Technical Report

AD 640 106

MECHANIZATION STUDY
OF THE U.S. ARMY
PICATINNY ARSENAL,
DOVER, NEW JERSEY

BOOZ · ALLEN APPLIED RESEARCH INC.

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Technical Report

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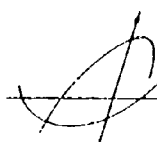Cameron Station, Virginia

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A B S T R A C T

The circulation of books and technical reports (both classified and unclassified) at Picatinny Arsenal's Library is mechanized by the IBM 7090 and 1401 compu'rs, producing seven outputs. At present, mechanized preparation of catalog cards, maintenance of catalog authorities, preparation of bibliographies and accessions lists, routing of periodicals, and control of classified reports are under development. Routing of periodicals should be operational early in 1966. An SDI system is under consideration. Work measurement and standard time data studies on the efficiency of the system indicate that the mechanized circulation system is much more efficient than the previous manual one.

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I. SUMMARY

The circulation of books and technical reports (both classified and unclassified) at Picatinny Arsenal's Library is mechanized by computer. Seven outputs are provided using the 7090 and the 1401. Programs for the present mechanized circulation system are written in SPS language; the entire system is being reprogrammed in COBOL.

In connection with reports relating to the Joint Atomic Weapons Technical Information (JAWTIG) program, subjects and report numbers will be keypunched so that an index to this file can be prepared. This is a joint AEC-DoD experiment.

At present, mechanized preparation of catalog cards, maintenance of catalog authorities, preparation of bibliographies and accessions lists, routing of periodicals, and control of classified reports are under development. Routing of periodicals should be operational in six months. Activities in the planning stages of mechanization include the check-in of periodicals, maintenance of user interest files, and statistical accounting.

The Library subscribes to 1,000 periodical titles; there are presently 50,000 classified and 100,000 unclassified technical reports in the collection with an annual growth of 5,000 and 10,000 respectively.

There are currently 20,400 book titles (35,000) volumes in the collection with an annual growth of 3,500 titles. IDEP entries are received on microfilm and chemical patents, on microfiche. Total circulation runs from 67,000 to 114,000 per year, with about 1,670 of the 2,000 Arsenal professional scientists and engineers having items charged out at any one time. (Total number of employees at the Arsenal is about 8,000.)

Because of the large area covered by the post, most users in the research and engineering areas request items by telephone or the standard request form through the mail. Users relate to the mechanized system of circulation directly, since the request forms (SMUPA Form 862) completed by the requester are used to process each transaction on the computer.

Duplicate subscriptions to periodicals provide sufficient numbers for routing. Items requested by a user are normally purchased rather than borrowed. New items are announced in the weekly accessions bulletin, which is circulated to scientific and engineering supervisory personnel throughout the Arsenal.

Appendix A indicates the organization of the Library and its activities.

II. MECHANIZATION

II.   MECHANIZATION

1.   CHRONOLOGY

Before the introduction of mechanization, changes and stream-lining of the circulation system took place periodically in an attempt to keep up with the steadily rising circulation. The computer was installed in the Arsenal in 1959.

Beginning late in 1961, IBM personnel and the local data processing office have assisted the Library in the formulation of design concepts for automating certain of the Library operations.

In April 1962, a semiautomated, computer-based circulation system for books and reports was adopted and has been in operation ever since.

2.   DESCRIPTION OF PROCESSES

A description of the Arsenal's mechanized circulation control is detailed in the following paragraphs and summarized on the flow chart in Figure 1.

(1)   Input Procedures

1.   Borrower enters his name, organization, and building number on the request card and identifies the material

Figure 1: Circulation control flow chart

he wants by entering either the accession number for the report or the call number for the book, if known, or writing in the author, title, and other identifying information. These blank punched cards are available at convenient locations throughout the research groups and at the Library circulation desk. (See Figure 2 for sample of card.)

2.   When received by mail, only one card is required; cards completed at the desk or brought to the Library involve the completion of two copies of the card instead of one (one is used immediately as a route or charge slip; the other is used to process the request).

3.   When the accession number of the call number is not indicated, the Library staff member searches to determine whether the material is already in the Library.

If the material is not found, the card is sent to the ordering section for a decision on whether or not to buy. If the material is in the Library, the call number or the accession number is added to the card.

Request cards are sent to the keypunch operator to punch date or transaction, type and classification of

Front of Card

LIBRARY REQUISITION & ROUTING FORM

MO DAY YR

Two weeks from this date REPORTS are Due
One Month from this date BOOKS are Due

INSTRUCTIONS (PLEASE PRINT)

1. FILL IN DATA AT LEFT

2. FILL IN ACCESSION OR CALL NUMBER   HERE

3. IF UNKNOWN, COMPLETE   BELOW

AUTHOR

TITLE

PUBLISHER, CONT. NO., PROJ. NO.,   SERIES,   REPORT NO.,   PRICE,   ETC.

NEED TO KNOW AND REQUIRED SECURITY CLEARANCE VERIFIED

COPY   SEND TO

LAST NAME   INITIALS

ORGANIZATION (ABBREV.)   BLDG. NO.

SEC. CL.   PAYROLL NO.

RETURN

BY CROSSING OUT ABOVE ADDRESS AND MAILING IN

ACCORDANCE WITH SECURITY REGULATIONS TO:

TECHNICAL   INFORMATION   BRANCH
PICATINNY   ARSENAL   DOVER, N.J.

