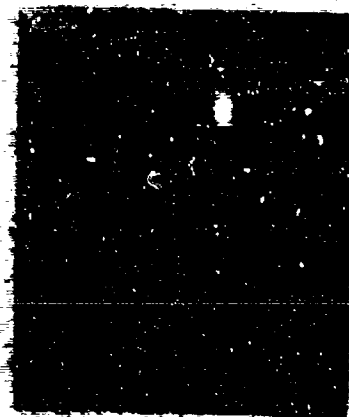


DE40114



BOOZ · ALLEN APPLIED RESEARCH INC.

CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION			
Subject	Microfilm		
1,00	1,50	21	72
1 ARCHIVE COPY			

DDC
RECEIVED
OCT 17 1966
A

Distribution of this
Document is Unlimited

Technical Report

AD 640 114

MECHANIZATION STUDY
OF THE AIR FORCE
INSTITUTE OF TECHNOLOGY LIBRARY,
WRIGHT-PATTERSON AFB, OHIO

Submitted to

Defense Supply Agency
Defense Documentation Center
Cameron Station, Virginia

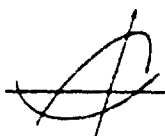
by

Booz, Allen Applied Research Inc.
4733 Bethesda Avenue
Bethesda, Maryland 20014

Under Contract No. DSA-7-15489

BAARINC Report No. 914-1-19

September 1966



BOOZ·ALLEN APPLIED RESEARCH INC.

WASHINGTON
CLEVELAND
CHICAGO
LOS ANGELES

Best Available Copy

ABSTRACT

The Air Force Institute of Technology (AFIT) Library uses an IBM 1401 computer to produce a list of journal holdings, alphabetically arranged and provided with an abbreviation glossary. At present, one list has been produced and circulated. Input to the system is EAM cards with journal data. Because of difficulties in obtaining use of the computer--which is not owned by the Library--within a reasonable time, the Library has decided to abandon computer mechanization and to use instead Library-owned Flexowriter equipments interfaced with supplemental EAM card punch, sorter, and reader.

TABLE OF CONTENTS

	<u>Page Number</u>
ABSTRACT	ii
I. SUMMARY	1
II. MECHANIZATION	3
1. Chronology	3
2. Description of Processes	3
(1) Input Procedures	4
(2) Output	5
3. Major Problems	5
4. Activities Being Planned or Developed for Mechanization	6
III. DEVELOPMENT COSTS	8

A P P E N D I C E S

- A. ORGANIZATION OF AFIT
- B. PROGRAM SYSTEM FLOW DIAGRAMS
AND SAMPLE PRINTOUTS

I. SUMMARY

The Air Force Institute of Technology (AFIT) Library uses a computer to produce a list of journal holdings. Input to this operation consists of EAM cards with journal data; output is the journal holdings list alphabetically arranged and provided with an abbreviation glossary. To date, one such list has been produced and circulated. The program used is written in SPS language for the IBM 1401 computer.

AFIT is a part of the Air University system. Its organization, charted in Appendix A, includes a School of Engineering, a Civil Engineering Center, a School of Systems and Logistics, and a Defense Weapons Systems Management Center. AFIT also conducts the Minute-man Educational Program at five western sites. It is a graduate school and is accredited for both undergraduate and master's degrees. A doctoral program was initiated in June 1965. The Library is, therefore, an educational library rather than a technical library for professional workers.

The Library serves a resident student population of about 600 with 75,000 books, 1,250 periodicals, 25,000 documents, and 3,000 theses. The monthly circulation rate is 3,000 books and theses,

10,600 periodical titles, and 1,800 documents. There are over 105,000 AEC titles and 1,600 documents on microform. The stacks are open for all users. Bibliographic searches are not performed for students. Rather, an effort is made by the staff to instruct them in the methods of searching on their own. Materials are selected by the Library staff and by instructors. Library of Congress cards are used for cataloging, and classification is by the Dewey Decimal System. New books and reports are announced in a manually produced, semi-monthly acquisitions list.

