZARDS

SA: Explosion-Hazards
Fire-Hazards
Health-Hazards
Propellant-Hazards
RF: Hazards
Propellant-Hazards

FUEL-INJECTION

SA: Coaxial-Injection
RF: Injection
Propulsion-Systems

FUEL-LOSSES

RF: Losses

FUEL-MATERIALS

RF: Materials

FUEL-MOTION

RF: Sloshing

FUEL-OIL

SA: Diesel-Fuels

FUEL-ORIFICE

RF: Orifices

FUEL-OSCILLATIONS

RF: Sloshing

FUEL-PIPE

FUEL-SUBSTITUTE

FUEL-SWELLING

FUEL-SYSTEMS

SA: Manifold

FUEL-TANKS

SA: Aircraft-Fuel-Tank
Bladders
Boost-Tanks
Booster-Tank
Diaphragms
Missile-Fuel-Tanks
Pistons
Tank-Liners
RF: Tanks

FUEL-TEMPERATURE

RF: Temperature

FUEL-TESTS

SA: Alcohol-Fuel-Tests
RF: Tests

FUEL-TOXICITY

RF: Toxicity

FUEL-TUBES

RF: Tube

FUEL-VISCOSITY

RF: Viscosity

FUELING

SA: Refueling

FUELS

SA: Aircraft-Fuels
AN-F-58-Fuel
Atomized-Fuel
Combustibles
Diesel-Fuels
Graphite-Fuel
High-Energy-Fuel
Hybaline-A5-Fuel
Hydrazine-Fuel
Hydrocarbon-Fuels
Jet-Fuel
JP-4-Fuel
JP-5-Fuel
JPX-Fuel
Kerosene-Type-Fuel
Light-Metal-Fuels
Liquid-Fuels
Metallic-Fuel
Monofuels
Nuclear-Fuels
Organoborane-Fuel
Propellants
Reactor-Fuel
Rocket-Fuels
Rover-Fuel
Rubber-Fuel-Base
Solid-Propellants
Slurry-Fuels
Super-Fuels
Turbine-Fuels
Turborocket-Fuel

FULL-POWER-RUN

RF: Tests

FUME-CONTROL

SA: Leak-Detection
Vapor-Detection
RF: Hazard-Control

FUMES**FUMING-NITRIC-ACID**

SA: FNA-
Caseous-FNA
IRFNA
IWFNA
RFNA
WFNA
RF: Nitric-Acid

FUNCTIONS

SA: Drag-Functions
Forcing Functions
Prandtl-Meyer-Func
Thermodynamic-Func

FURFURAL

RF: Aldehydes

FURFURYL-ALCOHOL

RF: Alcohol

FURNACES

SA: Arc-Image-Furnace
Induction-Heating

FUSED-SALT

RF: Salts

FUSION

SA: Heat-of-Fusion

FUSION-WELDING

RF: Welding

GAGES

SA: Force-Gages
Liquid-Level-Gages
Piezo-Gages
Pressure-Gages
Strain-Gage
Stress-Gage
RF: Instruments

GALCIT-65

RF: Asphalt

GAMMA-DOSE-RATE**GAMMA-RADIATION**

RF: Radiation

GAMMA-RAY**GAMMA-RAY-HEATING**

RF: Heating

GAS-ADSORPTION

RF: Adsorption

GAS-ANALYSIS

SA: Acetylene-Analysis
RF: Analysis

GAS-BREAKDOWN

GAS-CHROMATOGRAPHY

RF: Analysis-Technique

GAS-COMBUSTION

SA: Carbon-Black
Hydrogen-Combust
RF: Combustion

GAS-COMPOSITION

GAS-CONDUCTION

RF: Conduction

GAS-DISCHARGE

SA: R-F-Gas-Discharge
RF: Discharge

GAS-DYNAMICS

SA: Mollier-Charts

GAS-FILM

SA: Degassing
RF: Film

GAS-FLOW

SA: Adiabatic-Flow
RF: Flow

GAS-GENERATION

SA: Aerogens

GAS-GENERATOR

RF: Generators

GAS-KINETICS

RF: Kinetics

GAS-MASK-CANISTERS

GAS-METAL-REACTION

RF: Reaction

GAS-MIXTURES

RF: Mixture

GAS-OPERATED

GAS-PERMEABILITY

RF: Permeability

GAS-PHASE

GAS-PRESSURE

RF: Pressure

GAS-PRESSURIZATION

RF: Pressurization

GAS-REACTIONS

SA: Ethylene-Reactions
RF: Reaction

GAS-SEPARATORS

GAS-SUPPLY

GAS-TURBINES

RF: Turbines

GAS-VALVES

RF: Valves

GASEOUS-BORANE

RF: Borane

GASEOUS-DIFFUSION

RF: Diffusion

GASEOUS-FISSION

RF: Fission

GASEOUS-FLUORINE

RF: Fluorine

GASEOUS-FNA

RF: Fuming-Nitric-Acid

GASEOUS-HAZARDS

SA: Acetylene-Hazard
Ammonia-Hazard
Diborane-Hazard
Fluorine-Hazard
Hydrogen-Hazard
Oxygen-Hazard
Ozone-Hazard
RF: Chemical-Hazards

GASEOUS-HYDROGEN

RF: Hydrogen
Joul-Thomson-Eff

GASQUES-INJECTION

SA: Hot-Gas-Injection
RF: Injection

GASES

SA: Argon
Combustion-Gases
Compressed-Gases
Detonating-Gases
Diatomic-Gases
Entrained-Gases
Exhaust-Gases
Gray-Gas
Heavy-Gas
Helium
Hot-Gas-Blow-Down
Hot-Gas-Ignition
Hot-Gas-Primer
Hydrogen
Ideal-Gas-Theory
Knudsen-Gas
Nitrogen
Noble-Gas
Oxygen
Ozone
Phosgene
Powder-Gases
Propellant-Gas
Rare-Gas-Compounds

GASKETS

SA: Seals
RF: Leakage
Seals

GASOLINE

RF: Aircraft-Fuels

GELLED-FUELS

RF: Gelled-Propellants
Gels
Liquid-Propellants
Propellants

Gelled-Propellants

S: Gelled-Fuels

GELS

SA: Gelled-Fuels
Silica-Gels

GENERATORS

SA: Aerosol-Generators
Auxiliary-Power
Fluidic-Generator
Gas-Generator
Thermoelectric-Gen
RF: Power-Generation
Power-Sources

GERMANIUM**GIMBALS**

RF: Gyroscopes

GLASS

SA: Fiberglass

GLASS-BEADS**GLASS-FABRIC**

RF: Plastic-Laminates

GLASS-FIBERS

RF: Fiberglass
Fibers

GLASS-FILTERS

RF: Filters

GLAZING-MATERIALS

SA: Plastics
RF: Materials

Global-Surveillance

S: Surveillance

Glucinum

S: Beryllium

GLUCOSE

SA: Alpha-d-Glucose
Beta-d-Glucose
Penta-acetate
RF: Alpha-d-Glucose
Beta-d-Glucose
Penta-acetate

GLYCIDYL-NITRATE

RF: Nitrate

GLYCOLS

SA: Ethylene-Glycol

GLYOXAL

RF: Aldehydes

GOLD

GOSLING-MOTOR

RF: Motors

GR-S-RUBBER

RF: Rubber

GRAIN-CRACKING

GRAIN-DESIGN

RF: Design

GRAIN-SIZE

GRAINS

SA: Cruciform-Grains
Dual-Grain-Systems
Powder-Grains
Propellant-Grains
Reinforced-Grains
Sodium-Azide-Grain
Zuni-Grains

GRAPHITE

SA: Pyrolytic-Graphite
RF: Refractories

GRAPHITE-FUEL

RF: Fuels
Reactor-Fuel

GRAPHITE-MATERIALS

RF: Materials

GRAPHITE-STUDIES

RF: Studies

GRAVITY

SA: Low-G
Specific-Gravity
Zero-G

GRAVITY-CONTROL

SA: Zero-G-Control
RF: Control-Systems

Gravity-Environments

S: High-G-Environment
Low-G-Environment

GRAVITY-FED-ROCKET

RF: Feed-Systems
Rocket

GRAY-GAS

RF: Gases

Great-Altitudes

S: High-Altitude

GRID-TURBULENCE

RF: Turbulence

GROSS-WEIGHT

RF: Weight

GROUND-SHOCK

RF: Shock

GROUND-SUPPORT

SA: Aerospace-Gd-Equip
Semi-Trailer
Servicing-Equip
RF: Launch-Sites

Ground-Support-Equipment

S: GSE

GSE

RF: Ground-Support-Equipment

GUANIDINES

SA: Nitroguanidine
Perfluoroguanidine
RF: Amides

GUIDANCE

SA: Command-Guidance
Control-Systems
Flight-Control
Heat-Homing
Homing-Devices
Inertial-Guidance

Navigation
 Rendezvous
 Star-Trackers
 Terminal-Guidance
 RF: Navigation

 GUIDANCE-SYSTEM

 GUIDANCE-TECHNIQUE

 GUIDED-MISSILES
 SA: Polaris
 Sidewinder
 RF: Missile

 GUINEA-PIGS
 RF: Laboratory-Animals

 GUN-FIRINGS
 RF: Ballistics
 Weapons-Research

 GUN-PROPELLANTS
 RF: Propellants

 GUN-PROPULSION
 RF: Propulsion

 GUNS
 SA: Compressed-Gas-Gun
 High-Speed-Guns
 Ignition-Energy
 RF: Weapons

 GYPSUM
 SA: Alabaster

 GYROSCOPES
 SA: Gimbals
 RF: Accelerometer
 Flight-Instruments
 Inertial-Guidance
 Inertial-Navigation

 HAFNIUM

 HAFNIUM-ALLOYS
 RF: Alloys

HALIDES
 SA: Boron-Halide
 Dihalides

 HALOGEN-COMPOUNDS
 RF: Compounds

 HALOGENS

 HANDLING-DEVICES
 RF: Remote-Handling

 HANDLING-PROBLEMS

 HANDLING-TECHNIQUE

 HASTELLOY-R-235
 RF: Nickel-Base-Alloy

 HAWK-MOTOR
 RF: Motors

 HAZARD-CLASS
 SA: Sensitivity
 RF: Hazard-Classification

 Hazard-Classification
 S: Hazard-Class

 HAZARD-CONTROL
 SA: Decontamination
 Fume-Control
 Leak-Prevention
 RF: Launching-Hazards
 Safety
 Safety-Precautions

 HAZARDS
 SA: Accident-Hazards
 Chemical-Hazards
 Electric-Hazards
 Explosion-Hazards
 Fire-Hazards
 Fuel-Hazards
 Health-Hazards
 Launching-Hazards
 Potential-Hazards
 Propellant-Hazards
 Radiation-Hazards
 Reactor-Hazards
 Safety

HEALTH-HAZARDS

SA: Antidotes
Be-Hazard
Biological-Effects
Radiation-Hazards
Toxicity
RF: Chemical-Hazards
Fuel-Hazards
Hazards
Military-Chemicals
Propellant-Hazards
Toxicity

HEAT

SA: Specific-Heat

HEAT-CAPACITY

Heat-Conductivity
S: Thermal-Conduct

Heat-Content
S: Enthalpy

HEAT-EFFECTS**HEAT-EXCHANGERS****HEAT-FLUX**

SA: High-Heat-Flux
RF: Flux

HEAT-GENERATION**HEAT-HOMING**

RF: Guidance
Homing-Devices

HEAT-OF-COMBUSTION

RF: Combustion

HEAT-OF-EXPLOSION

RF: Explosion

HEAT-OF-FORMATION

RF: Formation

HEAT-OF-FUSION

RF: Fusion

HEAT-OF-REACTION

RF: Chemical-Reaction

HEAT-OF-SOLUTION

RF: Solutions
Chemical-Solutions

HEAT-PENETRATION**HEAT-RECOVERY**

RF: Recovery

HEAT-SHIELD-MATLS

SA: Barrier-Materials
RF: Ablation-Materials
Shield-Materials

HEAT-SHIELDS

RF: Shield

HEAT-SOURCE

SA: Radioisotopes

HEAT-TRANSFER

SA: Boiling-Heat-Trans
Laminar-Heat-Trans
Marangoni-Effect
Radiant-Heat-Trans

HEAT-TRANSFER-ANAL

RF: Analysis
Heat-Transfer-Analysis

Heat-Transfer-Analysis

S: Heat-Transfer-Anal

HEAT-TREATMENT

RF: Metalworking

HEAT-UP-CYCLE**HEATED-CHAMBERS**

RF: Chambers

HEATED-PLATES

RF: Plates

HEATED-TUBE

RF: Tube

HEATER-SYSTEMS

SA: Immersion-Heater

HEATING

SA: Aerodynamic-Heat
Base-Heating
Dielectric-Heating
Fission-Heating
Gamma-Ray-Heating
Induction-Heating
Nuclear-Heating
Preheating
Radiant-Heating
Rapid-Heating
Regenerative-Heat
Solar-Heating

HEATING-RATE

HEATING-TESTS

RF: Tests

HEAVY-GAS

RF: Gases

HEAVY-WATER

RF: Water

HEF

S: High-Energy-Fuel

HEF-2

HEF-3

HEF-4

HELICOPTERS

RF: Airplanes

HELIUM

SA: Joule-Thomson-Proc
Liquid-Helium

RF: Gases

HELIUM-EXPLOSIONS

RF: Explosion

HELIUM-PROPERTIES

HELIUM-STORAGE

RF: Storage

HEMISPHERES

RF: Spheres

HEPTANE

HERCULES-FPC-MOTOR

RF: Motors

HERMES-MOTOR

RF: Motors

HI-CAT

RF: Atmosphere
High-Clear-Air-Turbulence
Turbulent-Air

HIGH-ACCELERATION

RF: Acceleration

HIGH-ALTITUDE

RF: Altitude
Great-Altitude

HIGH-BURNING-RATE

RF: Burning-Rate

HIGH-CHAMBER-PRESS

RF: Chamber-Pressures
High-Chamber-Pressures

High-Chamber-Pressures

S: High-Chamber-Press

High-Clear-Air-Turbulence

S: HI-CAT

HIGH-DENSITY

RF: Density

HIGH-ENERGY-COMP

RF: Compounds
High-Energy-Compounds

High-Energy-Compounds

S: High-Energy-Comp

HIGH-ENERGY-FUEL

RF: Fuels
HEF

HIGH-ENERGY-MATERIAL

RF: High-Energy-Materials
Materials

High-Energy-Materials

S: High-Energy-Mater

HIGH-ENERGY-OXIDIZ

RF: High-Energy-Oxidizer
Oxidizers

High-Energy-Oxidizers

S: High-Energy-Oxidiz

HIGH-ENERGY-POLY

RF: High-Energy-Polymers
Polymers

High-Energy-Polymers

S: High-Energy-Poly

HIGH-ENERGY-PROPEL

RF: High-Energy-Propellants
Propellants

High-Energy-Propellant-Hazards

S: Propellant-Hazards

High-Energy-Propellants

S: High-Energy-Propel.