SUPERVISOR'S SIGNATURE

Front of Card

FOR LIBRARY USE ONLY

VERIFIED IN

SEARCHED IN (PLACE X)

RPTS. CAT.   BOOK CAT

PER. LIB.   PROCESS FILE

UNFILED CARDS

☐ OUT OF PRINT

_____ COPIES ON HAND

_____ COPIES TO ORDER

_____ CALL OR ACCESSION NO.

SUPPLIER

☐ SOLE SOURCE ☐ IMPREST FUND ☐ COLLECTION

☐ WOULD APPRECIATE RECEIVING ☐ COST AND AVAILABILITY ☐ TELETYPE

☐ PHOTOCOPY ☐ REPRINT ☐ LOCAL

Back of Card

FIGURE 2
Library Requisition & Routing Form

document, accession number or call number, and bor-

rower's name and payroll number. (See Figure 3 for

sample of code used in punching.)

The keypunch operator sorts the cards by accession

number or call number, type of document, and security

classification (part of the accession number.)
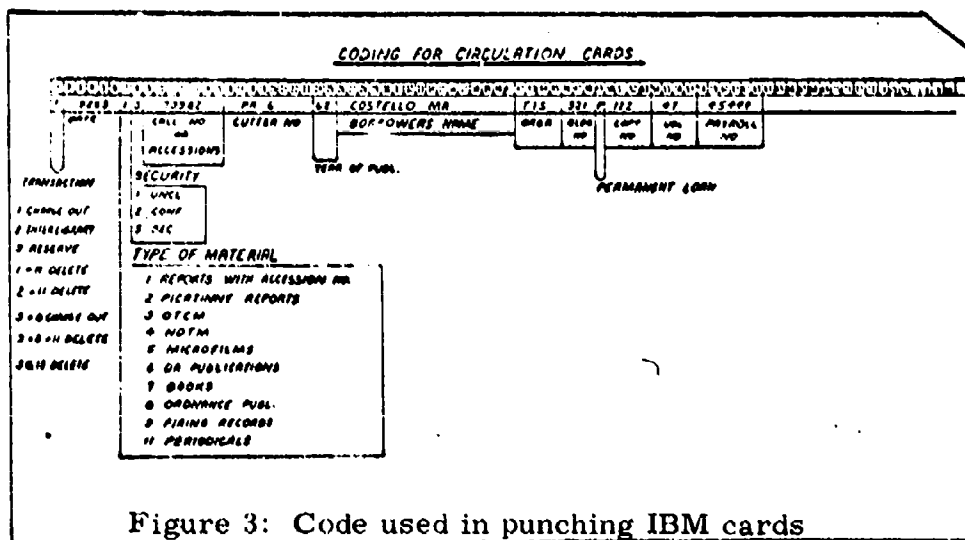
Figure 3: Code used in punching IBM cards

The cards are given to the clerk to determine by a

shelf search if the item is presently available.

If the item is on the shelf, the card is inserted, and

the item is then placed on a truck for delivery to the key-

punch operator, who adds the transaction code and the copy

number.

If the item is not on the shelf, the card is sent to the keypunch operator to have a reserve transaction code punched into it and is then put aside for sorting.

For items on the shelf, the keypunch operator prepares a duplicate card, using a gang punch.

The original card is attached to the item being loaned and a second copy is put aside for sorting.

4.   When the items are returned to the Library, the route slip is removed, gang punched with the delete code, and put aside for sorting.

The item is checked against the reserve list printout to determine whether anyone is waiting for it. If a reserve is on the item, the reserve card is pulled from the punched card file and sent with the item to the keypuncher.

The keypuncher punches a transaction code, deleting reserve and chargeout, and then duplicates the card. The original card is attached as a route card and duplicate card is set aside for sorting.

5.   Cards are sorted first by payroll number, then by volume number, accession number, and type of material, respectively.

6.   Cards are sent to the computer for updating of master tape.

In updating, the document number on each card is read into the memory and compared with numbers until the proper tape record is located for deletion from or addition to the master tape.

The transaction code on the card read indicates the action to be taken.

Document number and security classification, volume and copy numbers, requester's payroll number, and the status of the document (outstanding, reserve, etc.) are checked to insure that the proper document is removed before a given record is deleted from the tape. (Records written on the tape are exact duplicates of the card records.)

7.   Punched cards are returned to the Library.

8.   Reserve cards are pulled by sorting and all other cards thrown away.

(2)   Outputs

1.   Master List

The corrected tape record is transcribed on the IBM 1401 on-line printer. This statement lists all items on loan or on reserve and carries the following column headings: document type, document security classification, Library number, transaction code, borrower's name, organization, building and payroll numbers, and date. This list is printed as required, from the updated tape. (See Appendix B-1 for sample.)

2.   Reserve List

This listing is prepared as needed from the updated tape. The listing indicates items for which there are no outstanding reserves. (See Appendix B-2 for sample.) All other items currently overdue require printing of an overdue notice card.

3. Master Listing in Payroll Number Order

Each week the master tape is read into the 7090 computer for sorting by payroll number, and a printout is prepared. This printout is used in compiling the monthly statements sent to Library users and for clearing individuals leaving the Arsenal. (See Appendix B-3.)

4. Monthly Statement

A monthly statement to Library users tells them of the items with which they are charged. It also informs a user of classified items in his possession, alerting him to the safety of these items. (See Appendix B-4.)