II. MECHANIZATION

1. CHRONOLOGY

In January 1965, the AFIT data center was consulted about the feasibility of mechanizing production of the journal holdings list. This step was taken to reduce the steadily rising manual bookkeeping effort and to develop a background in mechanization for educational purposes. After feasibility was established, program development began immediately, leading to the first printing of the list in June 1965. The steps in this development were as follows:

- . Selected data for EAM card punching
Entered 1,540 titles on EAM card worksheet
- . Punched cards and programmed 1401
- . Checked EAM cards
- . Printed out list for proofreading
- . Made final printout

2. DESCRIPTION OF PROCESSES

The system flow diagrams of the program for producing the journal holdings list, and examples of the printouts, are shown in

Appendix B. Input data are punched onto 80-column EAM cards in Hollerith code. The program reads the cards (assembled alphabetically) and prints the information punched on them on sheets in a format suitable for binding in the list of journal holdings.

(1) Input Procedures

The following data are punched on an EAM card
for each title:

<u>Card Columns</u>	<u>Data</u>
1-41	Title
42-45	Number of entry
47	Mark to indicate title change
49-52	Number of former title (if any)
54-57	Number of new title
59-61	Starting volume
63-65	Ending volume
67-69	Starting year
71-73	Ending year
75	Microform or hard copy
77-80	Library location

In order to confine the data to one card per title, subscription information is not included, nor is there an indication of gaps in the holdings. Five decks of these cards have been punched: one is manually updated for the next list printout, one is hand sorted for renewal date (the journal expiration date is typed on manually), and three decks are for branch library reference.

(2) Output

The program produces the holdings list arranged alphabetically as shown in Appendix B-6. Each title is assigned a number which forms a cross-reference between a superseded title and its replacement. In addition, nine columns of data are listed which describe the holdings. The abbreviations used for these columns are explained in a printout referred to as the Column Heading Identification and Location Code Definitions List (Appendix B-4). Also on this sheet is a list of library branch code identifications. Abbreviations used in the journal titles are defined in a printout called an Abbreviation Glossary (Appendix B-2). Information for the Glossary and Column Heading Identification printouts is fixed and entered as part of the program.

3. MAJOR PROBLEMS

Development of the program and production of the first mechanized list took nearly six months. It was estimated that a clerk-typist could have typed the same information on multilith mats in less than two weeks. The delay was due to inexperience in the programming, card errors, and format revisions. It is expected that updating the list in the future, besides being a simpler process than producing the first list, will benefit from experience and will require much less time.

Another problem resulted from the fact that, in order to simplify bookkeeping and programming, journal data were confined to one EAM card per title. This limitation presented a problem both in establishing what data to include and in the file weakness that resulted from the exclusion of such data as gap and renewal information and costs. However, data on gaps (unless very broad), renewal periods, and costs were not essential to a Library holdings list.

There were difficulties in obtaining use of the computer within a reasonable time. Because of this, the Library has decided to abandon computer mechanization in favor of operations with Library-owned Flexowriter equipments interfaced with supplemental EAM card punch, sorter, and reader.

4. ACTIVITIES BEING PLANNED OR DEVELOPED FOR MECHANIZATION

Four years ago the Institute began giving courses in reliability and maintainability. The Library has been collecting and cataloging a large collection of documents on this subject and has been distributing to the students a bibliography, on cards, of the collection.

A deck of EAM cards is hand sorted in the Library by renewal dates and is used for manually preparing renewal lists. The Library possesses a Programmatic Flexowriter and has a Selectadata Flexowriter on order. (The latter machine will print out selected data from

an input of punched tape or edge-punched cards.) Plans are to utilize this equipment to produce edge-punched Flexowriter cards that will contain information for periodical renewals. These data would be punched at the time the periodical is ordered. There is also a plan to acquire interface accessories which will automatically feed and punch EAM cards from the Flexowriter keyboard.