HIGH-EXPLOSIVES

RF: Explosives

HIGH-G-ENVIRONMENT

RF: Environment
Gravity-Environments

HIGH-HEAT-FLUX

RF: Heat-Flux

HIGH-IMPULSE

RF: Impulse

High-Impulse-Propellant-Systems

S: Impulse-Propel-Sys

HIGH-MACH-NUMBER

RF: Hypersonic-Flight
Mach-Numbers
Supersonic-Flight

HIGH-MASS-RATIO

HIGH-MODULUS-FIBER

RF: Fibers

HIGH-POWER

RF: Power

HIGH-PRESSURE

RF: Pressure
Supernatmospheric-Pressure

HIGH-PRESSURE-CHEM

RF: Chemistry
High-Pressure-Chemistry

High-Pressure-Chemistry

S: High-Pressure-Chem

HIGH-PURITY-METALS

RF: Metals

HIGH-RESOLUTION

RF: Resolution

HIGH-SPEED

RF: Speed

High-Speed-Aircraft

S: Hypersonic-Vehicle
SST

HIGH-SPEED-CAMERA

RF: Cameras

HIGH-SPEED-FLIGHT

SA: Hypersonic-Flight
Supersonic-Flight
RF: Flight

HIGH-SPEED-GUNS

RF: Guns

HIGH-STRAIN-RATE

RF: Strain-Rate

HIGH-STRENGTH

RF: Strength

HIGH-TEMP-MATERIALS

SA: Beryllium

RF: High-Temperature-Materials
Materials

HIGH-TEMPERATURE

RF: Temperature

High-Temperature-Materials

S: High-Temp-Materials

HIGH-THRUST

RF: Thrust

HIGH-VELOCITY

RF: Velocity

HIGH STRENGTH-ALLOY

RF: Alloys

Superalloys

HOLLOW-CYLINDERS

RF: Cylinders

HOMING-DEVICES

SA: Heat-Homing

RF: Guidance

HONEST-JOHN

RF: JATO

HONEYCOMB-PANELS

RF: Panels

HONEYCOMB-STRUCT

RF: Honeycomb-Structures
Structures

Honeycomb-Structures

S: Honeycomb-Struct

HOT-AIR-IGNITION

RF: Ignition

HOT-FORMING

RF: Forming

HOT-GAS-BLOW-DOWN

RF: Gases

HOT-GAS-IGNITION

RF: Gases

Ignition

HAT-GAS-INJECTION

RF: Control-Techniques

Gaseous-Injection

HOT-GAS-PRIMER

RF: Gases

Primers

HOT-G'S-SYSTEMS

RF: Flight-Control

HOT-STORAGE

RF: Storage

HOT-WIRE-IGNITION

SA: Metal-Wire-Ignit

RF: Ignition

HUMAN-FACTORS

SA: Design-Consid

Physiology

System-Consid

RF: Bioastronautics

HUMIDITY

RF: Atmosphere

HYBALINE-A5-FUEL

RF: Fuels

HYBRID-COMBUSTION

RF: Combustion

HYBRID-ENGINE

RF: Engine

HYBRID-MOTOR

RF: Motors

HYBRID-PROPELLANT

RF: Propellants

HYBRID-PROPULSION
RF: Propulsion

HYBRID-ROCKET
RF: Rocket

HYBRID-SYSTEMS

HYDRAULIC-FLUIDS
RF: Fluids

HYDRAULIC-SYSTEMS
SA: Pneumatic-Systems
RF: Pneumatic-Systems

HYDRAZINE
SA: Boiling-Hydrazine
Dimethyl-Hydrazine
RF: Acetalazine

HYDRAZINE-COMPOUND
RF: Compounds

HYDRAZINE-FUEL
RF: Fuels

HYDRAZINE-HAZARD
RF: Liquid-Hazards

HYDRAZINE-VAPOR
RF: Vapor

HYDRAZOIC-ACID
SA: Azides
RF: Acids

HYDRAZONE
RF: Acetalazine

HYDRIDES
SA: Al-Hydride
Ca-Hydride
Li-Hydride
Metal-Hydrides

HYDROCARBON-COMBUS
RF: Combustion
Hydrocarbon-Combustion

Hydrocarbon-Combustion
S: Hydrocarbon-Combust

HYDROCARBON-CRACK
RF: Hydrocarbon-Cracking

Hydrocarbon-Cracking
S: Hydrocarbon-Crack

HYDROCARBON-FUELS
RF: Fuels

HYDROCARBON-IGNIT
RF: Hydrocarbon-Ignition
Ignition

Hydrocarbon-Ignition
S: Hydrocarbon-Ignit

HYDROCARBONS
SA: Alkanes
Aromatic-Hydrocarb
Toluene
RF: Petroleum-Hydrocarbons

HYDROFLUORIC-ACID
RF: Acids

HYDROGEN
SA: Atomic-Hydrogen
Gaseous-Hydrogen
Liquid-Hydrogen
RF: Gases

HYDROGEN-BONDING
RF: Bonding

HYDROGEN-BROMIDE
RF: Bromides

HYDROGEN-CHLORIDE
RF: Chloride

HYDROGEN-COMBUST
RF: Gas-Combustion
Hydrogen-Combustion

Hydrogen-Combustion
S: Hydrogen-Combust

Hydrogen-Dioxide
S: Hydrogen-Peroxide
RF: Dioxides

HYDROGEN-EMBRITTLE

RF: Hydrogen-Embrittlement
Metal-Properties

Hydrogen-Embrittlement

S: Hydrogen-Embrittle

HYDROGEN-FIRES

RF: Fires

HYDROGEN-FLAMES

RF: Flames

HYDROGEN-FLUORIDE

RF: Fluoride

Hydrogen-Generation

S: Hydrogen-Product

HYDROGEN-HAZARD

RF: Gaseous-Hazard

HYDROGEN-ISOTOPE

SA: Deuterium

Tritium

RF: Isotopes

Hydrogen-Manufacture

S: Hydrogen-Product

HYDROGEN-MOLECULE

RF: Molecule

HYDROGEN-PEROXIDE

RF: Hydrogen-Dioxide

Liquid-Hazards

Liquid-Oxidizers

HYDROGEN-PRODUCT

RF: Hydrogen-Generation

Hydrogen-Manufacture

Hydrogen-Production

Hydrogen-Production

S: Hydrogen-Product

HYDROGEN-PROPERT

RF: Hydrogen-Properties

Hydrogen-Properties

S: Hydrogen-Propert

HYDROGEN-PROPULS

RF: Hydrogen-Propulsion

Propulsion

Hydrogen-Propulsion

S: Hydrogen-Propuls

HYDROGEN-REACTION

RF: Chemical-Reaction

HYDROGEN-SLUSH

RF: Slush-Hydrogen

HYDROGEN-SOLUBIL

RF: Hydrogen-Solubility

Hydrogen-Solubility

S: Hydrogen-Solubil

HYDROGENATION

HYDROGENOLYSIS

HYDROLYSIS

HYDROSTATIC-LOAD

RF: Loads

HYDROXIDES

SA: Barium-Hydroxide

Sodium-Hydroxide

HYDROXYLS

HYPER-ENVIRONMENT

RF: Environment

HYPERGOLIC-IGNIT

RF: Hypergolic-Ignition

Ignition

Hypergolic-Ignition

S: Hypergolic-Ignit

Hypersonic-Aircraft

S: Hypersonic-Vehicle

HYPERSONIC-FLIGHT

RF: Flight
High-Mach-Number
High-Speed-Flight

HYPERSONIC-FLOW

RF: Flow

HYPERSONIC-VEHICLE

SA: Reentry-Vehicles
RF: Aircraft
High-Speed-Aircraft
Hypersonic-Aircraft

HYPERVELOCITY

RF: Velocity

HYSTERESIS-LOOP

RF: Magnetic-Fields

ICBM

SA: Minuteman
Mobile-ICBM
Snark
Titan
RF: Intercontinental-Ballistic-Missiles

ICBM-SYSTEMS

IDEAL-GAS-THEORY

RF: Gases

IGNITER-ANALYSIS

RF: Analysis

IGNITER-DESIGN

RF: Design

IGNITER-MIXTURES

RF: Mixture

IGNITER-SYSTEM

IGNITERS

SA: Artillery-Primers
Bayonet-Type-Igniter
Booster-Igniter
Chemical-Igniters
Conductive-Film
Detonating-Cord
Lexcord-Igniter
Mass-Flow-Igniters
Pyrogen-Igniter
Tube-Igniter
RF: Detonators
Primers

IGNITION

SA: Ammonia-Ignition
Arc-Ignition
Cobalt-Ignition
Hot-Air-Ignition
Hot-Gas-Ignition
Hot-Wire-Ignition
Hydrocarbon-Ignit
Hypergolic-Ignit
Metal-Wire-Ignit
Propellant-Ignit
Reignition
Spark-Ignition
Spontaneous-Ignit
Spray-Ignition
Thermal-Ignition

IGNITION-COATINGS

RF: Coatings

IGNITION-DELAY

IGNITION-ENERGY

RF: Energy
Guns

IGNITION-LIMITS

IGNITION-REACTIONS

RF: Reaction

IGNITION-SENSIT

RF: Ignition-Sensitivity
Sensitivity

Ignition-Sensitivity
S: Ignition-Sensit

IGNITION-STUDIES
RF: Studies

IGNITION-SYSTEMS
RF: Ammunition

IGNITION-TEMP
RF: Ignition-Temperature
Temperature

Ignition-Temperature
S: Ignition-Temp

IGNITION TESTS
SA: Arc-Image-Furnace
Propellant-Deterio
RF: Tests

ILLUMINATION
SA: Optical-Illuminat
Photometers

IMAGE-CONVERTER

IMMERSION-HEATER
RF: Heater-Systems

IMPACT-DATA

IMPACT-LIMITER
SA: Inflated-Sphere

IMPACT-RESISTANCE
RF: Resistance

IMPACT-SENSITIVITY
RF: Sensitivity

IMPACT-STRENGTH
SA: Al-Impact-Strength
RF: Strength

IMPACT-VELOCITY
RF: Velocity

IMPEDANCE
SA: Admittance
RF: Admittance
Resistance

IMPELLER-PUMPS
RF: Pumps

IMPINGED-JETS
RF: Jets

IMPINGEMENT
SA: Jet-Impingement

IMPULSE
SA: High-Impulse
Ultra-High-Impulse
Variable-Impulse

IMPULSE-CONTROL
RF: Controls

IMPULSE-MEASURE
RF: Impulse-Measurement
Measurement

Impulse-Measurement
S: Impulse-Measure

IMPULSE-PROPEL-SYS
RF: High-Impulse-Propellant-Systems
Impulse-Propellant-Systems
Propellant-Systems
Ultra-High-Impulse-Propellant-
Systems

Impulse-Propellant-Systems
S: Impulse-Propel-Sys

IMPULSE-ROCKET
RF: Rocket

INCONEL
RF: Nickel-Base-Alloy

INDEXES
SA: Abstracts
Bibliography
Documentation

RF: Abstracts	INFRARED-RADIATION
Bibliography	RF: Radiation
Document-Retrieval	
Literature-Search	INFRARED-SPECTRA
Publications	RF: Spectra
INDICATORS	INFRARED-SPECTORS
SA: Accelerometer	RF: Infrared-Spectroscopy
RF: Instruments	Spectroscopy
INDUCTION-HEATING	Infrared-Spectroscopy
RF: Furnaces	S: Infrared-Spectors
Heating	
INERT-WEIGHT	INFRARED-STUDIES
RF: Weight	RF: Studies
INERTIA	Inhibited-Red-Fuming-Nitric-Acid
SA: Moments-of-Inertia	S: IRFNA
INERTIA-WHEEL	Inhibited-White-Fuming-Nitric-Acid
RF: Wheels	S: IWFNA
INERTIAL-GUIDANCE	INHIBITOR-MATERIAL
SA: Gyroscopes	SA: Cellulose-Acetate
RF: Guidance	Ethyl-Cellulose
INERTIAL-NAVIGATION	INJECTION
SA: Flight-Instruments	SA: Coaxial-Injection
Gyroscopes	Fluid-Injection
RF: Accelerometer	Fuel-Injection
Navigation	Gaseous-Injection
Navigation-Inertial	Regenerative-Injec
	Vortex-Injection
INFLATED-SPHERE	INJECTION-TECH
RF: Impact-Limiter	RF: Injection-Techniques
Spheres	
Information-Retrieval	Injection-Techniques
S: Document-Retrieval	S: Injection-Tech
INFORMATION-SOURCE	INJECTOR-CONCEPTS
INFRARED-ANALYSIS	INJECTOR-DESIGN
RF: Analysis	RF: Design
INFRARED-CELL	INJECTOR-ORIFICE
RF: Cells	RF: Orifices
INFRARED-DETECTION	INJECTOR-RESEARCH
RF: Detection	RF: Research

INJECTOR-TESTS

RF: Tests

INJECTOR-THROTTLE

RF: Throttling

INJECTOR-THRUST

RF: Thrust

INJECTORS

SA: Jet-Injector
Rotating-Injector
Spray-Injector

INORGANIC-CHEM

RF: Chemistry
Inorganic-Chemistry

Inorganic-Chemistry

S: Inorganic-Chem

INORGANIC-CONTAM

RF: Contaminants
Inorganic-Contaminants

Inorganic-Contaminants

S: Inorganic-Contam

INSPECTION

SA: Flaw-Detection
Welding-Inspection

INSTABILITY

SA: Combustion-Instab
Explosive-Instabil
RF: Stability

INSTABILITY-ANAL

RF: Analysis
Instability-Analysis

Instability-Analysis

S: Instability-Anal

INSTRUMENTATION

RF: Instruments

INSTRUMENTS

SA: Accelerometer
Analyzers
Calorimeter
Flight-Instruments
Flowmeters
Gages
Indicators
Instrumentation
Mass-Spectrometer
Measurement
Photometers
Spectrometer
Spectrophotometers
Tensiometers
Voltmeters

INSULATED-CONES

RF: Cones

INSULATED-TANKS

RF: Tanks

INSULATION

SA: Asbestos
Cellulose-Acetate
Fibrous-Insulation
Motor-Insulation
Thermal-Protection
RF: Coatings
Rocket-Chamber

INSULATION-PANELS

RF: Panels

INTEGRAL-MANDRELS

RF: Mandrels

INTERACTION

SA: Reaction
RF: Reaction

INTERCEPT-SYSTEM

RF: Surveillance

INTERCEPT-X

RF: Ballistic-Missile

INTERCEPTION

RF: Space-Maneuvering

INTERCEPTORS

RF: Countermeasures

Intercontinental-Ballistic-Missiles

S: ICEM

INTERIOR-BALLISTIC

RF: Ballistics

Internal-Ballistics

Intermediate-Range-Ballistic-Missile

S: IREM

INTERMETALLIC-COMP

RF: Compounds

Intermetallic-Compounds

Intermetallic-Compounds

S: Intermetallic-Comp.

INTERMETALLICS

RF: Metals

INTERMITTENT-CREEP

RF: Creep

Internal-Ballistics

S: Interior-Ballistic

INTERNAL-EXPANSION

RF: Expansion

INTERNAL-FRICTION

RF: Friction

INTERPLANETARY**INVAR**

RF: Alloys

Iron-Nickel-Alloy

INVAR-WRAPPER

RF: Phoebus-Reactor

IODINE**ION-CHEMISTRY**

RF: Chemistry

ION-EXCHANGE**ION-PROPULSION**

RF: Propulsion

ION-SOURCE

RF: Source

IONIZATION**IONIZATION-EFFECTS****IONIZATION-SOURCES**

RF: Source

IONIZATION-SUPPRES

RF: Ionization-Suppression

Ionization-Suppression

S: Ionization-Suppres

IONIZERS

SA: Porous-Ionizers

IONIZING-RADIATION

RF: Radiation

IONOSPHERE

RF: Atmosphere

Upper-Atmosphere

IONS

SA: Ferric-Ions

Rare-Earth-Ions

IREM

SA: Polaris

Thor

RF: Intermediate-Range-Ballistic-Missile

IRFNA

SA: Acid subheadings

IWFNA

Nitric-Acid

RFNA
 WFNA
 RF: Acids
 Anhydrous-Nitric-Acid
 Inhibited-Red-Fuming-Nitric-Acid
 Liquid-Oxidizers

 IRFNA-CORROSION
 RF: Corrosion

 IRFNA-Hazard
 S: Nitric-Acid-Hazard

 IRIIDIUM

 IRIIDIUM-ALLOYS
 RF: Alloys

 IRIIDIUM-COATINGS
 RF: Coatings

 IRIS
 RF: Sounding-Rockets

 IRON
 SA: Porous-Iron

 IRON-CARBIDE
 RF: Carbides

 IRON-CATALYST
 RF: Catalysts

 IRON-NICKEL-ALLOY
 SA: Invar
 RF: Alloys

 IRON-WHISKERS
 RF: Whiskers

 ISOCYANATE

 ISOLDE-120-A
 RF: Monopropellants

ISOMERS

Isopropanol
 S: Isopropyl-Alcohol

 ISOPROPYL-ALCOHOL
 RF: Alcohol
 Dimethyl-Carbinol
 Isopropanol

 ISOPROPYL-CHLORIDE
 RF: Chlorides

ISOTOPIES

SA: Hydrogen-Isotope

IWFNA

SA: Acid subheadings
 IRFNA
 Nitric-Acid
 RFNA
 WFNA
 RF: Acids
 Anhydrous-Nitric-Acid
 Inhibited-White-Fuming-Nitric-Acid
 Liquid-Oxidizers

IWFNA-Hazard

S: Nitric-Acid-Hazard

JATO

SA: Honest-John
 Matador
 Nike-Missile
 Power-Plants
 Smokeless-JATO
 RF: Aircraft-Engines
 Jet-Assisted-Takeoff
 Thrust-Augment

Jet-Assisted-Takeoff
 S: JATO

JET-CONTROL-VANES
RF: Control-Systems

JET-DEFLECTION
RF: Deflection

JET-DRIVEN-FLOWS
RF: Flow

JET-DRIVEN-VORTEX
RF: Vortex

JET-ENGINE
SA: Turbojet-Engine
RF: Engine

JET-EXPANSION
RF: Expansion

JET-FUEL
RF: Fuels

JET-IMPINGEMENT
RF: Impingement

JET-INJECTOR
RF: Injectors

JET-MIXING
SA: Coaxial-Jet-Mixing

JET-MOTORS
RF: Motors

JET-PIPE

JET-PROPULSION
RF: Propulsion

JET-PROPULSION-SYS
RF: Jet-Propulsion-Systems
Propulsion-Systems

Jet-Propulsion-Systems
S: Jet-Propulsion-Sys

JET-PUMP
RF: Pumps

JET-REACTOR
RF: Reactors

JETS
SA: Exhaust-Jets
Free-Jets
Impinged-Jets

JOINING
SA: Al-Joining
Be-Joining
Bonding
Brazing
Nickel-Joining
Welding

JOINING-TECHNIQUES

JOINTS
SA: As-Welded-Joints
Lockseal
Riveted-Joints
Structural-Joints
Welded-Tank-Joints

JOULE-THOMSON-EFF
RF: Caseous-Hydrogen
JouleThomson-Effect

Joule-Thomson-Effect
S: Joule-Thomson-Eff

JOULE-THOMSON-PROC
RF: Helium
Joule-Thomson-Process

Joule-Thomson-Process
S: Joule-Thomson-Proc

JP-4 FUEL
RF: Fuels
Kerosene-Type-Fuel

JP-5-FUEL
RF: Fuels
Kerosene-Type-Fuel

JPL-X500
RF: Ammonium-Perchlor
Propellants

JPX-FUEL
RF: Fuels

JUNO
RF: Space-Probes

Kel-F-Bladder-Cell
S: Bladder-Cell

KEL-F-LINERS
RF: Liners

KEROSENE
RF: Distillates

KEROSENE-TYPE-FUEL
SA: JP-4-Fuel
JP-5-Fuel
RF: Fuels

Kerr-Cell
RF: Cells

Ketone-Propane
S: Acetone

KETONES
SA: Acetone
Acetylacetone
Aldehydes
Carbonyl-Compounds
Diacetyl

KINETIC-CONSID
RF: Considerations
Kinetic-Considerations

Kinetic-Considerations
S: Kinetic-Consid

KINETIC-METHOD

KINETIC-STUDIES
RF: Studies

KINETIC-THEORY

KINETICS
SA: Chemical-Kinetics
Combustion-Kinetic
Condensation-Kinet
Conversion-Kinetic
Gas-Kinetics
Reaction-Kinetics

KIWI-REACTOR
RF: Reactors
Rover-Reactor

KNUDSEN-GAS
RF: Gases

LABORATORIES

SA: Research-Facility
Space-Laboratories
Test-Facility
RF: Research-Facility
Test-Facility

LABORATORY-ANIMALS

SA: Guinea-Pigs

LAMINAC-RESIN

RF: Resins

LAMINAR-FLAMES

RF: Flames

LAMINAR-FLOW

RF: Flow

LAMINAR-HEAT-TRANS

RF: Heat-Transfer
Laminar-Heat-Transfer

Laminar-Heat-Transfer

S: Laminar-Heat-Trans

LAMINAR-MIXING

LAMINATES

SA: Plastic-Laminates
Reinforced-Laminat
Structural-Laminat

LANDING

SA: Lunar-Landing
Mars-Landing

LANDING-IMPACT

RF: Abort

LANDING-MISSION

RF: Missions

LASER-BEAM

LASER-BEAM-WELDING

RF: Welding

LASER-DEVICES

LASERS

SA: Ring-Laser
Ruby-Laser
RF: Optical-Maser

LAUNCH-CONTROL

RF: Control-Systems

LAUNCH-MODES

LAUNCH-RATE

LAUNCH-SITES

SA: Ground-Support
Silos

LAUNCH-SYSTEMS

LAUNCH-VEHICLES

SA: Payload
Vanguard
RF: Aerospace-Vehicles
Vehicles

LAUNCHERS

LAUNCHING

SA: Orbital-Launch

LAUNCHING-HAZARDS

SA: Accidental-Firing
Explosion-Hazards
Fire-Hazards
Hazard-Control
Leak-Detection
Missile-Safety
Radiation-Hazards
Vapor-Detection
WS-Hazards
RF: Hazards

LAUNCHING-PROBLEMS

LAUNCHING-SHOCK

RF: Shock

LEAD

LEAD-COMPOUNDS

RF: Compounds

LEAD-SALTS

RF: Salts

LEAD-STANNATE

RF: Stannates

LEAK-DETECTION

RF: Detection
Fume-Control
Launching-Hazards
Safety-Precautions

LEAK-PREVENTION

RF: Hazard-Control
Leakage

LEAKAGE

SA: Connectors
Gaskets
Leak-Prevention
Seals

LEAPFROG

RF: Spike-Nozzle-Motor

LEM

RF: Apollo
Command-Module
Lunar-Excursion-Module

LEWIS-ACID

SA: Acid subheadings
Catalysts
RF: Acids

Lexcord-Igniter

S: Igniters

LI-BOROHYDRIDE

RF: Borohydrides

LI-CHLORIDE

RF: Chlorides

LI-FLUORIDE

RF: Fluoride

LI-HYDRIDE

RF: Hydrides

LI-HYDROGENATION

LI-HYDROXIDE

LI-PERCHLORATE

RF: Perchlorates
Solid-Oxidizers

LIGHT-METAL-COMBUS

RF: Combustion
Light-Metal-Combustion

Light-Metal-Combustion

S: Light-Metal-Combustion

LIGHT-METAL-FUELS

SA: Cesium
RF: Fuels
Metallic-Fuel

LIGHT-METAL-RES

RF: Light-Metal-Research
Research

Light-Metal-Research

S: Light-Metal-Res

LIGHT-METALS

SA: Aluminum
Beryllium
Boron
Calcium
Cesium
Lithium
Magnesium
Potassium
Rubidium
Scandium
Silicon
Sodium
Strontium
RF: Aerospace-Metals
Metals