5. Statistical Breakdown

A statistical breakdown of circulation transactions is printed monthly. Listings are by type of document, security classification, and user organization. (See Appendix B-5.)

6. Overdue Cards

Once a month, overdue notices are sent out. To facilitate mailing, the notices are sorted by payroll

number and then by building number. Overdues are sent
only on items that have been requested by other users.
(See Appendix B-6 for sample.)

7.   Printout of Library Circulation by Organization
      and Building Number

A monthly statement of circulation statistics by organi-
zation and building number is prepared for the Library.
(See Appendix B-7.)

3.   MAJOR PROBLEMS

First, the physical location of a library user may change from
time to time, but his new location is not conveyed to the circulation
files. An experimental program is presently being studied which would
update the file by placing the latest known address in all records for the
given individual.

Second, programming, in most cases, lags behind the planning
and input from the Library staff. There are no programmers on the
Library staff. However, the two department heads have taken program-
ming courses; this has helped in communications between the Library
staff and the programmers.

In addition, there has been difficulty in getting management support on the programs although financial support is available.

4. ACTIVITIES BEING PLANNED OR DEVELOPED FOR MECHANIZATION

(1) Periodicals

A periodical program is under study to provide a mechanized means for periodical ordering and renewal, automatic routing, bindery schedules and slips, statistics, periodical gap claims, and periodical check-in. In order to accomplish this economically, a magnetic tape file containing the descriptive information on 2,500 periodical titles was borrowed from the Redstone Scientific Information Center

(2) Picatinny Arsenal Reports

Bibliographic information on some 7,000 in-house reports is now stored on magnetic tape. (See Appendix C-1 for sample of tape record format.) Of this number, about 50 percent contain both subject headings and Uniterms. The entire collection contains some form of subject categorization. The Arsenal's contractor reports will be added to the file as time and money permit.

Data is added to the tape using the data capture sheet (See Appendix C-2 for sample.) On this data capture sheet is recorded information from which up to 35 cards will be punched. The information includes document classification, serial number, Cutter number, corporate author, title and title classification, personal authors, publication date or range of dates, publisher, contract number, and series notes.

Data capture sheet is forwarded to the head of the Technical Processing Section for subject analysis and addition of subject terms or descriptors to the data sheet. Completed data sheet is returned to the keypuncher for keypunching.

At present, there are no computer programs in existence to use the data already on magnetic tape except for a simple printout program.

Studies will be made to determine the type of indexing that would be most effective for automatic or semiautomatic retrieval of information. The three major techniques under consideration are permuted titles, subjects, or Uniterms.

(3)   Selective Dissemination of Information

Selective Dissemination of Information (SDI) may be imprac-
tical because of the rapidly changing project assignments and user
interests; however, it is under consideration.

III. PROGRAM SYSTEM DATA

III.   PROGRAM SYSTEM DATA

1.   CIRCULATION FILES

(1)   Master File

This is an image of the 63-character card format with nine blank characters appended and one record per block of tape.   The records are in sequence by type of material, call number or accession number, Cutter number, year of publication, copy number, volume number, and payroll number.   There are 23,000 to 24,000 items in the files.   Two copies of the current file are saved.

(2)   Payroll File

This file contains exactly the same information as the Master file and is arranged in payroll number order.

2.   CIRCULATION ROUTINES

The seven outputs of the circulation system are produced by the following routines.

(1)   Update

This program reads transaction cards (1,500 per week) and

adds, changes, or deletes records from the master file as required. Once transactions have been sorted by code, all transactions requiring records be added to the file are input first; the new file is passed a second time, and all deletions are executed; the data is passed a third time to create a reserve copy of the file. Errors such as unmatched cards and cards out of sequence are printed. This run takes approximately one hour and is normally run weekly.

(2) List

This program prints the contents of the master file or, by option, only those records containing the "reserve" code. It is used to print the tile in normal sequence or in payroll number sequence. The whole file can be printed in 30 minutes, the reserves in 15 minutes. All three prints are normally made weekly.

(3) Monthly Statements

Monthly or on demand, this program prints the list of items charged out to each individual. The file sorted to payroll number is used. It runs 30 minutes.

(4) Overdue

The computer searches for long-overdue items for which there is a reserve card. The computer counts the number of reserves against the item and number of copies that are overdue. If there are fewer reserves than overdues, the computer punches as many overdue cards as there are reserves, starting with the copy of the item that has been outstanding for the longest period of time. These cards are then passed through an interpreting machine and sorted by payroll number and then building number. This routine takes 30 minutes to run.

(5) Statistics

The master file and current transactions are sorted to organization and building and document type, and tallies are made by that breakdown in the following categories: Secret, Confidential, Unclassified, outstanding, deletion, and reserved items. The program is run on demand and takes 30 minutes. By option, building and document-type breakdowns may be omitted, reducing run time to 10-15 minutes. It uses total memory.

(6)   Sort

Immediately following the Update run, the new master file is sorted to payroll number and listed. This sort runs weekly on the 7090 and takes 30 minutes.

The sorting and statistics programs are performed on the 7090. All other programs are written in SPS language for the 1401.

3.   NEW CIRCULATION ROUTINES

The system is being reprogrammed in COBOL for the 7090 for three reasons: to increase efficiency by introducing a tape-blocking factor of 20, to reduce immediately the 1401 load, and to anticipate the acquisition of a new computer system. The philosophy and outputs of the new system are identical with those of the existing system. It will run under IBSYS control without operator intervention and will function as follows:

- The transactions will be sorted internally (2-5 minutes)

- The file will be updated and printed and statistics printed (5-9 minutes)

- The file will be sorted to payroll order (2-5 minutes) and printed

This much of the new system is being run in parallel with the old system. It required about two man-weeks over a two-month period for the programmer who knew the old system. The remaining outputs are yet to be reprogrammed.