The Library also wishes to mechanize the ordering and processing of new books. The necessary information would be put into the mechanized record at the time the book is ordered and would be used later to produce charge cards, catalog cards, labels, etc.

Some degree of mechanization of the circulation processes is planned when the size of the circulation warrants it. It is estimated that this will be when the daily circulation, now about 200, reaches 1,000 or more. The Librarian feels that development of sophisticated mechanization should proceed slowly, and that the first activities to be mechanized should be those that are clerical and repetitive; this would free the staff for other tasks. The philosophy is that students should learn to make literature searches manually, since most of their assignments after graduation will not provide mechanized information retrieval services.

III. DEVELOPMENT COSTS

The Library staff spent time working on the program as follows:

6 man-hours developing format

30 man-hours preparing EAM card worksheets
for 1,540 titles

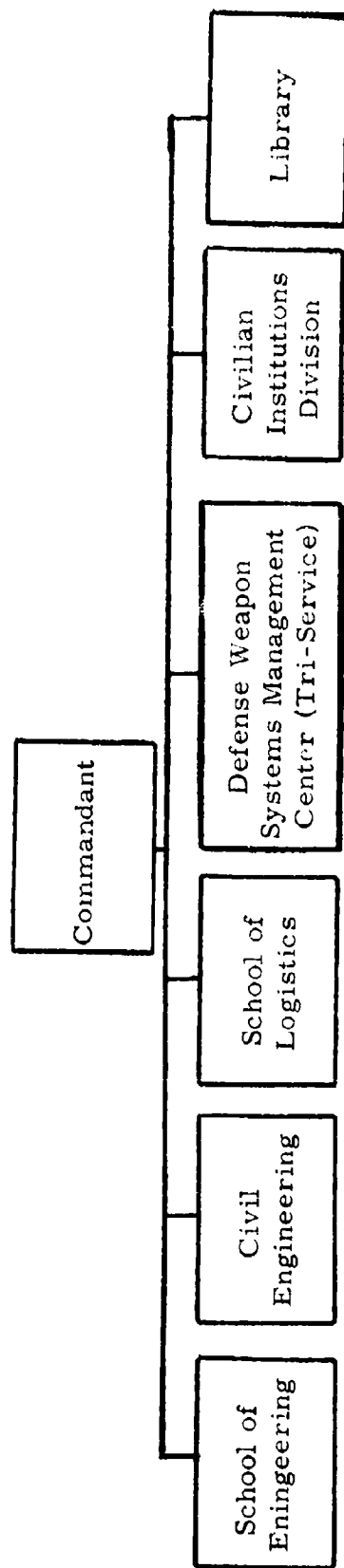
12 man-hours checking punched EAM cards

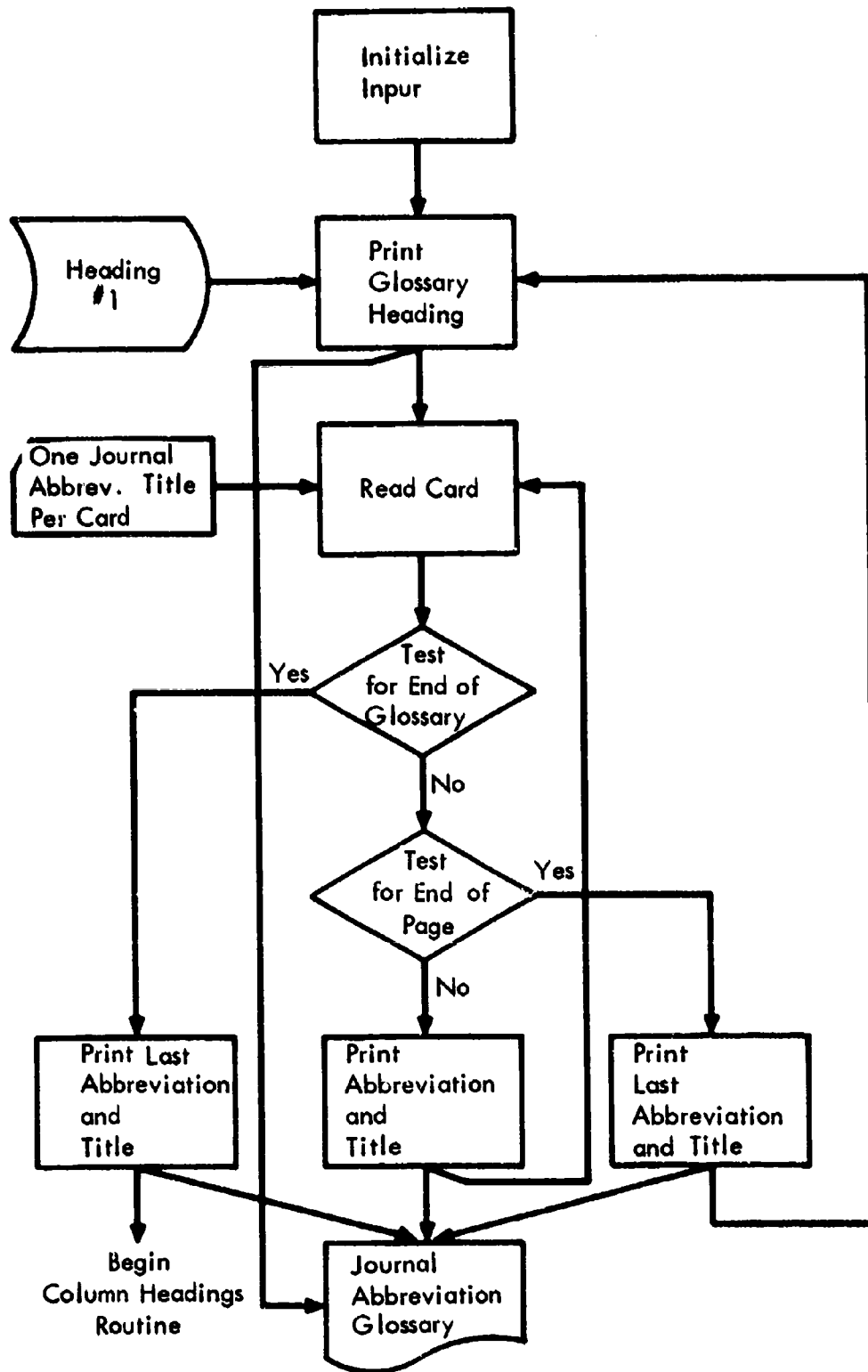
12 man-hours proofreading printout

The cost of this time is estimated at \$300.

No cost information was available from the AFIT data center, since the program that was developed was one of the first programs produced by the center and was considered largely experimental.