LIGHT-WEIGHT

RF: Weight

LIGHT-WEIGHT-TANKS

RF: Tanks

LIMITED-WARFARE

SA: Tactical-Systems
RF: Warfare

LINEAR-ACCELERAT
RF: Acceleration
Linear-Acceleration

Linear-Acceleration
S: Linear-Accelerat

LINEAR-PYROLYSIS
RF: Pyrolysis

LINEAR-SYSTEMS

LINEAR-TECHNIQUES

LINERS
SA: Acoustic-Liners
Ceramic-Liners
Kel-F-Liners
Metal-Liners
Nozzle-Liners
Refractory-Liners
Rocket-Liners
Tank-Liners

LIQUID-AMMONIA
RF: Ammonia
Liquid-Hazards

Liquid-Droplet
S: Droplets

LIQUID-EXPLOSIVES
RF: Explosives

LIQUID-FLUORINE
RF: Fluorine
Liquid-Oxidizers

LIQUID-FUELS
SA: Liquid-Rocket-Fuel
RF: Fuels

LIQUID-HAZARDS
SA: Acid-Hazards
Cryogenic-Liquids
Hydrazine-Hazard
Hydrogen-Peroxide
Liquid-Ammonia
Liquid-Oxidizers
Pentaborane-Hazard
RF: Chemical-Hazards

LIQUID-HELIUM
RF: Helium
Liquid-Oxidizers

LIQUID-HYDROGEN
RF: Cryogenic-Hydrogen
Hydrogen

LIQUID-LEVEL-GAGES
RF: Gages

LIQUID-METALS
RF: Metals

LIQUID-NITROGEN
RF: Liquid-Oxidizers
Nitrogen

LIQUID-OXIDIZERS
SA: Chlorine-Trifluor
Fluorine-Oxidizers
Hydrogen-Peroxide
IRFNA
IWFNA
Liquid-Fluorine
Liquid-Helium
Liquid-Nitrogen
Liquid-Oxygen
Liquid-Ozone
Nitric-Acid
Nitrogen-Tetroxide
RFNA
WFNA
RF: Liquid-Hazards
Liquid-Propellants
Oxidizer-Hazards

LIQUID-OXYGEN
SA: Lox
RF: Liquid-Oxidizers
Oxygen

LIQUID-OZONE
RF: Liquid-Oxidizers
Ozone

LIQUID-PHASE
SA: Condensation

Liquid-Propellant-Hazards
S: Propellant-Hazards

LIQUID-PROPELLANTS

SA: ARCOGEL
Cryogenic-Propel
Gelled-Fuels
Liquid-Oxidizers
RF: Propellants

LIQUID-PROPULSION

RF: Propulsion

LIQUID-ROCKET

RF: Rocket

LIQUID-ROCKET-FUEL

RF: Liquid-Fuels

LIQUID-SOLUTIONS

RF: Solutions

LIQUID-SPHERES

RF: Spheres

LIQUIDS

SA: Aeration
Fluids
Volatile-Liquids
RF: Fluids

LITERATURE

RF: Documentation

LITERATURE-SEARCH

SA: Indexes

LITHIUM

SA: Headings under Li.
RF: Alkali-Metals
Light-Metals

LITHIUM-COMPOUNDS

RF: Compounds

LITTLE-JOHN

RF: Artillery-Rockets
Surface-to-Surface

LOAD-CELLS

RF: Cells

LOAD-RELIEF-SYSTEM

RF: Acceleration-Loads
Relief-Systems
Shock

LOADING

SA: Edge-Loading
Explosive-Loaded
Pressure-Loading

LOADING-DENSITY

RF: Density

LOADING-RATE

LOADS

SA: Acceleration-Loads
Axial-Loads
Cyclic-Loads
Dynamic-Loads
Hydrostatic-Load

LOCKSEAL

RF: Joints
Seals

LOGISTICS

SA: Advanced-Bases
Lunar-Logistics

LOGISTICS-STUDIES

RF: Studies

LOKI-MISSILE

RF: Missile

LONG-RANGE-FLIGHT

RF: Flight

LONG-RANGE-ROCKET

RF: Rocket

LONGITUDINAL-FINS

RF: Fins

LONGITUDINAL-OSCIL

RF: Longitudinal-Oscillations
Oscillations

Longitudinal-Oscillations

S: Longitudinal-Oscil

LONGITUDINAL-STAB
RF: Longitudinal-Stability
Stability

Longitudinal-Stability
S: Longitudinal-Stab

LONGITUDINAL-VIBRA
RF: Longitudinal-Vibrations
Vibrations

Longitudinal-Vibrations
S: Longitudinal-Vibra

LOSS-RATE

LOSSES
SA: Acoustic-Losses
Fuel-Losses
Pressure-Losses

LOW-ALLOY-STEEL
RF: Alloys
Steels

LOW-ALTITUDE
RF: Altitude

LOW-COST
RF: Costs

LOW-COST-FILAMENTS
RF: Filaments

LOW-COST-MATERIALS
RF: Materials

LOW-COST-METHODS

LOW-COST-TOOLING
RF: Tooling-Costs

LOW-COWL-DRAG

LOW-DRAG
RF: Drag

LOW-FREEZING
RF: Freezing

LOW-FREEZING-POINT
RF: Freezing-Point

LOW-G
SA: Zero-G
RF: Gravity
Low-Gravity
Low-Pressure

LOW-G-ENVIRONMENT
RF: Environments
Gravity-Environments

LOW-G-PROBLEMS

Low-Gravity
S: Low-G

LOW-PRESSURE
SA: Low-G
RF: Pressure
Subatmospheric-Pressure
Vacuum

LOW-PRESSURE-CHAM
RF: Chambers
Low-Pressure-Chamber

Low-Pressure-Chamber
S: Low-Pressure-Cham

LOW-TEMP-EFFECT

LOW-TEMP-STUDIES
RF: Studies

LOW-TEMP-SYNTHESIS
RF: Synthesis

LOW-TEMPERATURE
SA: Cryogenic-Temp
RF: Cryogenic-Temp
Temperature

LOW-THRUST
RF: Thrust

LOW-VOLUME-RAMJET
RF: Ramjet

LOX
RF: Liquid-Oxygen
Oxidizers

LOX-LUBRICANT
RF: Lubricants

LOX-TANKS
SA: Saturn-LOX-Tank
RF: Tanks

LUBRICANTS
SA: Aircraft-Lubricants
Cutting-Fluids
Lox-Lubricant

LUBRICATION

LUMINESCENCE
SA: Thermoluminescence

LUNAR-BASES
RF: Bases

Lunar-Excursion-Module
S: LEM

LUNAR-LANDING
RF: Landing

LUNAR-LOGISTICS
RF: Logistics

LUNAR-MISSIONS
RF: Manned-Missions
Missions
Space-Missions

LUNAR-ORBITS
RF: Orbits

LUNAR-PROBES
SA: Ranger
Surveyor
RF: Probes

LUNAR-TRANSPORT
RF: Lunar-Transportation-Systems

Lunar-Transportation-Systems
S: Lunar-Transport

MACERATED-CORDITE
RF: Cordite

MACH-NUMBER-RANGE

MACH-NUMBERS
SA: High-Mach-Number

MACHINABLE-METAL
RF: Metals

MACHINING
SA: Alloy-Machining
Be-Machining
Mandrels
Spark-Erosion
Titanium-Machining
RF: Fabrication

MACHINING-PROCESS

MAGNESIA
RF: Refractories

MAGNESIUM
SA: Headings under Mg.
RF: Light-Metals

MAGNETIC-FIELDS
SA: Hysteresis-Loop
Magnetostriction

MAGNETIC-RESONANCE
RF: Resonance

MAGNETIC-TAPE
RF: Transcribers

MAGNETS
SA: Bar-Magnets

MAGNETOSTRICTION
RF: Magnetic-Fields

MAINTENANCE
SA: Space-Maintenance
Wear

MANAGEMENT	MANY-BODY-PROBLEM
SA: Configuration-Mgt	SA: Perturbation
Cost-Analysis	RF: Bodies
Planning	
Safety-Management	MAPPING
Systems-Analysis	RF: Convolutional-Mapping
MANAGEMENT-REPORTS	MARAGING-STEELS
RF: Publications	RF: Steels
MANAGEMENT-SYSTEMS	MARANGONI-EFFECT
MANDRELS	RF: Heat-Transfer
SA: Integral-Mandrels	MARINER
RF: Machining	RF: Mars-Missions
MANGANESE	Space-Probes
MANGANESE-CARBIDE	MARS
RF: Carbides	MARS-LANDING
MANIFOLD	RF: Landing
RF: Engine	MARS-MISSIONS
Fuel-Systems	SA: Mariner
MANIFOLD-EXPLOSION	RF: Missions
RF: Explosion	MARS-ORBIT
MANNED-MISSIONS	RF: Orbits
SA: Lunar-Missions	MASS-EXPULSION
Space-Missions	RF: Attitude-Control
Space-Patrols	Expulsion
Unmanned-Missions	MASS-FLOW-IGNITERS
RF: Missions	RF: Igniters
Manned-Orbiting-Laboratory	MASS-SPECTRA
S: MOL	RF: Spectra
Manned-Orbital-Research-Laboratory	MASS-SPECTROGRAPHY
S: MORL	RF: Spectrography
MANNED-VEHICLES	MASS-SPECTROMETER
RF: Aerospace-Vehicles	RF: Instruments
Spacecraft	Mass-Spectrometer
Unmanned-Vehicles	MASS-TRANSFER
Vehicles	
MANUAL-CONTROL	MATADOR
RF: Controls	RF: JATO

MATERIAL-SELECTION

SA: Optimum-Material

MATERIAL-TRANSFER

RF: Missile-Materials

MATERIALS

SA: Acetylene-Material
Ceramics
Chamber-Materials
Coating-Materials
Combustibles
Cryogenic-Material
Elastomers
Feed-Materials
Fuel-Materials
Glazing-Materials
Graphite-Materials
High-Energy-Mater
High-Temp-Materials
Low-Cost-Materials
Metals
Missile-Materials
Nuclear-Materials
Nylon
Plastics
Porous-Materials
Pyrolytic-Material
Reactor-Materials
Refractories
Sandwich-Materials
Space-Materials
Tank-Materials

MATTER

SA: Particulate-Matter

MAVERICK

RF: Tactical-Missiles

MEASUREMENT

SA: Force-Measurement
Impulse-Measure
Permeability-Meas
RF: Instruments

MEASURING-SYSTEM

MECHANICAL-DESIGN

RF: Design

MECHANICAL-FITTING

SA: Connectors
Seals
RF: Fittings

MECHANICS

SA: Flight-Mechanics
Fluid-Mechanics
Fracture-Mechanics
Orbital-Mechanics
Quantum-Mechanics
Rate-of-Onset

MEDIUM-STRENGTH

RF: Strength

MELTING

MELTING-POINT

SA: Eutectic-Melt

MELTING-TEMP

RF: Melting-Temperature
Temperature

Melting-Temperature

S: Melting-Temp

MEMBRANES

SA: Shell-Membranes

MERCAPTALS

MERCAPTANS

MERCURIC-CHLORIDE

RF: Chlorides

MERCURIC-FLUORIDE

RF: Fluoride

MERCURIC-OXIDE

MERCURIC-SALTS

RF: Salts

MERCURY

MERCURY-CELL

RF: Cells
Power-Sources

MESA-TYPE-PROPEL

RF: Mesa-Type-Propellant
Propellants

Mesa-Type-Propellant

S: Mesa-Type-Propel

META-BORIC-ACID

RF: Acids
Boric-Acid

METABORATE

SA: Sodium-Metaborate
RF: Borates

METAL-ADDITIVES

SA: Active-Metals
RF: Additives

METAL-BONDS

RF: Adhesives
Bonding

Metal-Borides

S: Borides

METAL-CARBIDES

SA: Acetylides
RF: Carbide-Coatings

METAL-COLUMNS

SA: Buckling
RF: Structures

METAL-CORROSION

SA: Specific metals
RF: Corrosion

METAL-DIAPHRAGM

RF: Diaphragms

METAL-DEFORMATION

RF: Deformation
Forging

METAL-HYDRIDES

SA: Be-Hydride
Sodium-Hydride
RF: Hydrides

METAL-LINERS

RF: Liners

METAL-PARTICLES

RF: Particles

METAL-POWDER

SA: Bi-Metallic-Powder
RF: Powder

METAL-PROPERTIES

SA: Fatigue-Properties
Fracture-Toughness
Hydrogen-Embrittle
Notch-Sensitivity

METAL-REMOVAL

RF: Metalworking
Milling

METAL-SULFIDES

RF: Sulfides

METAL-WIRE

RF: Bridgewire
Wire

METAL-WIRE-COMBUST

RF: Combustion
Exploding-Bridgewire
Exploding-Wire
Metal-Wire-Combustion

Metal-Wire-Combustion

S: Metal-Wire-Combust

METAL-WIRE-IGNIT

RF: Hot-Wire-Ignit
Ignition
Metal-Wire-Ignition

Metal-Wire-Ignition

S: Metal-Wire-Ignit

Metallic-Additives

S: Metal-Additives

METALLIC-ALUMINUM

RF: Aluminum

Metallic-Carbides

S: Acetylides

METALLIC-CONTAM

RF: Contaminants

Metallic-Contaminants

Metallic-Contaminants

S: Metallic-Contam

METALLIC-FUEL

SA: Light-Metal-Fuels

RF: Fuels

METALLIC-NOZZLES

RF: Nozzles

METALLIZED-PROPEL

RF: Metallized-Propellants

Propellants

Metallized-Propellants

S: Metallized-Propel

Metallo-Organic-Chemistry

S: Synthetic-Chem

METALLURGY

SA: Powder-Metallurgy

METALO-ACETYLENES

RF: Acetylene

METALS

SA: Active-Metals

Aerospace-Metals

Aircraft-Metals

Alloys

Bi-Metallics

Corrosion

Defense-Metals

High-Purity-Metals

Intermetallics

Light-Metals

Liquid-Metals

Machinable-Metal

Porous-Metal

Rare-Earth-Metals

Refractory-Metals

Sheet-Metals

Structural-Metals

Transition-Metals

Zinc

RF: Materials

METALWORKING

SA: Annealing

Casting

Chemical-Milling

Explosive-Forming

Heat-Treatment

Metal-Removal

RF: Forming

METEORITES

METEORIDS

METEOROLOGY

SA: Air-Dispersion

Atmosphere

RF: Atmosphere

METHACRYLATE

RF: Plastics

METHANE

SA: Nitromethane

METHANE-AIR-FLAMES

RF: Flames

Methanol

S: Methyl-Alcohol

Methoxyethyl-Acrylate

S: Resin-Binders

METHYL-ALCOHOL

RF: Alcohol

Methanol

METHYL-BORATE

RF: Borates

Methyl-Carbinol

S: Ethyl-Alcohol

METHYL-CHLORIDE

RF: Chlorides

Methyl-Cyanide
S: Acetonitrile

METHYL-DISULFIDE

METHYL-ETHER
RF: Dimethyl-Ether
Ether

METHYL-IODIDE

METHYL-NITRATE
RF: Nitrate

METHYL-RADICALS
RF: Radicals

METHYLACETYLENE
RF: Acetylene

METHYLAMINE
RF: Amines

METHYLATION

METHYLENE

METHYLENE-CHLORIDE
RF: Chlorides

MG-BOROHYDRIDE
RF: Borohydrides

MG-DIBORIDE

MG-TETRABORIDE

MICROBIAL-CONTAM
RF: Contaminants
Microbial-Contaminants

Microbial-Contaminants
S: Microbial-Contam

MICROSECOND
RF: Accuracy

MICROTHRUST
RF: Thrust

MILITARY-CHEMICALS

SA: Chemical-Hazards
Health-Hazards
RF: Chemistry

MILLIMICROSECOND
RF: Accuracy

MILLING
SA: Chemical-Milling
Metal-Removal

MINUTEMAN
RF: ICBM
WS-133A

MINUTEMAN-DESIGN
RF: Design

MINUTEMAN-PROPEL
RF: Propellants

Minuteman-Propellants
S: Minuteman-Propel

MISSILE
SA: Able-1-Missile
Aim-X
Air-Launched
Air-to-Air
Air-to-Surface
ASW-Missile
Ballistic-Missile
Bullpup
Corporal-Missile
Guided-Missiles
Loki-Missile
Nike-Missile
Orbiting-Missile
Ramjet-Missile
Submarine-Missiles
Surface-to-Air
Surface-to-Surface
Tactical-Missiles
Zuni

MISSILE-AIRFRAME
RF: Airframe

MISSILE-BOOSTERS
RF: Boosters

MISSILE-COMPONENTS

SA: Nose-Cones
RF: Components

MISSILE-DEFENSE

SA: Active-Defense
Antimissiles
Countermeasures
Decoys
RF: Ballistic-Missile-Defense
Defense

MISSILE-ENVIRON

RF: Environment
Missile-Environ

Missile-Environment

S: Missile-Environ

MISSILE-FLIGHTS

RF: Flight

MISSILE-FUEL-TANKS

RF: Fuel-Tanks

MISSILE-MATERIALS

SA: Material-Transfer
RF: Materials

MISSILE-SAFETY

SA: Accidental-Firing
RF: Launching-Hazards
Safety

MISSILE-STORAGE

SA: Aging
RF: Storage

MISSILE-SYSTEMS

RF: Weapon-System

MISSILE-VIBRATION

RF: Vibrations

MISSION-ANALYSIS

RF: Analysis

MISSION-SENSIT

RF: Mission-Sensitivity
Sensitivity

Mission-Sensitivity

S: Mission-Sensit

MISSIONS

SA: Landing-Mission
Lunar-Missions
Manned-Missions
Mars-Missions
Test-Missions

MIXED-ACID

RF: Acids

MIXTURE

SA: Air-Mixtures
Gas-Mixtures
Igniter-Mixtures
Propellant-Mixture
RF: Admixture

MOBILE-ICBM

RF: ICBM

MOCKUP-STUDIES

RF: Studies

MOCK-UPS

SA: Models
RF: Models
Prototypes

MODEL-SCALEUP

RF: Production
Scaleup

MODEL-SCALING

RF: Scaling

MODELS

SA: Analytical-Models
Mock-Ups
Simulation
Wind-Tunnel-Models
RF: Mock-Ups
Prototypes