IV.   EQUIPMENT, COSTS, AND EVALUATION

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1.   EQUIPMENT

__IBM 7090__   This rented system runs two shifts. The program

mix is 25 percent accounting-type problems, 75 per-

cent scientific problems. It is a closed shop. A

staff of 12 writes all the repetitive programs. En-

gineers or scientists may write FORTRAN programs

for their own use.

	7090	with 32K memory
	711	Card Reader
	716	Line printer
	721	Card punch
10	729	Mod V Tape units

__IBM 1401__   This system, owned by the Arsenal, serves mainly

as a peripheral processor for the 7090.

	1401	with 4K memory
	1402	Card reader/punch
	1403	Line printer (132 positions)
3	729	Mod II tape units

Additional equipment includes the following:

2	IBM 026 printing keypunch (purchased)
1	IBM 082 sorter with counter (rented)
1	Flexowriter
1	Filmac 200

2.   COSTS*

Blank IBM cards cost $1.05 per 1,000, and printed circulation cards are $1.50 per 1,000 (not including setup and plate charges). Since approximately 2,000 blank cards and 2,900 printed cards are used each month, the total monthly cost for material is $6.45. Setup and plate charge costs would be added to this figure.

Monthly equipment costs are listed below. (Cost is based on rental of 026 and 1401. These were purchased subsequent to publication of the article. Current costs are not available.)

026 Keypunch	$71.00
082 Sorter	46.00
1401 Cost (average)	318.87
7090 Cost (average)	319.93
TOTAL	$755.80

The total time involved per month in support of the mechanized circulation system is 120 hours. The 1401 is used approximately 10 hours a month; the 7090, 2 hours. The average processing time per item is 9 minutes.

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* Figures taken from "Automated Circulation at a Government R&D Installation, by L. Haznedari and H. Voos. Special Libraries, February 1964, pp. 77-81.

The initial time involved to write the routines for the circulation
system was as follows:

Update - one man-day for each of two versions

Monthly Statements - three to four man-days for each of three
versions

Overdue - two man-weeks

Statistics - three to four man-weeks

3. FACILITY'S EVALUATION OF SYSTEM

Considerable effort has been spent to make the products of the
system efficient and economical. In the circulation system, for
example, the object was to keypunch only the items that were checked
out of the Library, thus minimizing the so-called "conversion costs."
(No cards or book pockets are prepared.) In addition, no titles are
punched, only accession numbers, thus reducing keypunch time at the
expense of a manual title lookup when necessary.

Work measurement and standard time data studies on the effici-
ency of the system indicate that the mechanized circulation system is
much more efficient than the previous manual one, e.g., the overdue
portion of the system is considered five times more efficient.

The new system averages 9 minutes per item for keypunching,
sorting, pulling from shelves, preparing for mail, discharging and

refiling returns, and processing on the computer. The old system averaged 11 minutes per item. This represents a significant saving when the number of annual transactions is considered. The number of Library personnel needed to handle circulation functions was reduced by two with the introduction of the computer-based system. However, 8 man-weeks were expended in writing the programs. In addition, statistical data on rate of return of documents and average number of people waiting for items is now available; it was not available under the manual system.

Less frequent computer runs, automatic preparation of reserve cards, and other refinements will make greater economies possible.