AIR FORCE INSTITUTE OF TECHNOLOGY

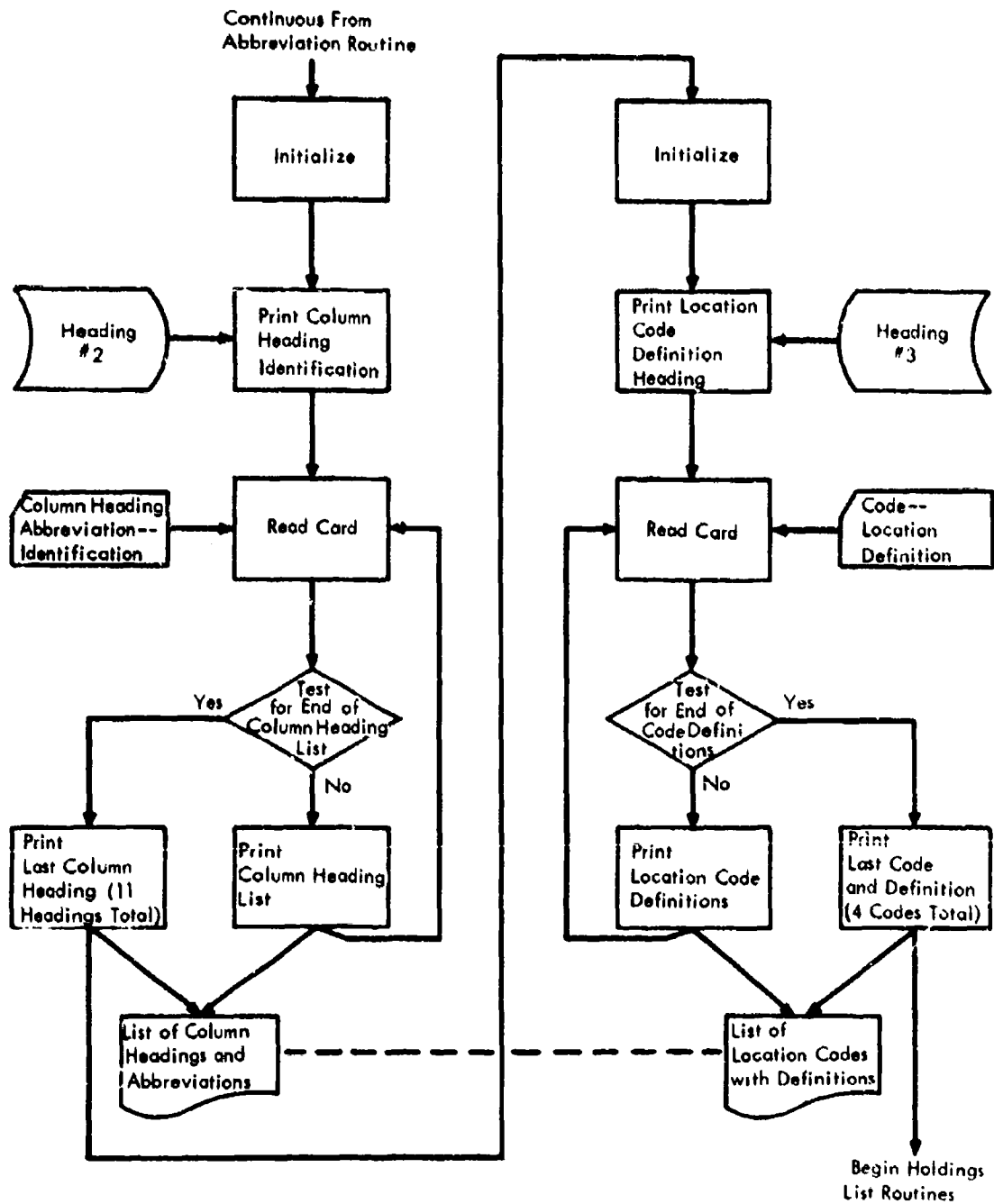




Print Journal Abbreviation
Glossary Routine

Abbreviation Glossary

ABBREVIATION	TITLE	PAGE
ASTRONAUTICAL	ASTRONAUTICAL ASTRONAUTICS	3
ASTRO	ASTRONOMICAL ASTRONOMY	
ATM	ATMOSPHERIC	
AUSTRAL	AUSTRALIEN AUSTRALIA	
AVIAT	AVIATION	
BEIR	BEIRAGE	
BER	BERICHTE	
BRIT	BRITISH	
BULL	BULLETIN	
BUR	BURLAU	
BUS	BUSINESS	
CALIF	CALIFORNIA CALIFORNIAN	
CAMBR	CAMBRIDGE	
CANAD	CANADA CANADIAN	
CATA	CATALYSIS	
CEN	CENTER	
CHAR	CHARACTERISTICS	
CHEM	CHEMICAL CHEMISTRY	
CHIM	CHIMIE	
COL	COLLEGE	
COLL	COLLOID	
COMM	COMMUNICATION	