MODERATED-REACTOR

RF: Reactors

MODULAR-BOOSTERS

RF: Boosters
Phoenix-Modular-Booster

MODULAR-ROCKET

RF: Rocket

MODULE-TESTS

RF: Tests

MOL

RF: Manned-Orbiting-Laboratory

MOLECULAR-WEIGHT

RF: Weight

Molecular-Reaction

S: Adducts

MOLECULAR-STRUCT

RF: Molecular-Structures
Structures

Molecular-Structures

S: Molecular-Struct

MOLECULE

SA: Atom
Free-Molecule
Hydrogen-Molecule
Water-Molecule
RF: Atom

MOLLIER-CHARTS

RF: Gas-Dynamics

MOLYBDENUM

RF: Refractory-Metals

MOLYBDENUM-ALLOY

RF: Alloys

MOLYBDENUM-BORIDE

RF: Borides

MOMENTS-OF-INERTIA

RF: Damping
Inertia

MONEL

RF: Nickel-Base-Alloy

MONOFUEL ROCKET

RF: Rocket

MONOFUELS

RF: Fuels

MONOMERS

SA: Nitromonomers
Polynitro-Monomers
Styrene-Monomer

MONOPROPELLANTS

SA: Isolde-120-A
RF: Propellants

MONTE-CARLO-METHOD

RF: Accuracy

MORL

RF: Manned-Orbital-Research-
Laboratory
Orbital-Vehicles

MOTOR-CASES

SA: Rocket-Motor-Cases
RF: Cases

MOTOR-COOLING

RF: Cooling

MOTOR-DESIGN

RF: Design

MOTOR-FAILURE

RF: Failure

MOTOR-INSULATION

RF: Insulation

MOTOR-PERFORMANCE

RF: Performance

MOTOR-PLUME

RF: Plumes

MOTOR-RESPONSE

MOTORS

SA: Alcohol-Motor
Arrow-Type-Motor
Cuckoo-Motor
Dual-Thrust-Motor
End-Burning-Motor
Engine
Gosling-Motor
Hawk-Motor
Hercules-FPC-Motor
Hermes-Motor
Hybrid-Motor
Jet-Motors
Nike-Motor
Nike-Zeus-Motor
Nitromethane-Motor
Pulse-Motor
Reaction-Motor
Research-Motors
Restartable-Motor
Retro-Rocket-Motor
Rocket-Motor
Spike-Nozzle-Motor
Starter-Motor
Static-Test-Firing
Steering-Motor
Vernier-Motor
RF: Engine
Power-Sources

MOVING-BED-REACTOR

RF: Reactor

MULTISTAGE-REACTOR

RF: Reactors

N-F-COMPOUNDS

RF: Compounds

N-Butanol

S: Butyl-Alcohol

N-Butyl-Alcohol

S: Butyl-Alcohol

NAVIGATION

SA: Doppler-Navigation
Flight-Control
Flight-Instruments
Fluid-Navigation
Guidance
Inertial-Navigation
Space-Navigation
RF: Guidance

Navigation-Fluid

S: Fluid-Navigation

Navigation-Inertial

S: Inertial-Navigation

NERVA-ENGINE

RF: Nuclear-Engines
RIFT
Rover-Reactor

NEUTRONICS

RF: Reactors
Rover-Project

NICKEL

SA: Porous-Nickel

NICKEL-BASE-ALLOY

SA: Hastelloy-R-235
Inconel
Monel
Rene-41
Udimet-500
RF: Alloys

NICKEL-JOINING

RF: Joining

NICKEL-PROPERTIES

NICKEL-TRANSDUCERS

RF: Transducers

NIKE-MISSILE

RF: JATO
Missile

NIKE-MOTOR

RF: Motors

NIKE-PROPELLANT

RF: Propellants

NIKE-ZEUS-MOTOR

RF: Motors

Niobium

S: Columbium

NITRATE

SA: Ammonium-Nitrate
Barium-Nitrate
Ethyl-Nitrate
Glycidyl-Nitrate
Methyl-Nitrate
Propyl-Nitrate
Sodium-Nitrate
Tetranitrate

NITRATE-ESTERS

RF: Esters

NITRATE-SALTS

RF: Salts

NITRATION

NITRIC-ACID

SA: FNA
IRFNA
IWFNA
RFNA
WFNA
RF: Acids
Anhydrous-Nitric-Acid
Liquid-Oxidizers

NITRIC-ACID-HAZARD

RF: Acid-Hazards

NITRIC-OXIDE

NITRILUS

NITRITES

SA: Silver-Nitrate

NITROCELLULOSE

SA: Sulfate-Wood-Pulps
RF: Binders
Cellulose
Cellulose-Nitrate

NITROGEN

SA: Liquid-Nitrogen
RF: Gases

NITROGEN-BOILOFF

NITROGEN-COMPOUNDS

RF: Compounds

NITROGEN-DIOXIDE

RF: Dioxides

NITROGEN-FIXATION

NITROGEN-FLUORIDE

RF: Fluoride

NITROGEN-OXIDES

NITROGEN-RICH-BIND

RF: Binders
Nitrogen-Rich-Binders

Nitrogen-Rich-Binders

S: Nitrogen-Rich-Bind

NITROGEN-TANKS

RF: Tanks

NITROGEN-TETROXIDE

RF: Liquid-Oxidizers

NITROGLYCERIN

NITROGUANIDINE

RF: Guanidines

NITROLYSIS

NITROMETHANE

RF: Methane

NITROMETHANE-MOTOR

RF: Motors

NITROMONOMERS

RF: Monomers

NITRONIUM

NITROPARAFFINS

RF: Paraffins

NITROPOLYMERS

RF: Polymers

NITROPROPANE

RF: Propane

NITROSTARCH

NITROUS-OXIDE

NOBLE-GAS

RF: Gases

NONCAVITATING-COND

RF: Cavitation
Noncavitating-Conditions

Noncavitating-Conditions

S: Noncavitating-Cond

NONFERROUS-ALLOYS

RF: Alloys
Superalloys

NONVOLATILE-BORANE

RF: Borane

NOSE-CONES

RF: Missile-Components

NOTCH-SENSITIVITY

RF: Fatigue
Metal-Properties
Sensitivity

NOVA-PROPULSION

RF: Propulsion

NOZZLE-CONCEPTS

NOZZLE-CONTOURS

NOZZLE-COOLANTS

RF: Coolants

NOZZLE-DESIGN

SA: Prandtl-Meyer-Func
Thrust-Coefficient
RF: Design

NOZZLE-DEVELOPMENT

NOZZLE-EJECTOR

RF: Ejectors

NOZZLE-EROSION

RF: Erosion

NOZZLE-EXTENSIONS

NOZZLE-LINERS

RF: Liners

NOZZLE-MATERIALS

RF: Ablation-Materials

NOZZLE-SYSTEMS

NOZZLE-THEORY

NOZZLE-THROATS

RF: Throats

NOZZLES

SA: Annular-Nozzles
Carbide-Nozzles
Conical-Nozzles
Exhaust-Nozzles
Exit-Nozzles
Film-Cooled-Nozzle
Metallic-Nozzles
Plug-Nozzles
Porous-Nozzle
Quench-Nozzles
Rocket-Nozzles
Supersonic-Nozzle
Transparent-Nozzle
RF: Convergent-Divergent-Nozzles

NUCLEAR-COMBUSTION

RF: Combustion

NUCLEAR-ENGINES

SA: Aspen
Carbide-Core
Nerva-Engine
Reactor-Engine-Sys
Reactor-Fuels
RF: Engine

NUCLEAR-EXPLOSION

RF: Explosion

NUCLEAR-FUELS

SA: Deuterium-Fuel
RF: Fuels

NUCLEAR-HEATING

RF: Heating

NUCLEAR-MATERIALS

RF: Materials

NUCLEAR-PHYSICS

RF: Physics

NUCLEAR-POWER

SA: SNAP
RF: Power

NUCLEAR-PROPULSION

SA: Fission-Power
Orion
RF: Thermonuclear-Propulsion

NUCLEAR-RADIATION

SA: Argus-Effect
RF: Radiation

NUCLEAR-REACTION

SA: Spallation
RF: Reaction

NUCLEAR-ROCKET

RF: Rocket

NUCLEAR-SAFTY

SA: Rover-Project
RF: Safety

NUCLEAR-SYSTEMS**NUCLEAR-TESTS**

RF: Tests

NUCLEAR-VEHICLES

SA: Rover
RF: Vehicles

NUCLEAR-WEAPONS

RF: Weapons

NUCLEATION**NUMERICAL-SOLUTION**

RF: Computation
Solutions

NYLON

RF: Amides
Fibers
Materials

O-RINGS

RF: Seals

OLANES**OLEFINS****OPACITIES**

SA: Spectral-Opacities

OPERATING-CHARACT

RF: Operating-Characteristics

Operating-Characteristics

S: Operating-Charact

OPTICAL-ABSORBANCE

RF: Absorptance

OPTICAL-CHARACTER

SA: Resolution
RF: Optical-Characteristics

Optical-Characteristics

S: Optical-Character

OPTICAL-ILLUMINAT

RF: Illumination
Optical-Illumination

Optical-Illumination

S: Optical-Illuminat

Optical-Maser

S: Lasers

OPTICAL-METHODS

OPTICAL-PROPERTIES

OPTICAL-STUDIES

RF: Studies

OPTIMIZATION

SA: Pulse-Optimization

OPTIMUM-BURNING

RF: Burning

OPTIMUM-DESIGN

RF: Design

OPTIMUM-LENGTH

OPTIMUM-MATERIALS

RF: Material-Selection

OPTIMUM-THRUST

RF: Thrust

OPTIMUM-TRAJECT

RF: Optimum-Trajectories
Trajectories

Optimum-Trajectories

S: Optimum-Traject

ORBITAL-CARRIER

RF: Aerospace-Vehicles

ORBITAL-FLIGHT

RF: Flight

ORBITAL-LAUNCH

RF: Launching

ORBITAL-MECHANICS

SA: Docking
Many-Body-Problem
Perturbation
Rendezvous
Two-Body-Problem
RF: Mechanics
Space-Sciences

ORBITAL-TRANSPORT

RF: Transports

ORBITAL-TRANSFER

ORBITAL-VEHICLES

SA: MORL
Satellites
RF: Aerospace-Vehicles
Vehicles

ORBITING-MISSILE

RF: Missile

ORBITS

SA: Circular-Orbits
Earth-Orbits
Lunar-Orbits
Mars-Orbit
Planetary-Orbits
Satellite-Orbits

ORGANIC-CHEMISTRY

RF: Chemistry

ORGANIC-COATINGS

RF: Abrasion
Coatings
Erosion
Finishes

ORGANIC-COMPOUNDS

RF: Compounds

ORGANIC-SOLVENTS

RF: Solvents

ORGANOBORANE-FUEL

RF: Fuels

ORGANOBORANES

RF: Borane

ORIFICES

SA: Fuel-Orifice
Injector-Orifice

ORION

RF: Nuclear-Propulsion

ORTHO-BORIC-ACID

SA: Acid subheadings
RF: Acids
Boric-Acid

ORTHOTOLUIDINE

RF: Amines

OSCILLATIONS

SA: Fluid-Oscillations
Longitudinal-Oscil
Rotary-Screaming
Vibrations
RF: Vibrations

OSCILLATORY-FLOW

RF: Flow

Oxidants

S: Oxidizers

OXIDATION

SA: Explosive-Oxidat
Thermal-Oxidation

OXIDATION-PROTECT

RF: Coatings
Oxidation-Protection
Protection

Oxidation-Protection

S: Oxidation-Protect

OXIDATION-RESIST

RF: Oxidation-Resistance
Resistance

Oxidation-Resistance

S: Oxidation-Resist

OXIDIZER-BINDERS

SA: Acetonitrile
RF: Binders

OXIDIZER-CHEMISTRY

RF: Chemistry

OXIDIZER-ENCAPSUL

RF: Encapsulation
Oxidizer-Encapsulation

Oxidizer-Encapsulation

S: Oxidizer-Encapsul

OXIDIZER-HAZARDS

SA: Fluorine-Hazards
Liquid-Oxidizers
RF: Propellant-Hazards

OXIDIZER-STABILITY

RF: Stability

OXIDIZERS

SA: Energetic-Oxidizer
Flox
High-Energy-Oxidizers
Liquid-Oxidizers
Lox
Ozone
Rocket-Oxidizers
Solid-Oxidizers
RF: Oxidants

OXYGEN

SA: Boiling-Oxygen
Liquid-Oxygen
RF: Gases

OXYGEN-HAZARD

RF: Gaseous-Hazard

Oxyisobutyric-Nitrile

S: Acetone-Cyanhydrin

OZONE

SA: Liquid-Ozone
RF: Gases
Oxidizers

OZONE-HAZARD

RF: Gaseous-Hazards

OZONE-STABILITY

RF: Stability

OZONE-SYSTEMS

OZONIDES

P-V-T

RF: Pressure-Volume-Temperature

PAINTS

SA: Enamels

RF: Coatings

PALLADIUM

PANEL-FATIGUE

RF: Fatigue

PANELS

SA: Honeycomb-Panels
Insulation-Panels
Plastic-Panels
Sandwich-Panels

RF: Plates

PARAFFINS

SA: Nitroparaffins

RF: Petroleum-Products

PARAMETRIC-AMP

RF: Amplifiers

Parametric-Amplifiers

Parametric-Amplifiers

S: Parametric-Amp

PARAMETRIC-DATA

PARAMETRIC-DESIGN

RF: Design

PARAMETRIC-STUDIES

RF: Studies

PARTICLE-COUNTER

PARTICLE-LAG

RF: Velocity-Lag

PARTICLE-SIZE

PARTICLE-SYMMETRY

PARTICLES

SA: Metal-Particles

PARTICULATE-MATTER

RF: Matter

PAYLOAD

SA: Saturn-Payload

RF: Boosters

Launch-Vehicles

PAYLOAD-CAPABILITY

PAYLOAD-COST

RF: Costs

PAYLOAD-EVALUATION

PAYLOAD-WEIGHT

RF: Weight

PELLETS

RF: Propellant-Grains

Solid-Oxidizers

Solid-Propellants

PENDULUM-ANALOGY

PENETRATION

PENETRATION-AIDS

SA: WS-SR-199

PENTAACETATE

SA: Glucose

RF: Alpha-d-Glucose

Beta-d-Glucose

Glucose

PENTABORANE

RF: Dihydropentaborane

Pentaboron-Enneahydride

Pentaboron-Enneahydride

S: Pentaborane

PENTABORANE-HAZARD

RF: Liquid-Hazards

PENTAFLUORIDE

RF: Fluoride

PENTANE

RF: Fluoro-Nitro-Comp

PERCHLORATES

SA: Ammonia-Perchlor
Barium-Perchlorate
Li-Perchlorate
Potassium-Perchlor

PERCHLORIC-ACID

SA: Acid subheadings
RF: Acids

PERFLUOROGUANIDINE

RF: Guanidines

PERFORMANCE

SA: Ballistic-Perform
Engine-Performance
Motor-Performance
Rocket-Performance
Thermal-Perform

PERFORMANCE-ANAL

RF: Analysis
Performance-Analysis

Performance-Analysis

S: Performance-Anal

PERFORMANCE-CURVES

RF: Curves

PERFORMANCE-DATA

PERFORMANCE-LOSSES

PERFORMANCE-TESTS

RF: Tests

PERFORMANCE-VALUES

PERIPHERAL-CONTROL

RF: Controls

PERMEABILITY

SA: Air-Permeability
Gas-Permeability

PERMEABILITY-MEAS

RF: Measurement
Permeability-Measurement

Permeability-Measurement

S: Permeability-Meas

PERTURBATION

RF: Many-Body-Problem
Orbital-Mechanics
Three-Body-Problem
Two-Body-Problem

PETRIN

PETROCHEMICALS

Petroleum-Hydrocarbons

S: Hydrocarbons

PETROLEUM-PRODUCTS

SA: Paraffins

PHENOLIC-POLYMERS

RF: Ablation-Materials

PHENOLIC-RESIN

RF: Resins

Phenylamine

S: Aniline

PHOEBUS-REACTOR

SA: Invar-Wrapper

RF: Reactors

Rover

Rover-Reactor

Phoenix-Modular-Booster

S: Modular-Boosters

PHOSGENE

RF: Gases

PHOSPHATE

PHOSPHORUS

PHOTOCELLS

RF: Cells

PHOTOCHEMISTRY

RF: Chemistry

PHOTOGRAPHY

SA: Cameras
Radiography

PHOTOLYSIS

SA: Ammonia-Photolysis

PHOTOMETERS

RF: Illumination
Instruments

PHOTOVOLTAIC-CELLS

RF: Cells
Energy-Conversion
Power-Sources

PHthalATE-ESTER

RF: Esters

PHthalATES

SA: Dibutyl-Phthalates

PHYSICAL-ANALYSIS

RF: Analysis

PHYSICAL-CHEMISTRY

RF: Chemistry

PHYSICAL-CONSTANTS

PHYSICAL-PHENOMENA

PHYSICS

SA: Nuclear-Physics
Plasma-Physics
Reactor-Physics

PHYSIOLOGY

RF: Human-Factors

PIEZO-GAGES

RF: Gages

PIEZOELECTRICITY

RF: Electrical-Phenom

PILOT-PLANT

RF: Production

PISTON-PUMP

RF: Pumps

PISTON-TUBE

RF: Tube

PISTONS

RF: Fuel-Tanks

PLANETARY-ORBITS

RF: Orbits

PLANNING

SA: Design-Selection
RF: Management

PLASMA-ARC

PLASMA-ARC-WELDING

RF: Welding

PLASMA-ENGINE

RF: Engine

PLASMA-PHYSICS

RF: Physics

PLASMA-PROBES

RF: Probes

PLASMA-PROPULSION

RF: Propulsion

PLASMAS

SA: Flame-Plasma
Quantum-Plasma

Plastic-Chars

S: Ablation-Chars

PLASTIC-FLOW

SA: Rheology
RF: Flow

PLASTIC-LAMINATES

SA: Glass-Fabric
RF: Laminates

PLASTIC-PANELS

RF: Panels

PLASTIC-PROPELLANT
RF: Propellants

PLASTIC-TANKS
RF: Tanks

PLASTICIZERS
SA: Carbamate

PLASTICS
SA: Methacrylate
Reinforced-Plastic
Structural-Plastic
Thermoplastics
Vinyl
RF: Ablation-Materials
Glazing-Materials
Materials

PLASTISOL-EXPLOS
RF: Explosives
Plastisol-Explosives

PLASTISOL-PROPEL
RF: Plastisol-Propellants
Propellants
Vinyl-Plastisol

Plastisol-Propellants
S: Plastisol-Propel

PLATES
SA: Flat-Plates
Heated-Plates
Panels
Rectangular-Plates
Steel-Plates
RF: Structures