APPENDIX A

ORGANIZATION OF THE LIBRARY AND ITS ACTIVITIES

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                        ┌──────────────────────────────┐
                        │      PICATINNY ARSENAL        │
                        └──────────────────────────────┘
                                      │
                        ┌──────────────────────────────┐
                        │ Feltman Research Laboratories │
                        └──────────────────────────────┘
                                      │
                        ┌──────────────────────────────┐
                        │  Plans and Programs Division  │
                        └──────────────────────────────┘
                                      │
                        ┌──────────────────────────────┐
                        │ Technical Information Branch  │
                        └──────────────────────────────┘
                                      │
        ┌─────────────────────────────┼──────────────────────────────┐
┌──────────────┐            ┌──────────────────┐          ┌──────────────────┐
│  Museum      │            │    Library       │          │   Technical      │
│          3   │            │    Office   2    │          │   Publications   │
└──────────────┘            └──────────────────┘          │    Section  4    │
                                      │                    └──────────────────┘
              ┌───────────────────────┴───────────────────┐
┌────────────────────────────┐              ┌────────────────────────────┐
│ Reference & Circulation    │              │  Technical Processes        │
│      Section     10        │              │  Section      11            │
└────────────────────────────┘              └────────────────────────────┘
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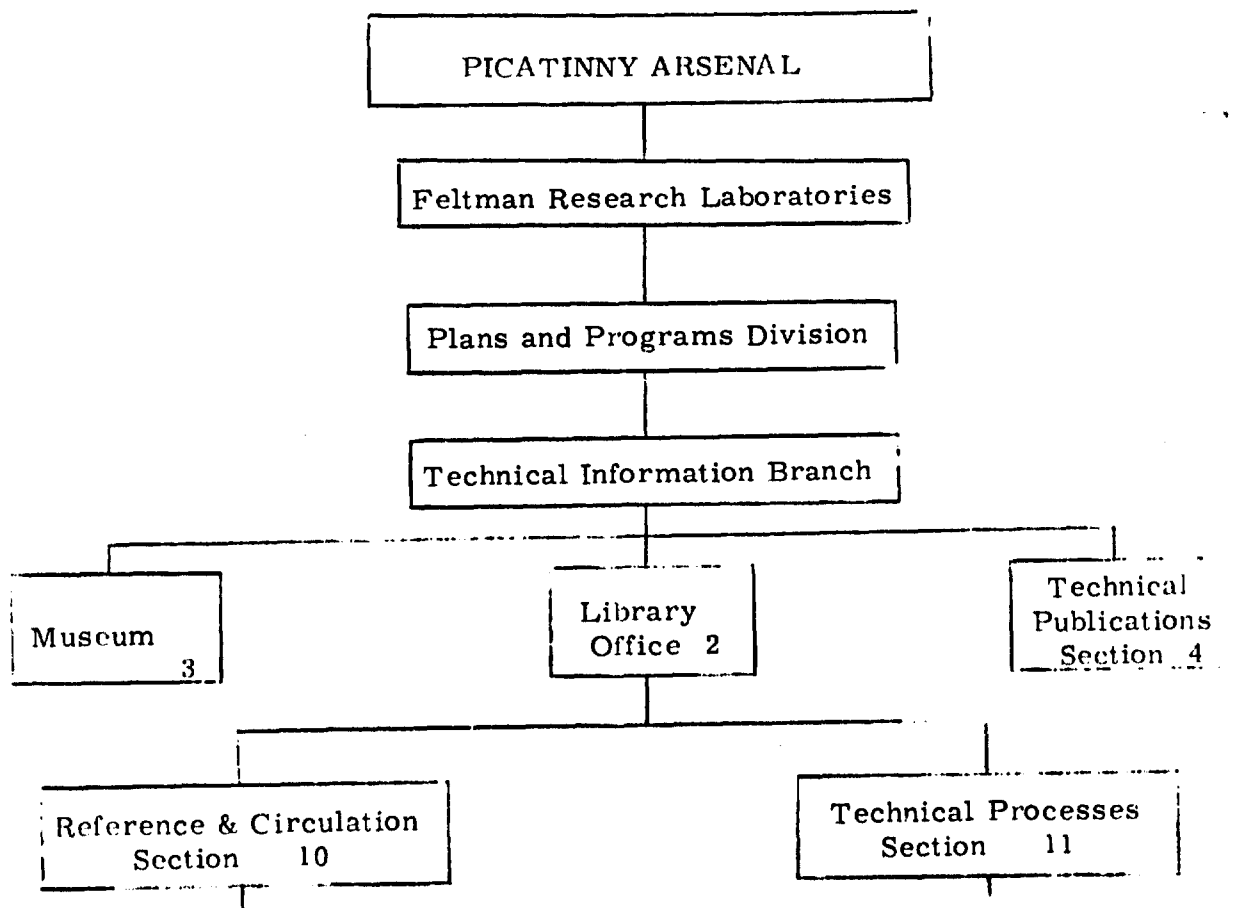
Reference & Circulation Section 10	Technical Processes Section 11
Answer ready reference questions	Select books, periodicals, other publications
Prepare bibliographies	Obtain approval of expenditure; need-to-know for classified material
Maintain specific area reference files	Order books, periodicals, other publications
Maintain user interest profiles	Check in Bindery, match and inspect shipment
Perform literature searches	Receive technical reports on distribution or special request
Translate technical articles	Assign classification numbers
Route new issues of periodicals	Assign control or accession numbers
File/circulate books, periodicals, and reports	Prepare main entry/subject catalog cards
Circulate classified reports	Order printed catalog cards for books
Perform interlibrary loan transactions	Maintain catalog authorities
Maintain borrower's file	Assign subject heading terms (books/reports)
Prepare/distribute list of acquisitions	File entries
Duplicate/circulate Table of Contents for periodicals	Perform statistical accounting
Perform statistical accounting	
Control classified reports; downgrading destruction, inventory	

NOTE: Number included with section title indicates staff size of that section.