Print Column Headings and
Print Location Codes Routines

Column Heading Identification and Location Code Definitions List

PAGE 1

COLUMN HEADING IDENTIFICATION

TITLE TITLE

PN PERIOD NUMBER

SR SEE REFERENCE

FN FORMER NUMBER

NN NEW NUMBER

SV STARTING VOLUME

EV ENDING VOLUME

SY STARTING YEAR

EY ENDING YEAR

MP MICRO PRINT

LC LOCATION CODES

LOCATION CODE DEFINITIONS

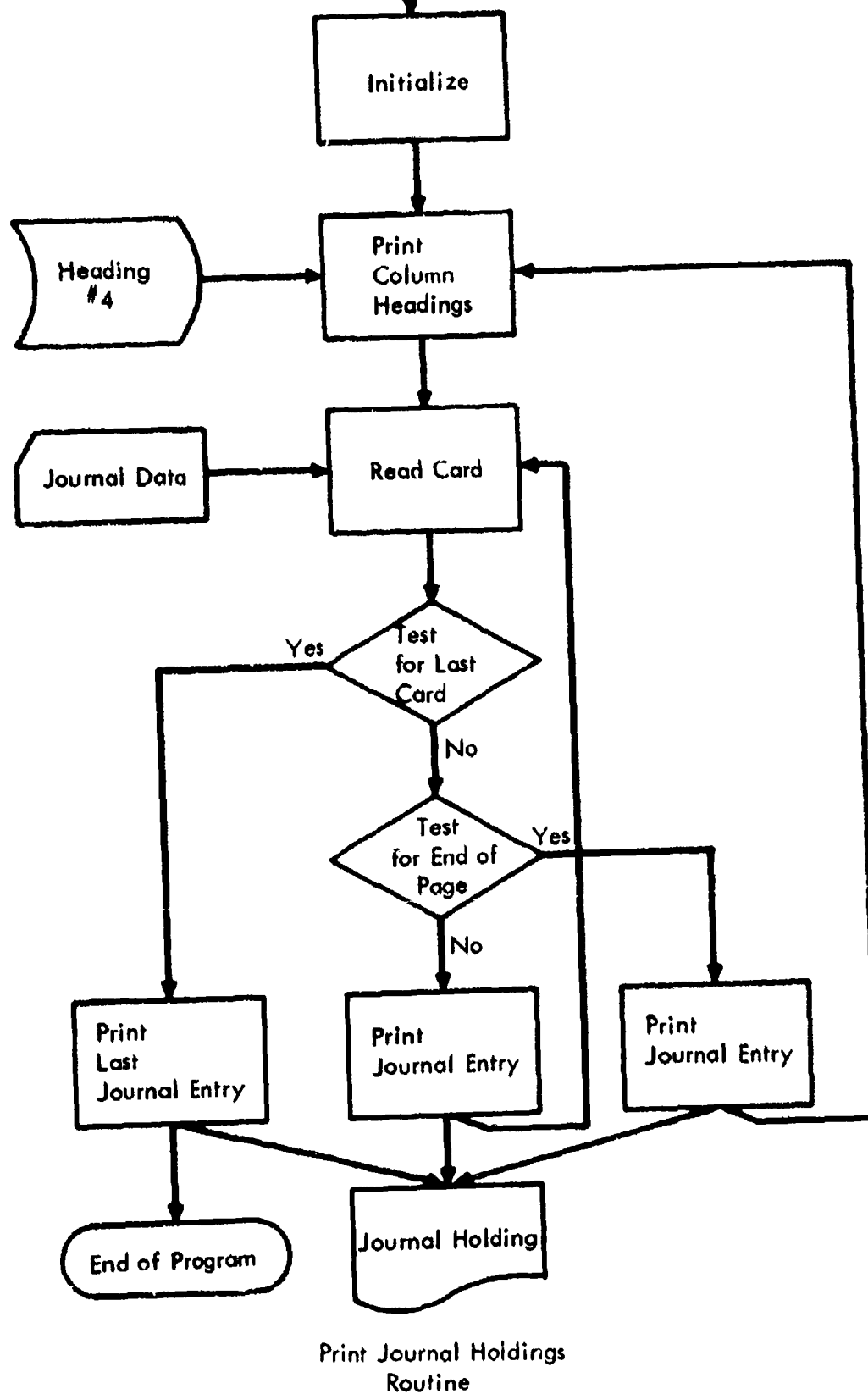
A MAIN LIBRARY

L LOGISTICS LIBRARY

C CIVIL ENGINEER CENTER LIB

D DETACHMENT LIBRARIES

Continuous From
Location Code Routine



Holdings List

PAGE 13

TITLE	PV	SR	FN	NN	SV	EV	SY	EY	MP	LC
AEROSPACE ENGINEERING	0225	S	0195	1.85	017	022	958	963		A
AEROSPACE MAINTENANCE SAFETY	0230	S	0220		010		963			A D
AEROSPACE MANAGEMENT	0235	S	0345		004		961			A
AEROSPACE MEDICINE	0240	S	3645		031		959			A
AEROSPACE SAFETY	0245	S	2670		016		960			A
AIR ALMAYAC	0250						958			A
AIR CONDITIONING AND REFRIGERATION NEWS	0255						958			C
AIR COND HEATING AND REFRIGERATION NEWS	0260				095		962			C
AIR COND HEATING AND VENTILATING	0265				052		955			A C
AIR FACTS	0270				009		946			A
AIR FORCE AND SPACE DIGEST	0275	S	0290		042		959			A C
AIR FORCE CIVIL ENG	0280				001		960			A C
AIR FORCE INFO POLICY LETTER	0285				017		963			A
AIR FORCE MAGAZINE	0290	S		0275	040	042	957	959	M	A
AIR FORCE TIMES	0295				021		962		M	A D
AIR INTELLIGENCE TRAINING BULL	0300						963			A
AIR POLLUTION CONTROL ASSOC SEE APCA	0305									
AIR POWER	0310				001	007	953	960		A
AIR TRAVELERS GUIDE	0315									A
AIR UNIV CALENDAR OF EVENTS	0320									A
AIR UNIV EDUC BULL SEE EDUC BULL	0325									
AIR UNIV PERIODICAL INDEX	0330				003		949			A D

B-6

Unclassified
Security Classification