PLATINUM

PLIABLE-EXPLOSIVE
RF: Explosives

PLUG-BURNER-TECH
RF: Burner
Plug-Burner-Technique

Plug-Burner-Technique
S: Plug-Burner-Tech

PLUG-CLUSTER
RF: Clusters

PLUG-NOZZLES
RF: Nozzles

PLUMES
SA: Exhaust-Plume
Motor-Plume

PLUTONIUM
RF: Reactor-Fuel

PNEUMATIC-SYSTEMS
SA: Hydraulic-Systems
RF: Hydraulic-Systemes

POLARIS
RF: Guided-Missiles
IRBM
Submarine-Missiles
Surface-to-Surface

POLARIS-PROPELLANT
RF: Propellants

POLONIUM

POLYACRYLAMIDE
RF: Acrylamide

POLYAMINES
RF: Amines

POLYBUTADIENE
RF: Butadiene

POLYESTER-RESIN
RF: Resins

POLYETHYLENE
RF: Ethylene

POLYISOBUTYLENE

POLYMER-ADHESIVES
RF: Adhesives

POLYMERIZATION

POLYMERS

SA: Borane-Polymer
High-Energy-Poly
Nitropolymers
Vinyl-Polymers

POLYNITRO-MONOMERS

RF: Monomers

POLYPROPYLENE

RF: Propylene

POLYSTYRENE

RF: Styrene

POLYSULFIDE

RF: Sulfides

POLYURETHANE-ELAST

RF: Elastomers
Polyurethane-Elast

Polyurethane-Elastomers

S: Polyurethane-Elast

POLYURETHANE-RESIN

RF: Resin-Binders
Resins

POLYURETHANES

RF: Urethane

POLYVINYL-ACETATE

POLYVINYL-CHLORIDE

RF: Chlorides

POROSITY-TEST

RF: Tests

POROUS-CERAMICS

RF: Ceramics

POROUS-FLAT-PLATE

RF: Flat-Plates

POROUS-IONIZERS

RF: Ionizers

POROUS-IRON

RF: Iron

POROUS-MATERIALS

RF: Materials

POROUS-METAL

RF: Metals

POROUS-NICKEL

RF: Nickel

POROUS-NOZZLE

RF: Nozzles

POROUS-TUBE

RF: Tube

Positive-Expulsion-Techniques

S: Expulsion-Tech

POTASSIUM

RF: Alkali-Metals
Light-Metals

POTASSIUM-BROMIDE

RF: Bromides

POTASSIUM-CHLORATE

POTASSIUM-CHLORIDE

RF: Chlorides

POTASSIUM-COMPOUND

RF: Compounds

POTASSIUM-FLUORIDE

RF: Fluoride

POTASSIUM-NITRATE

RF: Solid-Oxidizers

POTASSIUM-PERCHLOR

RF: Perchlorates
Potassium-Perchlorate
Solid-Oxidizers

Potassium-Perchlorate

S: Potassium-Perchlor

POTASSIUM-SULFATE

POTENTIAL-FLOW

RF: Flow

POTENTIAL-HAZARDS

RF: Hazards

POWDER

SA: Al-Powder
Bi-Metallic-Powder
Black-Powder
Casting-Powder
Metal-Powder

POWDER-COMPACTS

POWDER-CAS-EROSION

RF: Erosion

POWDER-GASES

RF: Gases

POWDER-GRAINS

RF: Grains

POWDER-METALLURGY

RF: Metallurgy

POWER

SA: Fission-Power
High-Power
Nuclear-Power
Submarine-Power
Thermionic-Power

POWER-DENSITY

RF: Density

POWER-EQUIPMENT

POWER-GENERATION

SA: Generators

POWER-PLANTS

SA: Auxiliary-Power
Rocket-Power-Plant
RF: Aircraft-Engines
JATO

POWER-REQUIREMENTS

POWER-SOURCES

SA: Electrolytic-Cell
Energy-Sources
Engine
Fuel-Cells
Generator
Mercury-Cell
Motor
Photovoltaic-Cells
Radiant-Energy
Reactors
Solar-Energy

RF: Sources

POWER-SUPPLIES

RF: Auxiliary-Power

POWER-SYSTEMS

SA: Space-Power-System

POWER-TRANSMISSION

PRANDTL-MEYER-FUNC

RF: Functions
Nozzle-Design

Prandtl-Meyer-Functions

S: Prandtl-Meyer-Func

PRECOMBUSTION

RF: Combustion

PREHEATING

RF: Heating

PRESSURE

SA: Ambient-Pressure
Atmospheric-Pressure
Base-Pressure
Chamber-Pressure
Combustion-Press
Critical-Pressure
External-Pressure
Gas-Pressure
High-Pressure
Low-Pressure
Static-Pressure
Ultra-Low-Pressure
Vapor-Pressure
RF: Superaatmospheric-Pressure

PRESSURE-CURVE

PRESSURE-DROP

PRESSURE-EFFECT

PRESSURE-FED

SA: Feed-Pumps

RF: Propellant-Feed

PRESSURE-GAGES

RF: Gages

PRESSURE-GRADIENTS

PRESSURE-LOADING

RF: Loading

PRESSURE-LOSSES

RF: Losses

PRESSURE-RANGE

PRESSURE-VARIATION

PRESSURE-VESSELS

RF: Tanks

Pressure-Volume-Temperature

S: P-V-T

PRESSURIZATION

SA: Gas-Pressurization

PRESSURIZATION-SYS

RF: Pressurization-System

Pressurization-System

S: Pressurization-Sys

PRESSURIZED-SHELLS

RF: Shells

PRIMARY-FLOW

RF: Flow

PRIMARY-VORTEX

RF: Vortex

PRIMERS

SA: Eimite

Electric-Primers

Hot-Gas-Primer

Igniters

PROBES

SA: Lunar-Probes

Plasma-Probes

Research-Probes

Space-Probes

Venus-Probes

PROCESS-SCALEUP

RF: Production

Scaleup

PROCESSING

SA: Chemical-Processing

Propellant-Process

PRODUCTION

SA: Model-Scaleup

Pilot-Plant

Process-Scaleup

PRODUCTION-COSTS

RF: Costs

PROGRAMMING

RF: Computer-Programs

PROJECTILES

SA: Drag

PROPADIENE

RF: Allene

Dimethylene-Methane

PROPANE

SA: Nitropropane

PROPANE-AIR-FLAMES

RF: Flames

Propanone

S: Acetone

PROPARGYL-ALCOHOL

RF: Alcohol

PROPARGYL-AMINE

RF: Amines

PROPARGYL-CHLORIDE

RF: Chlorides

Propellant-Actuated-Devices

S: Actuators

PROPELLANT-ADD

SA: Additives

Chemical-Additives

Metal-Additives

RF: Additives

Propellant-Additives

S: Propellant-Add

PROPELLANT-AGING

RF: Propellant-Deterio

PROPELLANT-ANAL

RF: Analysis

Propellant-Analysis

Propellant-Analysis

S: Propellant-Anal

PROPELLANT-BURNING

SA: Additive-Effects

Burning-Rate

PROPELLANT-CHARGES

PROPELLANT-CHEM

RF: Chemistry

Propellant-Chemistry

Propellant-Chemistry

S: Propellant-Chem

PROPELLANT-CURING

RF: Curing

PROPELLANT-DATA

PROPELLANT-DENSITY

RF: Density

PROPELLANT-DETERIO

SA: Propellant-Aging

Safe-Life

RF: Ignition-Tests

Propellant-Deterioration

Propellant-Deterioration

S: Propellant-Deterio

PROPELLANT-DEVELOP

RF: Propellant-Development

Propellant-Development

RF: Propellant-Develop

PROPELLANT-EXPULS

RF: Expulsion

Propellant-Expulsion

Propellant-Expulsion

S: Propellant-Expuls

PROPELLANT-FAILURE

PROPELLANT-FEED

SA: Pressure-Fed

Propellant-Supply

RF: Feed-Systems

PROPELLANT-FILLING

PROPELLANT-FLOW

RF: Flow

PROPELLANT-GAS

RF: Gases

PROPELLANT-GRAINS

SA: Pellets

RF: Grains

Solid-Propellants

PROPELLANT-HAZARDS

SA: Explosion-Hazards

Fire-Hazards

Fuel-Hazards

Health-Hazards

Oxidizer-Hazards

RF: Fuel-Hazards

Hazards

High-Energy-Propellant-Hazards

Liquid-Propellant-Hazards	Propellant-Stability
Solid-Propellant-Hazards	S: Propellant-Stabil
PROPELLANT-IGNIT	PROPELLANT-STORAGE
RF: Ignition	RF: Storage
Propellant-Ignition	PROPELLANT-SUPPLY
S: Propellant-Ignit	RF: Propellant-Feed
PROPELLANT-MIXTURE	PROPELLANT-SYSTEMS
RF: Mixture	SA: Impulse-Propel-Sys
PROPELLANT-PARAM	PROPELLANT-TANKS
RF: Propellant-Parameters	RF: Tanks
Propellant-Parameters	PROPELLANT-TECH
S: Propellant-Param	RF: Propellant-Technology
PROPELLANT-PERFORM	Propellant-Technology
RF: Propellant-Performance	S: Propellant-Tech
Propellant-Performance	PROPELLANT-X-9
S: Propellant-Perform	PROPELLANTS
PROPELLANT-PROCESS	SA: Acetylene-Propel
RF: Processing	Aged-Propellants
Propellant-Processing	Aircraft-Fuels
S: Propellant-Process	Alumizine-Propel
PROPELLANT-RES	Ammonium-Nitrate
RF: Propellant-Research	B-N-Propellants
Research	Ball-Propellants
Propellant-Research	Bi-Propellants
S: Propellant-Res	Case-Bonded-Propel
PROPELLANT-SENSIT	Catapult-Propel
RF: Propellant-Sensitivity	Colloidal-Propel
Sensitivity	Composite-Propel
Propellant-Sensitivity	Corporal-Propel
S: Propellant-Sensit	Double-Basc-Propel
PROPELLANT-SPILLS	Gelled-Fuels
RF: Decontamination	Gun-Propellants
PROPELLANT-STABIL	High-Energy-Propel
RF: Propellant-Stability	Hybrid-Propellant
	JPL-X500
	Liquid-Propellants
	Mesa-Type-Propel
	Metallized-Propel
	Minuteman-Propel
	Monopropellants
	Nike-Propellant
	Plastic-Propellant
	Plastisol-Propel

Polaris-Propellant
 Reactive-Propel
 Rocket-Propellant
 Rover-Fuel
 Solid-Propellants
 RF: Fuels

PROPOSALS
 RF: Publications
 Technical-Proposals

PROPULSION
 SA: Aerospace-Propuls
 Apollo-Propulsion
 Booster-Propulsion
 Electric-Propuls
 Gun-Propulsion
 Hybrid-Propulsion
 Hydrogen-Propuls
 Ion-Propulsion
 Jet-Propulsion
 Liquid-Propulsion
 Nova-Propulsion
 Plasma-Propulsion
 Rocket-Propulsion
 Satellite-Propuls
 Solar-Propulsion
 Space-Propulsion
 Submarine-Propuls

PROPULSION-COSTS
 RF: Costs

PROPULSION-RES
 RF: Propulsion-Research
 Research

Propulsion-Research
 S: Propulsion-Res

PROPULSION-SYSTEMS
 SA: Fuel-Injection
 Jet-Propulsion-Sys

Propulsion-System-Bell-Model-8043
 S: Bell-Model-8043

Propulsion-System-Bell-Model-8181
 S: Bell-Model-9131

PROPYL-ALCOHOL
 RF: Alcohol
 Ethyl-Carbinol

PROPYL-NITRATE
 RF: Nitrate

PROPYLAMINE
 RF: Amines

PROPYLENE
 SA: Polypropylene

PROTECTION
 SA: Corrosion-Protect
 Fire-Protection
 Oxidation-Protect
 Thermal-Protection

PROTECTIVE-COATING
 RF: Acid-Resistant-Coatings
 Coatings
 Corrosion

PROTECTIVE-STRUCT
 RF: Protective-Structures
 Structures

Protective-Structures
 S: Protective-Struct

PROTOTYPES
 SA: Mock-Ups
 Models

PUBLICATIONS
 SA: Bibliography
 Indexes
 Management-Reports
 Proposals
 Test-Report
 Thesis

PULSE
 SA: Square-Wave-Pulse

PULSE-HEIGHT

PULSE-MOTOR
 RF: Motors

PULSE-OPTIMIZATION
RF: Optimization

PULSE-REACTOR
SA: TREAT
RF: Reactors

PULSE-SYSTEM

PUMPING-SYSTEM

PUMPS
SA: Boost-Pumps
Centrifugal-Pumps
Cryogenic-Pumps
Feed-Pumps
Impeller-Pumps
Jet-Pumps
Piston-Pump
Spoon-Type-Pump
Turbopumps

PYROGEN-IGNITER
RF: Igniters

PYROLYSIS
SA: Linear-Pyrolysis

PYROLYTIC-CARBON
RF: Carbon
Carbon-Coatings

PYROLYTIC-GRAPHITE
RF: Graphite

PYROLYTIC-MATERIAL
RF: Materials

PYROTECHNICS
SA: Flares
Tracers

QUALIFICATION-TEST
SA: Fuel-Evaluation
RF: Tests

QUALITY-CONTROL
SA: Fatigue-Evaluation
Inspection
RF: Reliability

QUANTITATIVE-ANAL
RF: Analysis
Quantitative-Analysis

Quantitative-Analysis
S: Quantitative-Anal

QUANTUM-MECHANICS
RF: Mechanics

QUANTUM-PLASMA
RF: Plasmas

QUARTZ

QUENCH-NOZZLES
RF: Nozzles

QUENCH-VALVES
RF: Valves

QUENCHING-DISTANCE

QUIESCENT-AIR
RF: Air
Atmosphere
Turbulent-Air

R-F-ENERGY
RF: Radiant-Energy

R-F-GAS-DISCHARGE
RF: Gas-Discharge

R-F-SHIELDING
RF: Shielding

R-F-SPECTROMETER
RF: Spectrometer

RADAR

RADAR-ATTENUATION

RADIAL-FLOW

RF: Flow

RADIAL-SYMMETRY

RADIANCE

SA: Spectral-Radiance

RADIANT-ENERGY

SA: R-F-Energy

RF: Energy
Power-Sources

Radiant-Energy-Conversion

S: Energy-Conversion

RADIANT-HEAT-TRANS

RF: Heat-Transfer
Radiant-Heat-Transfer

Radiant-Heat-Transfer

S: Radiant-Heat-Trans

RADIANT-HEATING

RF: Heating

RADIATION

SA: Emissivity
Gamma-Radiation
Infrared-Radiation
Ionizing-Radiation
Nuclear-Radiation
Solar-Radiation
Thermal-Radiation
Van-Allen-Belt
RF: Space-Environment

RADIATION-ANALYSIS

RF: Analysis

RADIATION-COOLING

RF: Cooling

RADIATION-DENSITY

RF: Density

RADIATION-EFFECTS

SA: Radiation-Hazards

RADIATION-FORCE

RADIATION-HAZARDS

RF: Hazards
Health-Hazards
Launching-Hazards
Radiation-Effects
Reactor-Hazards

RADIATION-LEVELS

RADIATION-PHENOM

RF: Radiation-Phenomena

Radiation-Phenomena

S: Radiation-Phenom

RADIATION-SHIELDS

RF: Shielding

RADIATION-TRANS

RF: Radiation-Transmission

Radiation-Transmission

S: Radiation-Trans

RADICALS

SA: Free-Radicals
Methyl-Radicals

RADIO

RADIO-FREQUENCY

SA: R-F-
U-H-F

RADIO-RPOPAGATION

SA: Antennas

RADIOGRAPHY

RF: Photography

RADIOISOTOPES

RF: Heat-Source
Space-Power-System
Thermoelectric-Gen

RADIOLYSIS

RAIN-EROSION

RF: Erosion

RAMJET

SA: Low-Volume-Ramjet

RAMJET-ENGINE

RF: Engine

RAMJET-MISSILES

RF: Missile

RANGER

RF: Lunar-Probes

Space-Probes

RAPID-BURNING

RF: Burning

RAPID-HEATING

RF: Heating

RARE-EARTH-IONS

RF: Ions

RARE-EARTH-METALS

SA: Yttrium

RF: Metals

RARE-GAS-CHEM

RF: Chemistry

Rare-Gas-Chemistry

Rare-Gas-Chemistry

S: Rare-Gas-Chem

RARE-GAS-COMPOUNDS

SA: Rare-Gas-Fluorides

Xenon

RF: Compounds

Gases

RARE-GAS-FLUORIDES

RF: Fluoride

Rare-Gas-Compounds

RASCAL

RF: Air-to-Ground

RASCHIG-PROCESS**RATE-OF-ONSET**

RF: Mechanics

REACTION

SA: Adducts

Chemical-Reaction

Combustion-Reaction

Detonation-Reaction

Explosive-Reaction

Gas-Metal-Reaction

Gas-Reactions

Ignition-Reaction

Interaction

Nuclear-Reaction

RF: Interaction

REACTION-CHAMBER

RF: Chambers

REACTION-CONTROL

RF: Controls

REACTION-ENERGY

RF: Energy

REACTION-KINETICS

RF: Kinetics

REACTION-MECHANISM**REACTION-MOTOR**

RF: Motors

REACTION-PROCESSES**REACTION-PRODUCT****REACTION-RATE**

SA: Catalysts

REACTIVE-ENVIRON

RF: Environment

Reactive-Environment

Reactive-Environment

S: Reactive-Environ

REACTIVE-PROPEL

RF: Propellants

Reactive-Propellants

Reactive-Propellants

S: Reactive-Propel

REACTOR-ANALYSIS

REACTOR-COOLANT

RF: Coolants

REACTOR-CORES

SA: Carbide-Core

REACTOR-DESIGN

RF: Design

REACTOR-DIEPOSAL

REACTOR-DYNAMICS

REACTOR-ENGINE-SYS

RF: Nuclear-Engines
Reactor-Engine-Systems

Reactor-Engine-Systems

S: Reactor-Engine-Sys

REACTOR-EXPERIMENT

Reactor-Fuel-Materials

S: Reactor-Fuel

REACTOR-FUEL

SA: Ceramics
Graphite-Fuel
Plutonium
RF: Fuels
Nuclear-Engines
Reactor-Fuel-Materials

REACTOR-HAZARDS

SA: Radiation-Hazards
RF: Hazards

Reactor-In-Flight-Test

S: RIFT

REACTOR-MATERIALS

RF: Materials

REACTOR-PHYSICS

RF: Physics
Rover-Project

REACTOR-SAFETY

RF: Rover-Project
Safety

REACTORS

SA: Fast-Reactors
Fission-Reactor
Jet-Reactor
KIWI-Reactor
Moderated-Reactor
Moving-Bed-Reactor
Multistage-Reactor
Neutronics
Phoebus-Reactor
Pulse-Reactor
Rover-Reactor
Solid-Core-Reactor
RF: Power-Sources

REAGENTS

RF: Synthesis

RECONNAISSANCE

RF: Surveillance

RECOVERABLE-BOOST

RF: Boosters
Recoverable-Boosters

Recoverable-Boosters

S: Recoverable-Boost

RECOVERY

SA: Al-Recovery
Ca-Recovery
Diborane-Recovery
Heat-Recovery
Sodium-Recovery
Uranium-Recovery
RF: Abort

RECTANGULAR-FINS

RF: Fins

RECTANGULAR-PLATES

RF: Plates

RECYCLE-SYSTEM

Red-Fuming-Nitric-Acid

S: RFNA

REDUCING-AGENTS
SA: Borohydrides

REDUCTION
SA: Data-Reduction
Drag-Reduction
Shear-Reduction
RF: Synthesis

REDUNDANCY
RF: Reliability

REDUNDANT-CIRCUITS
RF: Electrical-Systems

REENTRY

REENTRY-STRESS
RF: Stress

REENTRY-SYSTEMS

REENTRY-VEHICLES
SA: ASSET-Vehicle
RF: Aerospace-Vehicles
Hypersonic-Vehicle
Vehicles

REFERENCES
RF: Bibliography

REFLECTANCE
RF: Absorptance

REFLECTIVE-COATING
RF: Coatings
Coatings-for-Aerospace-
Environment
Thermal-Control
Thermal-Control-Coatings

REFLECTIVITY
RF: Emissivity

REFRACTORIES
SA: Alumina
Beryllia
Cermets
Chromite
Chromium-Oxide
Graphite

Magnesia
Silica
Thoria
Zirconia
RF: Ablation-Materials
Materials

REFRACTORY-ALLOYS
RF: Alloys

REFRACTORY-COATING
RF: Coatings

REFRACTORY-COMPOS
RF: Composites
Refractory-Composites

Refractory-Composites
S: Refractory-Compos

REFRACTORY-FIBERS
RF: Fibers

REFRACTORY-LINERS
RF: Liners

REFRACTORY-METALS
SA: Chromium
Columbium
Molybdenum
Tantalum
Tungsten
Uranium
Vanadium
Zirconium
RF: Metals