APPENDIX B

SAMPLES OF OUTPUTS

CLASS		ACCOUNT NO.	CUTTER NO.	VOL	COPY	CODE	BORROWER NAME	PAYROLL	ORGN	BLDG	CLEAR DATE
1	1	87515				1	FREEMAN DJ	59471	AEL	351	10/17/63
1	2	87616	SPK 2		92	=	GOLDSMITH L	61663	SRPL	3359	2/11/63
1	3	87569		1		1	ECHEVARRIA M	56582	TAWL	65	12/ 9/63
1	1	87675		1		1	SCHMITT FT	49554	CAL	350	7/11/62
1	1	87681		46		1	DEMITRACK G	45514	ESL	350	4/15/63
1	1	87702			46	1	MILLER J	56755	WSP	61	2/25/63
1	2	87723		1		1	KIRSHENBAUM M	55082	EL	409	2/ 2/65
1	2	87724				1	HEPPER JD	310	EP	409	3/ 8/63
1	2	87724	PART 11	3		1	HEPPER JD	310	EP	409	3/11/63
1	2	87724	PART 11	2		1	ADELMAN SR	4652	AAL	351	7/10/64
1	2	87724	PART 11	1		=	VOGEL JJ	60488	APME	555	6/18/63
1	2	87724	PART 13	2		1	HEPPER JN	310	EP	409	5/15/63
1	2	87724	PART 13	1		1	ADELMAN SR	4652	AAL	351	7/10/64
1	2	87724	PART 15	4		1	ADELMAN SR	4652	AAL	351	6/ 4/64
1	2	87724	PART 15	1		=	LERNER S	54560	WSP	353	7/10/64
1	2	87724	PART 16	1		1	HEPPER JN	310	EL	409	9/ 8/64
1	2	87724	PART 18	1		1	HEPPER JD	310	EL	409	10/27/64
1	2	87724	PART 19	3		1	CLAUSEN J	55996	WSP	61	4/14/65
1	1	87724	PART 16	1		1	KLINE RW	59143	ESL	350	7/25/62
1	1	87726	IN 49			=	EISINGER SR	45994	WSP	61	7/25/62
1	2	87724	PART 19	3		1	GAYDOS GM	57712	WSP	355	7/ 9/63
1	2	87724	PART 19	1		1	MATSUGUMA H	55396	EL	409	7/26/65
2	2	87799	REV 1			1	FRISBIE WM	58549	RED	65	7/28/65
1	1	87744				1	WOLFF RE	54120	APPE	355	10/21/63
1	1	877.4		1		1	ARNOLD JR	62943	APPL	553	5/23/64
1	1	877.4				1	WEISS AL	344.7	SFPL	3159	8/13/64
1	1					1	MILLER DB	59163	EL	45.	17/ 6/65

B-2
Reserve List

CLASS	ACCOUNT NO	VOL	COPY	BORROWER NAME	PAYROLL	ORGN	BLDG	CLEAR	DATE
1 3	113236			MOSS J	54924	LRAR	65		9/ 2/65
1	113266			STECEN F	3699	PYRO	1510		10/ 7/65
1	113267			ERFINGER SR	45599	WSP	61		5/30/65
1	113262			KLINE RB	59143	ESL	350		10/ 7/65
1	113279			NITZSCHE	46191	WSP	61		10/ 7/65
2	113273			NASH AC	47634	APME	61		10/ 7/65
2	113275			KILLER J	56755	WSP	61		10/14/65
2	113275			KILLER J	56755	WSP	61		5/30/65
2	113277			WALGREN CF	6222C	WSP	61		10/14/65
2	113279			MICHELSON B	60767	CAC	61		5/30/65
2	113277			SMART 1	61138	CAC	61		10/11/65
1	113281			POWELL JC	45998	AAL	351		10/ 7/65
1	113281			NASH AC	47634	APME	61		10/ 7/65
2	11331.			ZIZTLUGA PJ	48691	AAL	351		5/30/65
2	11331.			STEIN SC	51936	WSP	61		10/ 4/65
2	11331.			WALGREN GH	6222C	WSP	61		10/14/65
2	11331.			FRIEDMAN NJ	6077C	WSP	61		10/11/65
2	11331.	NUML	1	LEACHITZ C	51485	PL	S162		10/ 4/65
2	11331.	PK	1	HELF S	44866	EL	457		10/ 7/65
2	11331.	PK	1	WITZV RG	45434	PL	V162		10/ 7/65
2	11331.	PK	1	AARCN HJ	59951	AAL	351		10/ 7/65
1	113311			NASH AG	47634	APME	61		10/ 4/65
1	11332.			CZILETT RA	6314C	ESL	350		10/11/65
2	113352			STEIN SC	51936	WSP	61		10/ 7/65
2	113352			KLIN AJ	57801	WSP	61		10/14/65
3	11336.			NITZSCHE R	46191	WSP	61		10/ 7/65
3	11335.			ZCLEVICKI C	45809	PEL	355		10/ 7/65
1	11335.			STEIN SC	51520	WSP	61		10/ 7/65
1	11354.			SPILLAN F	3699	PYRO	1510		10/ 4/65
1	1134.			ABRAHAMS JN	44746	ISC	6		10/ 7/65
3	1134..			PICARD J	55723	PL	S162		5/27/65
2	14542C			WAXLER E	54458	TAHL	65		5/13/65
1	11346.		354	SILVA A	45673	AAL	351		5/30/65
3	1134.		1	SILVA A	42673	AAL	351		10/ 4/65
3	1134.		2	MILLER N	45514	ESL	350		10/11/65