DOCUMENT CONTROL DATA - R&D		
(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)		
1. ORIGINATING ACTIVITY (Corporate author) BOOZ ALLEN APPLIED RESEARCH, INC. 4733 Bethesda Avenue Bethesda, Maryland 20014		2. SECURITY CLASSIFICATION Unclassified
3. REPORT TITLE Mechanization Study of the Air Force Institute of Technology Library, Wright-Patterson AFB, Ohio.		
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Final Report of on-site survey		
5. AUTHOR(S) (Last name, first name, initial) G. A. Kershaw, D. Crowder, J. E. Davis, E. G. Loges, E. Merendini, S. M. Thomas		
6. REPORT DATE September, 1966	7a. TOTAL NO. OF PAGES 24	7b. NO. OF PAGES 0
8a. CONTRACT OR GRANT NO. DSA-7-15489	9a. ORIGINATOR'S REPORT NUMBER(S) 914-1-19	
9. PROJECT NO.	9b. OTHER REPORT NUMBER(S) (Any other numbers that may be assigned this report) AD 640 114	
10. AVAILABILITY LIMITATION NOTICES Distribution of this Document is unlimited		
11. SUPPLEMENTARY NOTES None		12. SPONSORING MILITARY ACTIVITY Defense Supply Agency Defense Documentation Center Cameron Station, Virginia
13. ABSTRACT The Air Force Institute of Technology (AFIT) Library uses an IBM 1401 computer to produce a list of journal holdings, alphabetically arranged and provided with an abbreviation glossary. At present, one list has been produced and circulated. Input to the system is EAM cards with journal data. Because of difficulties in obtaining use of the computer--which is not owned by the Library--within a reasonable time, the Library has decided to abandon computer mechanization and to use instead Library-owned Flexowriter equipments interfaced with supplemental EAM card punch, sorter, and reader.		