REFRIGERANTS
RF: Cryocooler-Tech

REFUELING
RF: Fueling

REFUELING-EQUIP
RF: Refueling-Equipment

Refueling-Equipment
S: Refueling-Equip

REGENERATIVE-COOL

RF: Cooling
Regenerative-Cooling

Regenerative-Cooling

S: Regenerative-Cool

REGENERATIVE-HEAT

RF: Heating
Regenerative-Heating

Regenerative-Heating

S: Regenerative-Heat

REGENERATIVE-INJEC

RF: Injection
Regenerative-Injection

Regenerative-Injection

S: Regenerative-Injec

REIGNITION

RF: Ignition

REINFORCED-FIBERS

RF: Fibers

REINFORCED-GRAINS

RF: Grains

REINFORCED-LAMINAT

RF: Laminates
Reinforced-Laminates

Reinforced-Laminates

S: Reinforced-Laminat

REINFORCED-PLASTIC

RF: Ablation-Materials
Plastics

REINFORCED-TEFLON

RF: Teflon

RELEASE-MECHANISM

RELIABILITY

SA: Failure-Analysis
Quality-Control
Redundancy
Saturn-Reliability
RF: Failure

RELIEF-SYSTEMS

SA: Load-Relief-System

REMOTE-HANDLING

SA: Handling-Devices

RENDEZVOUS

SA: Docking
RF: Guidance
Orbital-Mechanics
Space-Maneuvering

RENDEZVOUS-PROFILE

RENE-41

RF: Nickel-Base-Alloy

RESEARCH

SA: Acetylene-Research
Additives-Research
Aerodynamic-Res
Aerospace-Research
Applied-Research
Be-Research
Borohydride-Res
Ceramics-Research
Chemical-Research
Controls-Research
Cryogenic-Research
Explosive-Research
Injector-Research
Light-Metal-Res
Propellant-Res
Propulsion-Res
Rocket-Research
Studies
Weapons-Research
Welding-Research

RESEARCH-EFFORT

RESEARCH-ENGINES
 SA: Research-Motors
 RF: Engines
 Research-Motors

RESEARCH-FACILITY
 SA: Altitude-Facility
 Laboratories
 Test-Facility
 RF: Laboratories
 Test-Facility

RESEARCH-MOTORS
 SA: Research-Engines
 RF: Motors
 Research-Engines

RESEARCH-PROBES
 RF: Probes

RESEARCH-PROGRAMS

RESEARCH-SATELLITE
 RF: Satellites

RESIN-BINDERS
 SA: Acrylic-Resin
 Polyurethane-Resin
 RF: Alcohol-Acrylates
 Binders
 Epoxide-Resin-Binders
 Methoxyethyl-Acrylate

RESINS
 SA: Ca-Resinate
 Epoxide-Resin
 Laminac-Resin
 Phenolic-Resin
 Polyester-Resin
 Polyurethane-Resin

RESISTANCE
 SA: Conductivity
 Contact-Resistance
 Corrosion-Resist
 Electrical-Resist
 Impact-Resistance
 Impedance
 Oxidation-Resist
 Shock-Resistance

RESISTANCE-NETWORK
 RF: Electrical-Systems

RESISTANCE-WELDING
 RF: Welding

RESOLUTION
 SA: High-Resolution
 RF: Optical-Character

RESONANCE
 SA: Magnetic-Resonance

RESONANT-BURNING
 RF: Burning

RESTARTABLE-MOTOR
 RF: Motors

RESTRICTED-BURNING
 RF: Burning

RETRO-ROCKET
 RF: Rocket

RETRO-ROCKET-MOTOR
 RF: Motors
 Rocket-Motor

REVERSE-FLOW
 RF: Flow

REYNOLDS-NUMBER
 RF: Fluid-Flow

RFNA
 SA: Acid subheadings
 IRFNA
 IWFNA
 Nitric-Acid
 WFNA
 RF: Acids
 Anhydrous-Nitric-Acid
 Liquid-Oxidizers
 Red-Fuming-Nitric-Acid

RFNA-AMMONIA
 RF: Ammonia

RFNA-CORROSION
 SA: AL-RFNA-Corrosion

RFNA-Hazard
S: Nitric-Acid-Hazard

RHENIUM

RHEOLOGY
RF: Plastic-Flow

RIFT
SA: NERVA-Engine
RF: Reactor-In-Flight-Test

RIGEL
RF: Submarine-Missiles
XSSM-N-6

RING-LASER
RF: Lasers

RIVETED-JOINTS
RF: Joints

ROCKET
SA: Air-to-Air
Air-to-Surface
Aircraft-Rocket
Artillery-Rockets
Booster-Rocket
Folding-Fin-Rocket
Gravity-Fed-Rocket
Hybrid-Rocket
Impulse-Rocket
Liquid-Rocket
Long-Range-Rocket
Modular-Rocket
Monofuel-Rocket
Nuclear-Rocket
Retro-Rocket
Sounding-Rockets
Soviet-Rockets
Surface-to-Air
Surface-to-Surface

ROCKET-ACCURACY
RF: Accuracy

ROCKET-BLAST

ROCKET-CHAMBER
SA: Insulation
RF: Chambers

ROCKET-CLUSTER
RF: Clusters

ROCKET-COMPONENTS
RF: Components
Rocket-System-Components

ROCKET-EFFICIENCY

ROCKET-EJECTOR
RF: Ejectors

ROCKET-ENGINE
SA: Air-Augmented
Screaming
Turbo-rocket
RF: Engine

ROCKET-EXHAUST
RF: Exhaust

ROCKET-FUELS
SA: Amine-Rocket-Fuels
Ammonia-Fuels
RF: Fuels

ROCKET-LINERS
RF: Liners

ROCKET-MOTOR
SA: Retro-Rocket-Motor
RF: Motors

ROCKET-MOTOR-ABL
RF: ABL-X-254-A1
ABL-X-254-A2

ROCKET-MOTOR-BE-1

ROCKET-MOTOR-CASES
RF: Motor-Cases

ROCKET-NOZZLES
RF: Nozzles

ROCKET-OXIDIZERS
RF: Oxidizers

ROCKET-PERFORMANCE
RF: Performance

ROCKET-PISTOL

RF: Small-Arms

ROCKET-POWER-PLANT

RF: Power-Plants

ROCKET-PROPELLANT

RF: Propellants

ROCKET-PROPELLED

RF: Aircraft-Engines

ROCKET-PROPULSION

RF: Propulsion

ROCKET-RESEARCH

RF: Research

ROCKET-SLED

ROCKET-SYSTEM

Rocket-System-Components

S: Rocket-Components

ROCKET-TECHNOLOGY

ROCKET-TESTING

RF: Tests

ROCKET-THRUST

RF: Thrust

ROCKET-VELOCITY

RF: Velocity

ROCKETSONDE

RF: Sounding-Rockets

ROLL-STABILIZATION

RF: Stabilization

ROLLING

SA: Sheet-Rolling

RF: Forming

ROTARY-SCREAMING

RF: Oscillations
Screaming

ROTATING-INJECTOR

RF: Injectors

ROVER

SA: Phoebus-Reactor

RF: Ballistic-Missile
Nuclear-Vehicles

ROVER-FUEL

RF: Burn-Leach-Process
Fuels
Propellants

ROVER-PROJECT

SA: Neutronics
Nuclear-Safety
Reactor-Physics
Reactor-Safety

ROVER-REACTOR

SA: KIWI-Reactor
NERVA-Engine
Phoebus-Reactor
RF: Reactors

RUBBER

SA: Chlorinated-Rubber
GR-S-Rubber
Silicone-Rubber
RF: Elastomers

RUBBER-COMPOUNDS

RF: Compounds
Elastomeric-Comp.

RUBBER-FUEL-BASE

RF: Fuels

RUBBER-FUEL-DRUMS

RF: Fuel-Drums

RUBIDIUM

RF: Alkali-Metals
Light-Metals

RUBY-LASER

RF: Lasers

RUN-AWAY-PHENOMENA

RF: Burning-Rate-Con

RUTILE

SAFE-LIFE

RF: Aging
Propellant-Deterio

SAFETY

SA: Chemical-Safety
Combustion-Safety
Hazard-Control
Missile-Safety
Nuclear-Safety
Reactor-Safety
Stowage-Safety
RF: Abort
Accidents
Hazards

SAFETY-ANALYSIS

RF: Analysis

SAFETY-DEVICES

SA: Ejection-Seat

SAFETY-MANAGEMENT

RF: Management

SAFETY-NEUTRONICS

RF: Reactor-Safety

SAFETY-PRECAUTIONS

SA: Accident-Hazards
Antidotes
Blood-Serum
Decontamination
Fire-Protection
Hazard-Control
Leak-Detection
Vapor-Detection
Warning-Devices
RF: Accident-Hazards

SAFETY-PROCEDURES

SAFETY-PROGRAMS

SA: Flight-Safety-Prog

SAINT

RF: Satellite-Inspection-System

SALICYLATES

SA: Sodium-Salicylate

SALTS

SA: Amine-Salts
Fused-Salt
Lead-Salts
Mercuric-Salts
Nitrate-Salts

SAM-N-6

S: Talos

SANDWICH-CYLINDER

RF: Cylinders

SANDWICH-MATERIALS

RF: Materials

SANDWICH-PANELS

RF: Panels

SANDWICH-SHELLS

RF: Shells

SARAN-FILM

RF: Film

SATELLITE-BASES

RF: Bases

SATELLITE-CONTROL

RF: Attitude-Control
Control-Systems
Spacecraft-Control

Satellite-Inspection-System

S: SAINT

SATELLITE-ORBITS

RF: Orbits

SATELLITE-PROPULS

RF: Propulsion
Satellite-Propulsion

Satellite-Propulsion

S: Satellite-Propuls

SATELLITES

SA: Earth-Satellites
Evasive-Satellite
Research-Satellite
RF: Orbital-Vehicles
Space-Stations

SATURN

RF: Apollo
Boosters

SATURN-COSTS

RF: Costs

SATURN-DESIGN

RF: Design

SATURN-LOX-TANK

RF: LOX-Tanks

SATURN-MISSIONS

RF: Space-Missions

SATURN-PAYLOAD

RF: Payload

SATURN-PROBLEMS

SATURN-RELIABILITY

RF: Reliability

SCALEUP

SA: Model-Scaleup
Process-Scaleup

SCALING

SA: Model-Scaling
Vehicle-Scaling

SCALING-CRITERIA

SCALING-PROCEDURES

SCANDIUM

RF: Light-Metals

SCATTERERS

RF: Absorber

SCHOCH-PROCESS

RF: Acetylene

SCOUT

RF: Boosters

SCREAMING

SA: Rotary-Screaming
RF: Rocket-Engine

SCREAMING-TENDENCY

SCRUBBING

SA: Chemical-Scrubbing

SEALANTS

RF: Adhesives

SEAL-DESIGN

RF: Design

SEALED-FOAM

RF: Foams

SEALS

SA: Chamber-Seals
Cryogenic-Seals
Elastic-Seals
Gaskets
Lockseal
O-Rings
RF: Gaskets
Leakage
Mechanical-Fitting

SECONDARY-FLOW

RF: Flow

SECONDARY-VORTEX

RF: Vortex

SEMI-TRAILER

RF: Ground-Support
Servicing-Trailer

SEMI-TRAILER-TANKS

RF: Tanks

SEMICONDUCTIVITY

RF: Conductivity

SEMICONDUCTORS

SENSITIVITY

SA: Compression-Sensit
Desensitization
Detonation-Sensit
Explosive-Sensit
Ignition-Sensit
Impact-Sensitivity
Mission-Sensit
Notch-Sensitivity
Propellant-Sensit
Shock-Sensitivity
Temperature-Sensit
Thermal-Sensitiv
RF: Hazard-Class

SENSITIVITY-STUDY

RF: Studies

SERGEANT

RF: Surface-to-Surface

SERVICING-EQUIP

RF: Ground-Support
Servicing-Equipment

Servicing-Equipment

S: Servicing-Equip

SERVICING-TRAILER

SA: Semi-Trailer

SERVO-VALVES

RF: Servomechanisms
Valves

SERVOMECHANISMS

SA: Servo-Valves
RF: Controls

SHAPED-CHARGES

SA: Cone-Charges
RF: Solid-Propellants

SHEAR

RF: Forces

SHEAR-DISTORTION

SHEAR-FLOW

RF: Flow

SHEAR-PROPERTIES

SHEAR-REDUCTION

RF: Reduction

SHEET-ALLOYS

RF: Alloys

SHEET-METALS

RF: Metals

SHEET-ROLLING

RF: Rolling

SHEET-ROLLING-PROG

RF: Sheet-Rolling-Program

Sheet-Rolling-Program

S: Sheet-Rolling-Prog

SHEETS

SA: Be-Sheets
Data-Sheets
Thin-Sheets
Titanium-Sheet
Tungsten-Sheet

SHELL-MEMBRANES

RF: Membranes

SHELL-STRUCTURES

RF: Structures

SHEELS

SA: Cylindrical-Shell
Elastic-Shells
Ellipsoidal-Shells
Pressurized-Shells
Sandwich-Shells
Tapered-Shells
Theory-of-Shells
Thin-Shells

SHELLS-OF-REVOLUT

RF: Bodies-of-Revolut
Shells-of-Revolution

Shells-of-Revolution

S: Shells-of-Revolut

SHIELD

SA: Heat-Shields
RF: Absorber

SHIELD-MATERIALS

SA: Heat-Shield-Matls
RF: Absorbent
Absorber

SHIELDING

SA: R-F-Shielding
Radiation-Shields

SHILLELAGH

RF: Tactical-Missiles

SHOCK

SA: Ground-Shock
Launching-Shock
Load-Relief-System
Temperature-Shock
Thermal-Shock

SHOCK-ABSORBER

RF: Absorber

SHOCK-ATTENUATION

RF: Detonation

SHOCK-HARDENING

RF: Explosive-Forming

SHOCK-ISOLATION

SA: Elastic-Systems

SHOCK-RESISTANCE

RF: Resistance

SHOCK-SENSITIVITY

RF: Sensitivity

SHOCK-TUBE

RF: Tube

SHOCK-TUNNEL

RF: Wind-Tunnel

SHOCK-WAVE

RF: Waves

SHORT-TIME-CREEP

RF: Creep

SHRIKE

RF: Air-to-Ground

SHUT-OFF-VALVE

RF: Valves

SIDEWINDER

RF: Guided-Missiles

SILICA

RF: Refractories

SILICA-GEL

RF: Gels

SILICON

RF: Light-Metals

SILICON-ADDITIVES

RF: Additives

SILICON-BORIDE

RF: Borides

SILICON-CARBIDE

RF: Carbides

SILICONE-RUBBER

RF: Rubber

SILOS

RF: Launch-Sites

SILVER

SILVER-CATALYST

RF: Catalysts

SILVER-NITRATES

RF: Nitrates

SIMULATION

SA: Altitude-Simulat
Artificial-Environ
Flight-Simulation
Thermal-Modeling

RF: Models
Test-Methods

SIMULATION-METHODS

SIMULATORS

SA: Environmental-Cham
RF: Test-Equipment

SINTERING

RF: Alloying-Process

SKIN-FRICTION

RF: Friction

SKYBOLT

RF: Air-Launched

SLIPSTREAM

RF: Aerodynamics
Air-Stream

SLOSHING

SA: Fluid-Oscillations
Fuel-Motion
Fuel-Oscillations
RF: Fluid-Slosh

SLOW-COMBUSTION

RF: Combustion

SLUDGE-FORMATION

RF: Formation

SLURRY-FUELS

RF: Fuels

Slush-Hydrogen

S: Hydrogen-Slush

SMALL-ARMS

SA: Rocket-Pistol
RF: Weapons

SMOKELESS-JATO

RF: JATO

SMOKELESS-PROPEL

RF: Smokeless-Propellants
Solid-Propellants

Smokeless-Propellants

S: Smokeless-Propel

SNAP

RF: Auxiliary-Power
Nuclear-Power
Systems-for-Nuclear-Auxiliary-
Power

SNARK

RF: ICBM

SODIUM

RF: Alkali-Metals
Light-Metals

SODIUM-ACETYLIDES

RF: Acetylides

SODIUM-AMIDE

RF: Amides

SODIUM-AZIDE

RF: Azides

SODIUM-AZIDE-GRAIN

RF: Grains

SODIUM-BORATE

RF: Borates

SODIUM-BOROHYDRIDE

RF: Borohydrides

SODIUM-CARBIDE

RF: Carbides

SODIUM-CARBONATE

RF: Carbonates

SODIUM-CHLORIDE

RF: Chlorides

SODIUM-FLUOBORATE

RF: Fluoborate

SODIUM-HYDRIDE

RF: Metal-Hydrides

SODIUM-HYDROXIDE

RF: Hydroxides

SODIUM-METABORATE

RF: Metaborate

SODIUM-NITRATE

RF: Nitrate

SODIUM-REACTIONS

RF: Chemical-Reaction

SODIUM-RECOVERY

RF: Recovery

SODIUM-SALICYLATE

RF: Salicylates

SODIUM-STANNATE

RF: Stannates

SOLAR-ENERGY

RF: Energy
Power-Sources

SOLAR-FLARES

RF: Space-Environment

SOLAR-HEATING

RF: Heating

SOLAR-PROPULSION

RF: Propulsion

SOLAR-RADIATION

RF: Radiation

SOLAR-SIMULATION

SA: Carbon-Arc-Lamps
RF: Environmental-Test

SOLID-BORANE

SOLID-CORE-REACTOR

RF: Reactors

SOLID-OXIDIZERS

SA: Ammonium-Nitrate
Ammonium-Perchlor
Li-Perchlorate
Pellets
Potassium-Nitrate
Potassium-Perchlor
RF: Oxidizers
Solid-Propellants

Solid-Propellant-Hazards

S: Propellant-Hazards

SOLID-PROPELLANTS

SA: Aircraft-Fuels
ARCITE-368
ARCOCEL-333E
ARCOCEL-365
Asphalt
B-N-H-Propellants
Pellets
Propellant-Grains
Shaped-Charges
Smokeless-Propel
Solid-Oxidizers
Sponge-Propellant
RF: Fuels
Propellants

SOLID-SOLUTIONS

RF: Solutions

SOLID-STATE

SOLIDS

SOLUBILITY

SA: Diborane-Solubil

SOLUTIONS

SA: Chemical-Solutions
Heat-of-Solution
Liquid-Solutions
Numerical-Solution
Solid-Solutions