CLASS	ACCOUNT NO.	CUTTER NO.	VOL	COPY	CODE	BORROWER NAME	PAYROLL	ORGN	BLDG	CLEAR	DATE
7 1	TK7872.0	T 73_ 4		3	1	SMITH CL	10785	PYRB	1515		6/ 2/64
7 1	TK7872.0	T 73R 31		4	1	SMITH CL	10785	PYRB	1513		2/17/64
7 1	TP 291.0	D 41 3			3P	SMITH CL	10785	PYRB	1515		12/16/64
7 1	TR 593.0	I 5	5	2	1	SMITH CL	10785	PYRB	1513		8/21/63
1 3	73427	65		3	3	LINDNER V	10933	AED	151		6/14/65
1 3	99835	NUMB 3	3		3	LINDNER V	10933	AED	151		4/21/65
1 2	110977			25	1P	LINDNER V	10933	AMMB	151		4/27/65
1 2	111465	IR 2		1	1P	LINDNER V	10933	AED	151		7/28/65
1 2	112651			1	1P	LINDNER V	10933	AMMB	151		7/21/65
1 1	PC4111.0	T 7			1	LIYDNER V	10933	AED	151		10/13/64
1 1	TP 270.0	C 66		15	1	LINDNER V	10933	AMMB	151		2/26/63
8 1	P7061C7	AMCP			1	LINDNER V	10933	AED	151		8/ 7/64
8 2	P706176	AMCP		235	1	LINDNER V	10933	AED	151		8/ 7/64
8 1	P706187	AMCP		15	1	LINDNER V	10933	AED	151		7/22/64
7 1	AG 521..	H 3		3	1	DORFMAN A	10964	OCB	151		12/ 6/63
7 1	HD 20.0	K 5		5	=	DORFMAN AL	10964	OCB	151		3/16/65
7 1	PE1628.J	A 5 62		3	1	DORFMAN AL	10964	STAF	151		9/28/62
7 1	PN6175.0	P 3		3	1	DORFMAN AL	10964	STAF	151		7/ 2/62
7 1	UD 5.0	C 6 50		3	1	DORFMAN AL	10964	STAF	151		8/14/63
7 1	UD 5.0	H 3 29			1	DORFMAN AL	10964	STAF	151		8/14/63
7 1	T 9.0	C 5		2	1	DORFMAN AL	10964	STAF	151		8/14/63
7 1	TA 153.0	N 3		4	1	DORFMAN AL	10964	OC2	151		5/21/63
7 1	TA 164.0	N 3		2	1	DORFMAN AL	10964	OC2	151		6/10/65
8 2	P20 176	ERDP		55	1	DORFMAN A	10964	STAF	151		2/20/63
8 2	P20 245	ERDP		55	1	DORFMAN A	10964	STAF	151		2/20/63
8 2	P20 247	ERDP		55	1	DORFMAN A	10964	STAF	151		2/20/63
8 3	P20 249	ERDP		51	1	DORFMAN A	10964	STAF	151		2/20/63
8 2	P20 261	ERDP		470	1	DORFMAN A	10964	STAF	151		2/20/63
8 2	P20 290	ERDP		5	1	DORFMAN A	10964	STAF	151		2/20/63
7 1	TK7801.0	N 31	10	3	1	COFFEY WG	11023	QAD	34		6/ 3/64
7 1	PE1591..	K 6		24	1	HUMPHREYS IM	12C15	FRL	354		6/18/64
7 1	TK7815.0	U 4		8	1	BECKER T	12110	QAD	92		4/ 6/65
1 2	77776	MU A235727		1	1	KATZ D	12153	APME	355		8/ 9/62
1 2	93281	MTG 16	4	5	1	KATZ D	12153	APME	355		10/ 4/62
1 2	94327			2	1	KATZ D	12153	APME	355		7/23/62
1 2	94936		1	3	1	KATZ D	12153	APME	355		6/28/63
1 2	102513			8	1	KATZ D	12153	APME	355		12/20/63
1 2	107452			2	1	KATZ D	12153	APME	355		10/16/64
2 2	108724			6	1P	KATZ D	12153	APME	355		1/ 6/65
2 2	113490			8	1P	KATZ D	12153	APME	355		3/31/65
2 2	1213	PAIR			3	KATZ E	12153	PFL	355		5/18/65
7 1	PF1...	..4R6		1HH	1	LITVINK? IH	12166	AAL	351		3/29/63
1 1	17963				.	EPTEN MC	12445	SMOO	151		2/11/63

B-4

* * * * * * * * * * *

* ORGANIZATION - TRAN *

* * * * * * * * * * *

A RECORD OF LIBRARY ITEMS ON LOAN IN (TRAN) AS OF (07/22/63)

ITEM	ITEM COUNT	CLASSIFIED COUNT
BOOK	000001	000000
- -		
TOTALS	000001	000000

B-5

** TOTAL LIBRARY CIRCULATION BY TYPE FOR DEC. 1963 **

ITEM	ITEM COUNT	SECRET COUNT	CONFID. COUNT	RESERVE COUNT	DELETION COUNT	UNCLASS. COUNT
REPORT	770	150	269	308	552	341
PAIR	24	0	2	0	29	22
FIRING RCD	0	0	0	0	0	0
BTGM	3	0	0	2	3	3
VDTM	10	1	8	3	13	1
MICRO FILM	6	0	2	4	4	4
DA PUB	237	0	3	12	151	237
GBOK	6	0	3	0	2	3
FED PUB	0	0	0	0	0	0
PERIODICAL	1	0	0	0	0	1
	1051	161	284	329	854	612

B-6

OVERDUE NOTICE

MATERIAL IDENTIFIED BY THE DOCUMENT OR CALL NUMBER BELOW IS _____ OVERDUE

SCIENTISTS AND ENGINEERS ARE WAITING FOR THIS DOCUMENT. PLEASE COOPERATE AND

RETURN IMMEDIATELY TO TECHNICAL INFORMATION SECTION. IF YOU WISH THIS

DOCUMENT ROUTED TO YOU LATER, PLEASE CHECK HER _____ AND IT WILL BE PLACED

ON RESERVE

TYPE OF MATERIAL BORROWED	DATE BORROWED	SEC CLASS	DOCUMENT OR CALL NUMBER
1 REPORT 2 PA-TR 3 OTCM 4 NDTM 5 MICRO 6 DA PUBL 7 BOOK 8 ORD PUBL 9 FIRING REC 10 OSRD 11 PERIODICAL	MO. DAY YR 4 13	1 UNCLASS 2 CONF 3 SECRET	
7		2	P 678/APS