Preceding Page Blank

Security Classification

4	KEY WORDS	LINK A		LINK B		LINK C	
		CODE	WT	CODE	WT	CODE	WT
Electronic Accounting Machines							
Libraries							

INSTRUCTIONS

1. **ORIGINATING ACTIVITY**—Enter the name and address of the contracting and/or contracting agency, Department of Defense activity, or other organization responsible for preparing the report.

2. **REPORT SECURITY CLASSIFICATION**—Enter the overall security classification of the report. Indicate whether "Restricted Data" is included. Marking is to be in accordance with applicable security regulations.

3. **GROUP**—A group designation is specified in DOD Directive 5400.7 and Armed Forces Instruction Manual. Enter the group number. Also enter any special markings that apply to marking the document for handling and disposal instructions.

4. **REPORT TITLE**—Enter the complete report title in all capital letters. Titles in all cases should be unclassified. If a document is classified, it should be so marked without classification markings on the title. Do not use all capital letters in parentheses.

5. **DESCRIPTIVE NOTES**—If appropriate, enter the type of report, progress report, summary, journal, or final, and the time in days, when possible, the reporting period of record.

6. **AUTHORS**—Enter the name(s) of the person(s) responsible for the report. Enter last name, first name, and the initials. If primary, check name of the chief sponsor. The name of the principal author is an administrative requirement.

7. **REPORT DATE**—Enter the date of the report in day, month, year, or month, year. If more than one date appears on the report, indicate date of publication.

8. **TOTAL NUMBER OF PAGES**—The total page count, including text, tables, figures, and references, must be entered. Do not include pages containing references.

9. **NUMBER OF REFERENCES**—Enter the total number of references cited in the report.

10. **CONTRACT OR GRANT NUMBER**—If appropriate, enter the applicable number of the contract or grant under which the report was written.

11. **PROJECT NUMBER**—Enter the appropriate contract identification number, such as project number, system number, task number, etc.

12. **ORIGINATOR'S REPORT NUMBER**—Enter the official report number by which the document will be identified and known to the originating activity. This number must precede the report.

13. **OTHER REPORT NUMBER**—If the report has been assigned to other report numbers, enter the originating activity number for each other number.

14. **AVAILABILITY LIMITATION NOTES**—Enter any time or other restrictions on availability of the report other than those

imposed by security classification, using standard statements such as:

- (1) "Qualified requesters may obtain copies of this report from DDC."
- (2) "Foreign announcement and dissemination of this report by DDC is not authorized."
- (3) "U.S. Government agencies may obtain copies of this report directly from DDC. Other qualified DDC users shall request through:

(4) "U.S. military agencies may obtain copies of this report directly from DDC. Other qualified users shall request through:

(5) "All individuals who request access to this report must be cleared by DDC. All requests through:

If the report has been checked to the Office of Technical Services, Department of Defense, for release to the public, only the following statement appears on the report:

15. **SUPPLEMENTARY NOTES**—Enter other special explanatory remarks.

16. **SPONSORING MILITARY ACTIVITY**—Enter the name of the sponsoring project, office, laboratory, agency, organization, or command, and location, if applicable.

17. **ABSTRACT**—Enter an abstract giving a brief and factual summary of the document and nature of the report, even though it may also appear elsewhere in the body of the technical report. If white noise paper is required, a summary of text shall be provided.

It is highly desirable that the abstract of technical reports be unclassified. Each paragraph of the abstract shall end with an indication of the security classification of the information in the paragraph represented as (TS), (C), (S), or (R).

The maximum number of the length of the abstract shall be over the suggested length of 150 to 200 words.

18. **KEY WORDS**—Key words are technically classified terms or phrases that characterize a report and its related activities, and categorize the report. Key words are assigned so that no security classification is required. Identify terms such as equipment, technology, or military project, conference, geographic location, or any key words that will be followed by an indication of their classification. The assignment of codes, codes, and a phrase, or phrase

Security Classification