SOLVENT-MEDIA

SOLVENTS

SA: Organic-Solvents

SONIC-ENERGY

RF: Energy

SORPTION

SA: Absorption
Adsorption

SOUND

SA: Acoustics

SOUND-DISPERSION

SOUND-VELOCITY

RF: Velocity

SOUNDING-ROCKETS

SA: Arcon

Iris

Rocketsonde

RF: Rockets

SOURCE

SA: Energy-Sources

Error-Sources

Ion-Source

Ionization-Sources

Power-Sources

Thermal-Source

SOVIET-ROCKETS

RF: Rocket

SPACE-AGE

SPACE-BIOLOGY

RF: Bioastronautics

Space-Docking

S: Docking

SPACE-ENVIRONMENT

SA: Radiation

Solar-Flares

Vacuum-Environment

RF: Aerospace-Environment
Environment

SPACE-EXPLORATION

SPACE-LABORATORIES

RF: Laboratories

SPACE-MAINTENANCE

RF: Maintenance

SPACE-MANEUVERING

SA: Docking

Interception

Rendezvous

SPACE-MATERIALS

RF: Materials

SPACE-MISSIONS

SA: Lunar-Missions

Saturn-Missions

RF: Manned-Missions

SPACE-NAVIGATION

SA: Orbital-Mechanics

RF: Navigation

SPACE-PATROLS

RF: Active-Defense

Manned-Missions

SPACE-POWER-SYSTEM

SA: Radioisotopes

RF: Power-Systems

SPACE-PROBES

SA: Able-1-Project

Juno

Mariner

Ranger

Surveyor

Voyager

RF: Probes

SPACE-PROGRAMS

SPACE-PROPULSION

SA: Squid

RF: Propulsion

SPACE-SCIENCES

SA: Aerospace-Research

Bioastronautics

Orbital-Mechanics

SPACE-STATIONS

SA: Satellites

SPACE-SYSTEMS

SPACE-TECHNOLOGY

Space-Vehicles

S: Spacecraft

SPACECRAFT

SA: Apollo
Manned-Vehicles
Unmanned-Vehicles
RF: Aerospace-Vehicles
Space-Vehicles

SPACECRAFT-CONTROL

SA: Satellite-Control
RF: Control-Systems

SPACECRAFT-COSTS

RF: Costs

SPACECRAFT-ENGINES

RF: Engine

SPALLATION

RF: Nuclear-Reaction

SPARK-EROSION

RF: Machining

SPARK-IGNITION

RF: Ignition

SPARK-SOURCE

SPARKS

SA: Electric-Sparks

SPARROW

RF: Air-to-Air

SPECIFIC-ENERGY

RF: Energy

SPECIFIC-GRAVITY

RF: Gravity

SPECIFIC-HEAT

RF: Heat

SPECIFIC-IMPULSE

RF: Acetylene

SPECIFIC-WEIGHT

RF: Weight

SPECIFICATIONS

RF: Standards

SPECTRA

SA: Borane-Spectra
Emission-Spectra
Flame-Spectra
Infrared-Spectra
Mass-Spectra
Vibration-Spectra

SPECTRAL-ANALYSIS

RF: Analysis

SPECTRAL-EMITTANCE

RF: Emittance

SPECTRAL-OPACITIES

RF: Opacities

SPECTRAL-RADIANCE

RF: Radiance

SPECTROGRAPHY

SA: Mass-Spectrography

SPECTROMETER

SA: Mass-Spectrometer
R-F-Spectrometer
Vapor-Detection
RF: Instruments

SPECTROMETRIC-ANAL

RF: Analysis
Spectrometric-Analysis

Spectrometric-Analysis

S: Spectrometric-Anal

SPECTROMETRY

SPECTROPHOTOMETERS

RF: Instruments

SPECTROSCOPY

SA: Flame-Spectroscopy
Infrared-Spectros

SPECTRUM-ANALYZER

RF: Analyzers

SPEED

SA: Detonation-Speed
Flame-Speed
High-Speed
Transonic-Speeds
Velocity
RF: Velocity

SPHERES

SA: Hemispheres
Inflated-Sphere
Liquid-Spheres

SPHERICAL-SHELLS

RF: Shells

SPIKE-NOZZLE-MOTOR

SA: Leapfrog
RF: Motors

SPIN-DYNAMICS

SPONGE-PROPELLANT

RF: Solid-Propellants

SPONTANEOUS-IGNIT

RF: Ignition
Spontaneous-Ignition

Spontaneous-Ignition

S: Spontaneous-Ignit

SPOON-TYPE-PUMPS

RF: Pumps

SPRAY-COMBUSTION

RF: Combustion

SPRAY-COOLED

RF: Cooling

SPRAY-FORMATION

SA: Atomization
RF: Formation

SPRAY-IGNITION

RF: Ignition

SPRAY-INJECTOR

RF: Injectors

SPRAYS

SA: Aerosols
Atomized-Fuel
Burning-Sprays

SQUARE-WAVE-PULSE

RF: Pulse

SQUID

RF: Space-Propulsion

SS-AFC-77

RF: Stainless-Steel

SST

RF: High-Speed-Aircraft
Supersonic-Aircraft
Supersonic-Transports
Transports

STABILITY

SA: Chemical-Stability
Dynamic-Stability
Elastic-Stability
Flame-Stability
Flow-Stability
Instability
Longitudinal-Stab
Oxidizer-Stability
Ozone-Stability
Static-Stability
Storage-Stability
Temperature-Stabil
Thermal-Stability
Vehicle-Stability

STABILITY-ANALYSIS

RF: Analysis

STABILITY-GRADING

STABILITY-LIMITS

STABILITY-TESTS

RF: Tests

STABILIZATION

SA: Roll-Stabilization

STABILIZERS

STAGED-COMBUSTION

RF: Combustion

STAGNATION-TEMP

RF: Stagnation-Temperature
Temperature

Stagnation-Temperature

S: Stagnation-Temp

STAINLESS-STEEL

SA: SS-AFC-77

RF: Alloys
Steels

STAIL

STALL-LIMITS

STANDARD-ATMOS

RF: ARDC-Model-Atmosphere
Atmosphere
Standard-Atmosphere

Standard-Atmosphere

S: Standard-Atmos

STANDARDIZATION

STANDARDS

SA: Specifications
Welding-Standards

STANNATES

SA: Lead-Stannate
Sodium-Stannate

Star-Grains

S: Cruciform-Grains

STAR-TRACKERS

RF: Guidance

STARTER-MOTOR

RF: Motors

STARTING-FLOW

RF: Flow

STARTING-FLUID

RF: Fluids

STATIC-PRESSURE

RF: Pressure

STATIC-STABILITY

RF: Stability

STATIC-TEST-FIRING

RF: Engine
Motors
Test-Firing

STATISTICAL-DESIGN

RF: Design

STATISTICAL-STUDY

RF: Studies

STATISTICS

STEADY-STATE-BURN

RF: Burning
Steady-State-Burning

Steady-State-Burning

S: Steady-State-Burn

STEARIC-ACID

RF: Acids

STEEL-AISI-1020

STEEL-AISI-4130

STEEL-CASTING

RF: Casting

STEEL-PLATES

RF: Plates

STEELS

SA: Carbon-Steel
Cold-Worked-Steels
Low-Alloy-Steel
Maraging-Steels
Stainless-Steel
Tool-Steel

RF: Alloys

STEERING-MOTOR

RF: Motors

STERILIZATION

SA: Thermal-Steriliz

STORABILITY

STORAGE

SA: Acid-Storage
Chlorine-Storage
FNA-Storage
Helium-Storage
Hot-Storage
Missile-Storage
Propellant-Storage
Tanks

STORAGE-DRUMS

RF: Drums

STORAGE-FACILITIES

STORAGE-PROPERTIES

STORAGE-STABILITY

RF: Stability

STORAGE-SYSTEM

STORAGE-TANKS

RF: Tanks

STORAGE-TEST

RF: Test

STOWAGE-SAFETY

RF: Safety

STRAIN-AGING

RF: Aging

STRAIN-GAGE

RF: Gages

STRAIN-RATE

SA: High-Strain-Rate

STREAMLINED-BODIES

SA: Drag

STRENGTH

SA: Compressive-Streng
Fatigue-Strength
Fracture-Toughness
High-Strength
Impact-Strength
Medium-Strength
Tensile-Strength
Yield-Strength

STRESS

SA: Biaxial-Stress
Reentry-Stress
Thermal-Stress

STRESS-ANALYSIS

RF: Analysis

STRESS-CORROSION

RF: Corrosion

STRESS-EFFECTS

STRESS-FIELDS

STRESS-GAGE

RF: Gages

STRESS-INTERACTION

STRESS-RUPTURE

RF: Fracture

STRETCH-FORMING

RF: Forming

STROBE-CONTROL

RF: Cameras
Controls

STRONTIUM

RF: Light-Metals

STRUCTURAL-ANAL

RF: Analysis
Structural-Analysis

Structural-Analysis

S: Structural-Anal

STRUCTURAL-DESIGN

RF: Design

STRUCTURAL-JOINTS

RF: Joints

STRUCTURAL-LAMINAT

RF: Laminates

Structural-Laminates

Structural-Laminates

S: Structural-Laminat

STRUCTURAL-METALS

RF: Metals

STRUCTURAL-PLASTIC

RF: Plastics

STRUCTURES

SA: Aerospace-Structur
Aircraft-Structure
Be-Structures
Chemical-Structure
Clustering-Struct
Crystal-Structure
Cylinder-Structure
Dynamic-Response
Elastic-Structures
Honeycomb-Struct
Metal-Column
Molecular-Struct
Plates
Protective-Struct
Shell-Structures

STUDIES

SA: Aging-Study
Animal-Studies
Ballistic-Studies
Borane-Studies
Cavitation-Studies
Coating-Studies
Combustion-Studies
Corrosion-Studies
Design-Studies
Detonation-Studies
Diffuser-Studies
Engine-Studies
Enzyme-Studies
Flame-Studies

Flow-Studies

Graphite-Studies

Ignition-Studies

Infrared-Studies

Kinetic-Studies

Logistics-Studies

Low-Temp-Studies

Mockup-Studies

Optical-Studies

Parametric-Studies

Sensitivity-Study

Statistical-Study

Tests

Thermal-Studies

RF: Research

STYRENE

SA: Polystyrene

STYRENE-MONOMER

RF: Monomers

SUBASSEMBLIES

SA: Engine-Subassembly

Subatmospheric-Pressure

S: Low-Pressure

SUBCOOLED-WATER

RF: Water

SUBMARINE-MISSILES

SA: Polaris

RIGEL

RF: Missile

SUBMARINE-POWER

RF: Power

SUBMARINE-PROPULS

RF: Propulsion

Submarine-Propulsion

Submarine-Propulsion

S: Submarine-Propuls

SUBMARINES

RF: Undersea-Warfare

SUBSONIC-FLOW

RF: Flow

SUBSYSTEMS

SA: Engine-Subsystem
Vehicle-Subsystems

SULFATE-WOOD-PULPS

RF: Nitrocellulose
Wood-Pulps

SULFIDES

SA: Antimony-Sulfide
Metal-Sulfides
Polysulfide

SULFUR

SULFUR-COMPOUNDS

RF: Compounds

SULFURIC-ACID

RF: Acids

SUPER-FUELS

RF: Fuels

SUPERALLOYS

SA: Highstrength-Alloy
Nonferrous-Alloys
RF: Alloys

Superatmospheric-Pressure

S: Atmospheric-Press
High-Pressure
Pressure

SUPERCONDUCTORS

RF: Conductors

Supersonic-Aircraft

S: SST

SUPERSONIC-DRAG

RF: Drag

SUPERSONIC-FLIGHT

RF: Flight
High-Mach-Number
High-Speed-Flight

SUPERSONIC-FLOW

RF: Flow

SUPERSONIC-NOZZLE

RF: Nozzles

Supersonic-Transports

S: SST

SURFACE-EFFECTS

SURFACE-TEMP

RF: Surface-Temperature
Temperature

Surface-Temperature

S: Surface-Temp

SURFACE-TENSION

SURFACE-TO-AIR

SA: Talos
Tartar
Terrier
RF: Missile
Rocket

SURFACE-TO-SURFACE

SA: Little-John
Polaris
Sergeant
Titan
RF: Missile
Rocket

SURVEILLANCE

SA: Intercept-System
Reconnaissance
RF: Active-Defense
Global-Surveillance

SURVEYOR

RF: Lunar-Probes
Space-Probes

SUSPENSIONS

SA: Emulsions
RF: Colloidal-Suspensions

SWEAT-COOLING

RF: Cooling

SYMPOSIA

RF: Symposium

Symposium

S: Symposia

SYNTHESIS

SA: Chemical-Synthesis
Low-Temp-Synthesis
Reagents
Reduction

SYNTHETIC-CHEM

RF: Chemistry
Metallo-Organic-Chemistry
Synthetic-Chemistry

Synthetic-Chemistry

S: Synthetic-Chem

SYSTEM-CONSID

RF: Considerations
Human-Factors
System-Considerations

System-Considerations

S: System-Consid

SYSTEM-DESIGN

RF: Design

SYSTEM-COSTS

RF: Costs

SYSTEMS-ANALYSIS

RF: Analysis
Management

Systems-for-Nuclear-Auxiliary-Power

S: SNAP

TACTICAL-MISSILES

SA: Condor
Maverick
Shillelagh
RF: Missile

TACTICAL-SYSTEMS

RF: Limited-Warfare

TALIANI-TEST

RF: Tests

TALOS

SA: Typhon
RF: Bumblebee-Project
SAM-N-6
Surface-to-Air

TANK-DESIGN

RF: Design

TANK-DEVELOPMENT

TANK-DRAINAGE

TANK-LINERS

RF: Fuel-Tanks
Liners

TANK-MATERIALS

RF: Materials

TANK-OUTLET

TANK-TESTS

RF: Tests

TANKAGE

TANKAGE-PROGRAM

TANKS

SA: Acid-Tanks
Al-Tanks
Auxiliary-Tanks
Containers
Cryogenic-Tanks
Cylindrical-Tanks
Drop-Tanks
Drums
Expulsion-Tank
Feed-Tanks
Fuel-Tanks
Insulated-Tanks
Light-Weight-Tanks
LOX-Tanks
Nitrogen-Tanks
Plastic-Tanks
Pressure-Vessels
Propellant-Tanks

Semi-Trailer-Tanks	Combustion-Temp
Storage-Tanks	Critical-Temp
Titanium-Tanks	Cryogenic-Temp
Welded-Tanks	Cyclic-Temperature
RF: Storage	Elevated-Temp
TANTALUM	Flame-Temperature
RF: Refractory-Metals	Fuel-Temperature
TANTALUM-ALLOY	High-Temperature
RF: Alloys	Ignition-Temp
TANTALUM-BORIDE	Low-Temperature
RF: Borides	Melting-Temp
TANTALUM-CARBIDES	Stagnation-Temp
RF: Carbides	Surface-Temp
TANTALUM-DIAPHRAGM	Variable-Temp
RF: Diaphragms	Wall-Temperature
TAPERED-CHANNEL	TEMPERATURE-COEF
RF: Channel	RF: Coefficients
TAPERED-SHELLS	Temperature-Coefficients
RF: Shells	Temperature-Coefficients
TARTAR	S: Temperature-Coef
RF: Surface-to-Air	TEMPERATURE-CON
TARTAR-PLENUM-CHAM	RF: Control-Systems
RF: Chambers	Temperature-Control
Tartar-Plenum-Chamber	TEMPERATURE-MEAS
Tartar-Plenum-Chamber	SA: Calorimeter
S: Tartar-Plenum-Cham	Thermocouple
Technical-Proposals	RF: Temperature-Measurement
S: Proposals	Temperature-Measurement
TEFLON	S: Temperature-Meas
SA: Reinforced-Teflon	TEMPERATURE-PROFIL
TELEMETRY	RF: Temperature-Profiles
RF: Communications	Temperature-Profiles
TEMPERATURE	S: Temperature-Profil
SA: Air-Temperature	TEMPERATURE-RANGE
Ambient-Temp	TEMPERATURE-RATE
Burner-Tip-Temp	TEMPERATURE-SENSIT
Burning-Temps	RF: Sensitivity
	Temperature-Sensitivity

Temperature-Sensitivity
S: Temperature-Sensit

TEMPERATURE-SHOCK
RF: Shock

TEMPERATURE-STABIL
RF: Stability
Temperature-Stability

Temperature-Stability
S: Temperature-Stabil

TEMPERATURE-SURVEY

TENSILE-PROPERTIES

TENSILE-RUPTURE

TENSILE-STRENGTH
RF: Strength

TENSILE-TESTS
RF: Tests

TENSIOMETERS
RF: Instruments

TENSOR-ANALYSIS
RF: Analysis
Theory-of-Shells

TERMINAL-BALLISTIC
RF: Ballistics

TERMINAL-GUIDANCE
RF: Guidance

TERNARY-PHASE

TERNARY-SYSTEMS

TERRIER
RF: Surface-to-Air

TERRIER-BOOSTER
RF: Boosters

TEST-CELLS
SA: Altitude-Cells

TEST-DATA

TEST-EQUIPMENT
SA: Altitude-Test-Cell
Altitude-Test-Cham
Simulators
Test-Stands

TEST-FACILITY
SA: Altitude-Facility
Laboratories
Research-Facility
RF: Laboratories
Research-Facility

TEST-FIRING
SA: Static-Test-Firing

TEST-METHODS
SA: Simulation

TEST-MISSIONS
RF: Missions

TEST-PROCEDURES

TEST-PROGRAM

TEST-PROJECTS

TEST-REPORT
RF: Publications

TEST-RESULTS

TEST-SPECIMENS

TEST-STANDS
RF: Test-Equipment

TEST-VEHICLES
RF: Vehicles

TESTS
SA: Accelerated-Tests
Acceleration-Tests
Acetylene-Tests
Al-Tensile-Tests
Altitude-Tests
Ballistic-Test
Combustion-Tests

Component-Tests	THEORETICAL-ANAL
Compression-Tests	RF: Analysis
Cooling-Tests	Theoretical-Analysis
Corrosion-Testing	
Demonstration-Test	Theoretical-Analysis
Detonation-Tests	S: Theoretical-Anal
Engine-Testing	
Environmental-Test	Theoretical-Flow
Explosive-Tests	S: Flow-Theory
Fatigue-Tests	
Feasibility-Test	THEORY-OF-SHELLS
Flight-Tests	SA: Tensor-Analysis
Fuel-Tests	RF: Shells
Full-Power-Run	
Heating-Tests	THERMAL-ANALYSIS
Ignition-Tests	RF: Analysis
Injector-Tests	
Module-Tests	THERMAL-BARRIER
Nuclear-Tests	
Performance-Tests	THERMAL-CONDUCT
Porosity-Test	RF: Air
Qualification-Test	Heat-Conductivity
Rocket-Testing	Thermal-Conductivity
Stability-Tests	S: Thermal-Conduct
Storage-Test	
Taliani-Test	THERMAL-CONTROL
Tank-Tests	SA: Reflective-Coating
Tensile-Tests	RF: Control-Systems
Vibration-Tests	
Vortex-Tests	Thermal-Control-Coatings
Welding-Test	S: Reflective-Coating
RF: Studies	
TETRABORANE	THERMAL-DATA
RF: Borane	
TETRABORIDE	THERMAL-DECOMP
RF: Borides	RF: Decomposition
	Thermal-Decomposition
TETRAFLUORIDE	
RF: Fluoride	Thermal-Decomposition
	S: Thermal-Decomp
TETRANITRATE	
RF: Nitrate	THERMAL-DEGRADAT
	RF: Degradation
TETRAZOLFS	Thermal-Degradation
	S: Thermal-Degradat
THALLIUM	