TO: _____

NAME _____

ORG.& _____

BLDG. _____

Best Available Copy

B-7

```
*  *  *  *  *  *  *  *
*                    *
*   ORGN. -   E      *
*                    *
*   BLDG. -   409    *
*                    *
*  *  *  *  *  *  *  *
```

LIBRARY CIRCULATIONS BY BUILDING NUMBER IN (E) FOR JAN. 1964

ITEM	ITEM COUNT	SECRET COUNT	CONFID. COUNT	RESERVE COUNT	DELETION COUNT	UNCLASS. COUNT
REPORT	1	0	0	0	0	1
TOTALS	1	0	0	0	0	1

APPENDIX C

MATERIAL USED IN TECHNICAL REPORTS PROCESSING

TAPE RECORD FORMAT

Field	Content	Characters Begin	End	Notes
F1	# of characters in record	1	5	Always set to 1978
F1A	Blank	6	6	No entry
F2	Classification	7	7	U, C, S or blank
F3A	Serial # - Alpha	8	9	Left adjusted
F3B	Serial # - Numeric	10	16	Right adjusted
F4A	Cutter # - Alpha	17	22	Left adjusted
F4B	Cutter # - Numeric	23	27	Right adjusted
F5	Counter	28	29	Blank
F6	Volume Number	30	32	Right adjusted
F7	Part	33	34	Blank
F8	No. of copies	35	37	Right adjusted
F9	Group	38	38	
F10	Type	39	39	
F11	Corporate Author	40	92	Left adjusted
F12	Title Classification	93	95	(U), (C), (S) or blank
F13	Title	96	275	Left adjusted
F14A	Personal Author 1	276	293	Left adjusted
F14B	Personal Author 2	294	311	Left adjusted
F14C	Personal Author 3	312	329	Left adjusted
F14D	Personal Author 4	330	347	Left adjusted
F14E	Personal Author 5	348	365	Left adjusted
F15	List	366	367	Blank
F16	Date Published	368	373	Numeric - day, month,
F17	Range of Dates	374	385	Numeric - day, month,
F18	Place Published	386	399	Left adjusted
F19	Publisher	400	414	Left adjusted
F20	Contract - Number	415	442	

TAPE RECORD FORMAT (Cont'd)

Field	Content	Characters Begin	End	Notes
F21A	Series Note 1	443	502	Formatted into 7 fields
F21B	Series Note 2	503	562	Formatted into 7 fields
F22A	Subject 1	563	610	
F22B	Subject 2	611	658	
F22C	Subject 3	659	706	
F22D	Subject 4	707	754	
F22E	Subject 5	755	802	
F22F	Subject 6	803	850	
F22G	Subject 7	851	898	Left adjusted -
F22H	Subject 8	899	946	Uniterms have U
F22I	Subject 9	947	994	in 46th character
F22J	Subject 10	995	1042	of each subject
F22K	Subject 11	1043	1090	
F22L	Subject 12	1091	1138	
F22M	Subject 13	1139	1186	
F22N	Subject 14	1187	1234	
F22O	Subject 15	1235	1282	
F22P	Subject 16	1283	1330	
F22Q	Subject 17	1331	1378	
F23	Expansion	1379	1398	Blank
F24	Notes	1399	1678	
F25	Copy Numbers	1679	1978	5 character field for each copy #

DATA CAPTURE SHEET

C-2
FRONT

CL | **SERIAL NO.** | **CUTTER NO.** | **BL** | **VOL** | **NO. CTS** | **GRP** | **TYPE**

CORPORATE AUTHOR

TITLE Q.

TITLE

PERSONAL AUTHORS

LIST | **DATE PUB** | **RANGE OF DATES** | **PLACE PUB** | **PUBLISHER**

CONTRACT NO.

A SERIES NOTES

C-1
BACK

SUBJECTS

NOTES

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)	2a. REPORT SECURITY CLASSIFICATION
BOOZ ALLEN APPLIED RESEARCH, INC. 4733 Bethesda Avenue Bethesda, Maryland 20014	Unclassified
	2b. GROUP

3. REPORT TITLE

Mechanization Study of the U.S. Army Picatinny Arsenal
Technical Library, Dover, New Jersey

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	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
September, 1966	47	1

8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S)
DSA-7-15489	914-1-11
b. PROJECT NO.	
c.	9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)
d.	AD 640 106

10. AVAILABILITY LIMITATION NOTICES

Distribution of this Document is unlimited

11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY
None	Defense Supply Agency Defense Documentation Center Cameron Station, Virginia

13. ABSTRACT

The circulation of books and technical reports (both
classified and unclassified) at Picatinny Arsenal's Library
is mechanized by the IBM 7090 and 1401 computers, producing
seven outputs. At present, mechanized preparation of catalog
cards, maintenance of catalog authorities, preparation of
bibliographies and accessions lists, routing of periodicals,
and control of classified reports are under development.
Routing of periodicals should be operational early in 1966.
An SDI system is under consideration. Work measurement
and standard time data studies on the efficiency of the system
indicate that the mechanized circulation system is much more
efficient than the previous manual one.

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
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7a. TOTAL NUMBER OF PAGES: The total page count should follow normal pagination procedures, i.e., enter the number of pages containing information.

7b. NUMBER OF REFERENCES: Enter the total number of references cited in the report.

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9a. ORIGINATOR'S REPORT NUMBER(S): Enter the official report number by which the document will be identified and controlled by the originating activity. This number must be unique to this report.

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