THERMAL-DIFFUSION
RF: Diffusion

THERMAL-EFFECTS

THERMAL-ENVIRON
RF: Environment
Thermal-Environment

THERMAL-EROSION
RF: Erosion

THERMAL-EXPANSION
RF: Expansion

THERMAL-EXPLOSIONS
RF: Explosion

THERMAL-IGNITION
RF: Ignition

THERMAL-MODELING
RF: Simulation

THERMAL-OXIDATION
RF: Oxidation

THERMAL-PERFORM
RF: Performance
Thermal-Performance

Thermal-Performance
S: Thermal-Perform

THERMAL-PROTECTION
RF: Coatings
Insulation
Protection

THERMAL-RADIATION
RF: Radiation

THERMAL-SENSITIV
RF: Sensitivity
Thermal-Sensitivity

Thermal-Sensitivity
S: Thermal-Sensitiv

THERMAL-SHOCK
RF: Shock

THERMAL-SOURCE
RF: Source

THERMAL-STABILITY
RF: Stability

THERMAL-STERILIZ
RF: Sterilization
Thermal-Sterilization

Thermal-Sterilization
S: Thermal-Steriliz

THERMAL-STRESS
RF: Stress

THERMAL-STUDIES
RF: Studies

THERMAL-UPDRAFT
RF: Updraft

THERMIONIC-POWER
RF: Power

THERMOCHEMISTRY
RF: Chemistry

THERMOCOUPLE
RF: Temperature-Meas

THERMODYNAMIC-ANAL
RF: Analysis
Thermodynamic-Analysis

Thermodynamic-Analysis
S: Thermodynamic-Anal

THERMODYNAMIC-FUNC
RF: Functions
Thermodynamic-Functions

Thermodynamic-Functions
S: Thermodynamic-Func

THERMODYNAMIC-PROP
RF: Thermodynamic-Properties

Thermodynamic-Properties
S: Thermodynamic-Prop

THERMODYNAMICS

SA: Aerothermodynamics
Entropy
RF: Aerothermodynamics

THERMOELECTRIC-GEN

SA: Radioisotopes
RF: Generators
Thermoelectric-Generator

Thermoelectric-Generator

S: Thermoelectric-Gen

THERMOELEMENTS

THERMOJET-ENGINE

RF: Engine

THERMOLUMINESCENCE

RF: Luminescence

Thermonuclear-Propulsion

S: Nuclear-Propulsion

THERMOPLASTICS

RF: Plastics

THESIS

RF: Publications

THIN-SHEETS

SA: Coated-Thin-Sheets
RF: Sheets

THIN-SHELLS

RF: Shells

THOR

RF: IRBR

THOR-AGENA

RF: Boosters

THORIA

RF: Refractories

THORIUM

THREE-BODY-PROBLEM

SA: Perturbation
RF: Bodies

THROAT-EROSION

RF: Erosion

THROAT-THROTTLING

RF: Throttling

THROATS

SA: Nozzle-Throats

THROTTLE-VALVE

RF: Valves

THROTTLING

SA: Injector-Throttle
Throat-Throttling

THRUST

SA: Dual-Thrust-Motor
High-Thrust
Injector-Thrust
Low-Thrust
Microthrust
Optimum-Thrust
Rocket-Thrust
Variable-Thrust

THRUST-AUGMENT

SA: Afterburner
JATO
RF: Thrust-Augmentation

Thrust-Augmentation

S: Thrust-Augment

THRUST-CHAMBER

SA: Ablation-Materials
RF: Chambers

THRUST-COEFFICIENT

RF: Nozzle-Design

THRUST-CONTROL

RF: Controls

THRUST-CYLINDERS

RF: Cylinders

THRUST-EFFICIENCY

THRUST-MODULATION

THRUST-RATING

TI-3AL-11CR-13V
RF: Beta-Titanium

TI-6AL-4V
RF: Titanium-Alloy

TI-7AL-(3-4)MO
RF: Titanium-Alloy

TIG-WELDING
RF: Welding

TIME-INTERVALS
RF: Accuracy

TITAN
RF: ICBM
Surface-to-Surface

TITANIUM

TITANIUM-ALLOY
SA: Alpha-Titanium
Beta-Titanium
TI-6AL-4V
TI-7AL-(3-4)MO
RF: Alloys

TITANIUM-BORIDE
RF: Borides

TITANIUM-CARBIDE
RF: Carbides

TITANIUM-CORROSION
RF: Corrosion

TITANIUM-MACHINING
RF: Alloy-Machining
Machining

TITANIUM-SHEET
RF: Sheets

TITANIUM-TANKS
RF: Tanks

TITANOUS-CHLORIDE
RF: Chlorides

TNT

S: Trinitrotoluene

TOLUENE

SA: Trinitrotoluene
RF: Hydrocarbons

TOOL-STEEL

RF: Steels

TOOLING

TOOLING-COSTS
SA: Low-Cost-Tooling
RF: Costs

TORPEDO-BOOSTER
RF: Boosters

TOW-FLIGHT
RF: Flight

TOWING

TOWING-CHANNEL
RF: Channel

TOXICITY

SA: Ammonia-Toxicity
Antidotes
Be-Toxicity
Blood-Serum
Borane-Toxicity
Chemical-Safety
Fuel-Toxicity
Health-Hazards
RF: Health-Hazards

TOXICOLOG.

TRACERS

RF: Ammunition
Pyrotechnics

TRAJECTORIES

SA: Optimum-Traject

TRANSCRIBERS

SA: Magnetic-Tape

TRANSDUCERS

SA: Digital-Transducer
Force-Transducer
Nickel-Transducers

TRANSITION-METALS

RF: Metals

TRANSMISSION

TRANSMITTANCE

RF: Absorptance

TRANSMITTERS

TRANSONIC-AIRCRAFT

RF: Aircraft

TRANSONIC-FLOW

RF: Flow

TRANSONIC-SPEEDS

RF: Speed

TRANSPARENT-NOZZLE

RF: Nozzles

TRANSPIRATION-COOL

RF: Cooling
Transpiration-Cooling

Transpiration-Cooling

S: Transpiration-Cool

TRANSPORT-PHENOM

RF: Transport-Phenomena

Transport-Phenomena

S: Transport-Phenom

TRANSPORT-PROPERT

RF: Transport-Properties

Transport-Properties

S: Transport-Propert

TRANSPORTS

SA: Orbital-Transport
SST

TRANSPORTATION

TREAT

RF: Pulse-Reactor

TRIAZINE

RF: Azine

TRICHLORIDES

RF: Chlorides

TRIFLUORIDE

RF: Fluoride

TRIETHLYALUMINUM

RF: Aluminum

TRIMETHLY-AL-HYDRA

RF: Aluminum
Trimethly-Aluminum-Hydrazine

Trimethyl-Aluminum-Hydrazine

S: Trimethyl-Al-Hydra

TRIMETHYL-BORATE

RF: Borates

TRINITROTOLUENE

RF: Explosives
TNT
Toluene

TRITIUM

RF: Hydrogen-Isotope

TRITIUM-COMPOUNDS

TUBE

SA: Al-Tubing
Flame-Tube
Fuel-Tubes
Heated-Tube
Piston-Tube
Porous-Tube
Shock-Tube
Uranium-Tubes
Vortex-Tubes

TUBE-IGNITER

RF: Igniters

TUNGSTEN

RF: Refractory-Metals

TUNGSTEN-ALLOY

RF: Alloys

TUNGSTEN-BORIDE

RF: Borides

TUNGSTEN-SHEET

RF: Sheets

TURBINE-FUELS

RF: Fuels

TURBINES

SA: Gas-Turbines

TURBOJET-ENGINE

RF: Jet-Engine

TURECPUMPS

RF: Pumps

TURBOROCKET

SA: Air-Turborocket

RF: Rocket-Engine

TURBOROCKET-ENGINE

RF: Engine

TURBOROCKET-FUEL

RF: Fuels

TURBULENCE

SA: Atmosphere

Boundary-Layer

Grid-Turbulence

Updraft

Turbulent-Air

S: Air-Turbulence

CAT

HI-CAT

Quiescent-Air

TURBULENT-FLAME

RF: Flames

TURBULENT-FLOW

RF: Flow

TURBULENT-MIXING

TWO-BODY-PROBLEM

SA: Perturbation

RF: Bodies

TWO-PHASE-FLOW

RF: Flow

TYPHON

RF: Air-to-Air

Talos

U-H-F

RF: Radio-Frequency

Ultra-High-Frequency

UDIMET-500

RF: Nickel-Base-Alloy

UDMH

RF: Dimethyl-Hydrazine

Unsymmetrical-Dimethylhydrazine

ULEXITE

Ultra-High-Frequency

S: U-H-F

ULTRA-HIGH-IMPULSE

RF: Impulse

Ultra-High-Impulse-Propellant-Systems

S: Impulse-Propel-Sys

ULTRASONIC-ENERGY

RF: Energy

ULTRA-LOW-PRESSURE

SA: Vacuum

RF: Pressure

ULTRASONIC-WELDING

RF: Welding

ULTRAVIOLET-ANAL

RF: Analysis

Ultraviolet-Analysis

Ultraviolet-Analysis
S: Ultraviolet-Anal

UNCONTROLLED-BURN
RF: Burning
Uncontrolled-Burning

Uncontrolled-Burning
S: Uncontrolled-Burn

Unconventional-Weapons
S: Weapon-System
Weapons

UNDERSEA-WARFARE
SA: Submarines

UNDERWATER-EXPLOS
RF: Explosives
Underwater-Explosives

Underwater-Explosives
S: Underwater-Explos

UNMANNED-MISSIONS
RF: Manned-Missions

UNMANNED-VEHICLES
RF: Manned-Vehicles
Spacecraft
Vehicles

UNSTABLE-BURNING
RF: Burning

UNSTABLE-COMBUST
SA: Combustion-Instab
RF: Combustion-Instab
Unstable-Combustion

Unstable-Combustion
S: Unstable-Combust

Unsymmetrical-Dimethylhydrazine
S: UDMH

UPDRAFT
SA: Thermal-Updraft
RF: Turbulence

UPPER-ATMOSPHERE
SA: Ionosphere
RF: Atmosphere

URANIUM
RF: Refractory-Metals

URANIUM-DIOXIDE

URANIUM-OXIDES

URANIUM-RECOVERY
RF: Burn-Leach-Process
Recovery

URANIUM-TUBES
RF: Tube

UREAS

URETHANE
SA: Polyurethanes

VACUUM
SA: Low-Pressure
Ultra-Low-Pressure

VACUUM-DEGASSING
RF: Degassing

VACUUM-DEPOSITION
RF: Coatings
Deposition

VACUUM-EFFECTS
RF: Coatings-for-Aerospace-
Environment

VACUUM-ENVIRONMENT
RF: Environment
Space-Environment

VACUUM-TECHNIQUES

VACUUM-WELDING
RF: Welding

VALVES

SA: Cold-Valves
Gas-Valves
Quench-Valves
Servo-Valves
Shut-off-Valve
Throttle-Valve
Venturi-Valves
Water-Quench-Valve

VAN-ALLEN-BELT

SA: Argus-Effect
RF: Radiation
Van-Allen-Radiation-Belt

Van-Allen-Radiation-Belt
S: Van-Allen-Belt

VANADIUM

RF: Refractory-Metals

VANGUARD

RF: Launch-Vehicles

VAPOR

SA: Hydrazine-Vapor
Water-Vapor

VAPOR-BINDING

VAPOR-DEPOSITION

VAPOR-DETECTION

RF: Detection
Fume-Control
Launching-Hazards
Safety-Precautions
Spectrometer

VAPOR-DETONATION

RF: Detonation

VAPOR-PHASE

VAPOR-PRESSURE

SA: FNA-Vapor-Pressure
RF: Pressure

VAPORIZATION

VAPORIZERS

VARIABLE-IMPULSE

RF: Impulse

VARIABLE-TEMP

RF: Temperature
Variable-Temperature

Variable-Temperature
S: Variable-Temp

VARIABLE-THRUST

RF: Thrust

VECTOR-CONTROL

RF: Control-Systems

VEHICLE-ANALYSIS

RF: Analysis

VEHICLE-DESIGN

RF: Design

VEHICLE-SCALING

RF: Scaling

VEHICLE-STABILITY

RF: Stability

VEHICLE-STRUCTURE

RF: Structures

VEHICLE-SUBSYSTEMS

RF: Subsystems

VEHICLES

SA: Aerospace-Vehicles
Launch-Vehicles
Manned-Vehicles
Nuclear-Vehicles
Orbital-Vehicles
Reentry-Vehicles
Test-Vehicles
Unmanned-Vehicles

VELOCITY

SA: Burning-Velocity
Exhaust-Velocity
Flow-Velocities
High-Velocity
Hypervelocity
Impact-Velocity

Rocket-Velocity
 Sound-Velocity
 Speed
 RF: Speed

 VELOCITY-LAG
 SA: Particle-Lag

 VELOCITY-PROFILES

 VENTING

 VENTING-DEVICES

 VENTING-EXPERIMENT

 VENTURI-VALVES
 RF: Valves

 VENUS-PROBES
 SA: Voyager
 RF: Probes

 VERNIER-MOTOR
 RF: Motors

 VIBRATION-SPECTRA
 RF: Spectra

 VIBRATION-TESTS
 RF: Tests

 VIBRATIONS
 SA: Longitudinal-Vibra
 Missile-Vibration
 Oscillations
 RF: Oscillations

 VINYL
 RF: Plastics

 VINYL-CHLORIDE
 RF: Chlorides

 VINYL-FERROCENE
 RF: Ferrocene

 VINYL-PLASTISOL
 SA: Plastisol-Propel

VINYL-POLYMERS
 RF: Polymers

 VINYLATION

 VIRGINIUM
 RF: Alkali-Metals

 VISOELASTICITY
 RF: Elasticity

 VISCOSITY
 SA: Fuel-Viscosity
 RF: Flow-Velocities

 VISCOUS-VORTEX
 RF: Vortex

 VOLATILE-ALLOYS
 RF: Alloys

 VOLATILE-LIQUIDS
 SA: Acid-Volatility
 RF: Liquids

 VOLTMETERS
 RF: Instruments

 VORTEX
 SA: Confined-Vortex
 Jet-Driven-Vortex
 Primary-Vortex
 Secondary-Vortex
 Viscous-Vortex
 Water-Vortex

 VORTEX-CONTAINMENT

 VORTEX-CONTROL
 RF: Controls

 VORTEX-FLOWS
 RF: Flow

 VORTEX-INJECTION
 RF: Injection

 VORTEX-TESTS
 RF: Tests

VORTEX-TUBES

RF: Tube

VOYAGER

RF: Space-Probes
Venus-Probes

WALL-COOLING

RF: Cooling

WALL-TEMPERATURE

RF: Temperature

WARFARE

SA: Limited-Warfare

WARHEAD-WEIGHT

RF: Weight

WARHEADS

RF: Weapons

WARNING-DEVICES

RF: Safety-Precautions

WATER

SA: Heavy-Water
Subcooled-Water

WATER-CONTENT

WATER-FOG

WATER-MOLECULE

RF: Molecule

WATER-QUENCH-VALVE

RF: Valves

WATER-VAPOR

RF: Vapor

WATER-VORTEX

RF: Vortex

WAVE-GUIDES

WAVES

SA: Combustion-Waves
Deflagration-Wave
Detonation-Waves
Shock-Wave

WAX

SA: Candelilla-Wax

WEAPON-SYSTEM

SA: Airborne-Alert
Armament
Arms-Control
Missile-Systems
WS-
RF: Unconventional-Weapons

Weapon-System-Hazards

S: WS-Hazard

WEAPONS

SA: Artillery
Atomic-Weapons
Ballistics
Guns
Nuclear-Weapons
Small-Arms
Warheads
RF: Unconventional-Weapons

WEAPONS-RESEARCH

SA: Gun-Firings
RF: Research

WEAR

SA: Friction
RF: Maintenance

WEAR-EVALUATION

WEAR-PROBLEMS

WEIGHT

SA: Engine-Weights
Gross-Weight
Inert-Weight
Light-Weight
Molecular-Weight
Payload-Weight
Specific-Weight
Warhead-Weight

WEIGHT-ANALYSIS

RF: Analysis

WEIGHT-PREDICTION

WEIGHTLESSNESS

RF: Bioastronautics

WELDABILITY

SA: Alloy-Weldability

WELDED-FITTINGS

RF: Fittings

WELDED-TANK-JOINTS

RF: Joints

WELDED-TANKS

RF: Tanks

WELDING

SA: Al-Welding
Arc-Welding
Cold-Welding
Columbium-Welding
Electron-Beam-Weld
Flash-Welding
Fusion-Welding
Laser-Beam-Welding
Plasma-Arc-Welding
Resistance-Welding
TIG-Welding
Ultrasonic-Welding
Vacuum-Welding

RF: Joining

WELDING-INSPECTION

SA: Al-Welding-Inspect
RF: Inspection

WELDING-RESEARCH

RF: Research

WELDING-STANDARDS

RF: Standards

WELDING-TECHNIQUES

WELDING-TEST

RF: Tests

WFNA

SA: Acid subheadings

IRFNA

IWFNA

Nitric-Acid

RFNA

RF: Acids

Anhydrous-Nitric-Acid

Liquid-Oxidizers

White-Fuming-Nitric-Acid

WFNA-Hazard

S: Nitric-Acid-Hazard

WHEELS

SA: Inertia-Wheel

WHISKER-GROWTH

WHISKERS

SA: Alumina-Whiskers

Carbon-Fibers

Iron-Whiskers

RF: Filaments

White-Fuming-Nitric-Acid

S: WFNA

WIND

SA: Cross-Wind-Deflect

WIND-TUNNEL

SA: Blowdown-Tunnel

Shock-Tunnel

WIND-TUNNEL-MODELS

RF: Models

WINGS

SA: Delta-Wings

Wire

S: Metal-Wire

WIZARD

RF: Antimissiles

WOOD-PULPS

SA: Sulfate-Wood-Pulps

WORMHOLE-BURNING

RF: Burning

WS-107A

SA: Weapon-System

RF: Atlas

WS-133A

SA: Minuteman

WS-321A

SA: Bullpup

WS-HAZARDS

SA: Accidental-Firing

Explosion-Hazards

RF: Accident-Hazards

Launching-Hazards

WS-SR-199

RF: Penetration-Aids

X-RAY-DIFFRACTION

RF: Diffraction

X-RAYS

XENON

RF: Rare-Gas-Compounds

XSSM-N-6

S: RIGEL

YIELD-STRENGTH

RF: Strength

YOUNGS-MODULUS

RF: Elastic-Moduli

Elasticity

YTTRIUM

RF: Rare-Earth-Metals

ZEOLITES

ZERO-G

RF: Gravity

Low-G

Zero-Gravity

ZERO-G-CONTROL

RF: Control-Systems

Gravity-Control

Zero-Gravity

S: Zero-G

ZINC

RF: Metals

ZINC-CHLORIDE

RF: Chlorides

ZINC-COATINGS

RF: Coatings

ZINC-OXIDE

ZIRCONIA

RF: Refractories

ZIRCONIUM

RF: Refractory-Metals

ZIRCONIUM-BORIDE

RF: Borides

ZIRCONIUM-CARBIDE

RF: Carbides

ZONING-TECHNIQUES

ZUNI

RF: Missile

ZUNI-GRAINS

RF: Grains

Section IV
SUPPRESSED WORD LIST

ABLE
ABOUT
ABOVE
ACCEPT
ACCEPTANCE
ACCOMPANY
ACCOMPANYING
ACCORD
ACCORDING
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ACTION
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A modified Keyword Out of Context (KWOC) system was developed to gain rapid control over more than 8,000 scattered, unindexed documents. This was the first step in providing the technical information support required by Air Force Rocket Propulsion Laboratory scientists and engineers. Implementation of the KWOC system, computer routines, and progress made during the course of the contract are described. Results are evaluated and recommendations for a total technical information program are presented. Complete, detailed procedures for operating the system are provided in the appendix. This includes an extensive, cross-referenced thesaurus.		

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