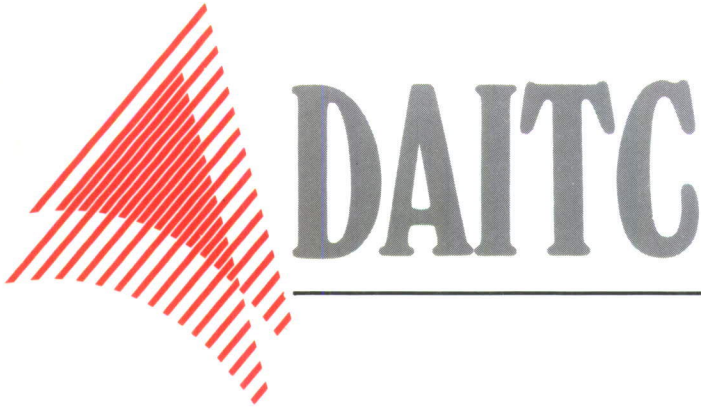




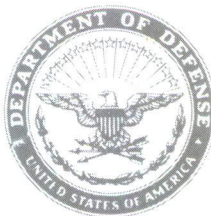
Current Awareness Bibliography (CAB) on Diskette Functional Description

DAITC/TR-88/002

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Block 18.

SDI, Selective Dissemination of Information, WORM

**Current Awareness Bibliography (CAB)
on Diskette
Functional Description**

August 19, 1988

TABLE OF CONTENTS

SECTION 1 FUNCTIONAL DESCRIPTION

1.1	Purpose of Functional Description	1
1.2	Project References	1
1.3	Terms and Abbreviations	2

SECTION 2 SYSTEM SUMMARY

2.1	Background.....	5
2.2	Objectives.....	5
2.3	Existing Methods and Procedures.....	5
2.4	Proposed Methods and Procedures	10
2.4.1	Summary of Improvements.....	12
2.4.2	Summary of Impacts.....	13
2.4.2.1	Equipment Impacts.....	13
2.4.2.2	Software Impacts	13
2.4.2.3	Organizational Impacts.....	14
2.4.2.4	Operational Impacts	14
2.4.2.5	Development Impacts	14
2.4.2.6	Other Impacts.....	14
2.5	Assumptions and Constraints.....	14

SECTION 3 DETAILED CHARACTERISTICS

3.1	Specific Performance Requirements	16
3.1.1	Accuracy Requirements.....	18
3.1.2	Timing	18
3.2	System Functions	18
3.3	Inputs - Outputs	20
3.4	Data Characteristics.....	24
3.5	Failure Contingencies	24

SECTION 4 ENVIRONMENT

4.1	Equipment Environment	25
4.2	Support Software Environment.....	26
4.3	Interfaces.....	26
4.3.1	External Interfaces.....	26
4.3.2	Internal Interfaces	27
4.4	Security and Privacy	27

SECTION 5 COST FACTORS

5.1	Cost Factors	28
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SECTION 6 SYSTEM DEVELOPMENT PLAN

6.1	System Development Plan	30
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APPENDICES

SECTION 1 FUNCTIONAL DESCRIPTION

1.1 PURPOSE OF FUNCTIONAL DESCRIPTION

This Functional Description for Current Awareness Bibliography (CAB) on Diskette, DTIC Major Project 733 13 3200, is written to provide:

- a. The system requirements to be satisfied, which will serve as a basis for mutual understanding between the user and the developer.
- b. Information on performance requirements, preliminary design, and user impacts, including fixed and continuing costs.
- c. A basis for the system test.

The user organization will consist of subscribers to the Current Awareness Bibliography on Diskette service. The developer organization will be the Defense Technical Information Center (DTIC), who will expand the present CAB service to include CAB on Diskette. Developmental assistance in the microcomputer area will be provided by the Defense Applied Information Technology Center (DAITC).

This document is intended to give an overview of the CAB on Diskette system. The basis for this document is the Current Awareness Bibliography User Needs Assessment, conducted in July 1988, where 3,500 surveys were sent to current CAB users to determine microcomputer hardware and software available to these users, retrieval software capability expectations, CAB information utilization patterns, and interest in CAB on Diskette prototype participation. Of the 3500 surveys mailed, 337 were returned to DTIC by August 12, 1988, the survey receipt cutoff date.

This document is organized according to the DLA ADS Life Cycle Management Specifications, with the sections of the standards document corresponding to the sections of this document. In those instances where sufficient information is not available, greater detail will be included in the CAB on Diskette System Specification.

1.2 PROJECT REFERENCES

Project Title: Current Awareness Bibliography (CAB) on Diskette.

Project Sponsor: Defense Technical Information Center Office of Information Systems and Technology.
Carol Jacobson, Project Officer.

Project User: Defense Technical Information Center Office of Information Systems and Technology.

Operating Centers: Various CAB user sites.

References:

- a. Current Awareness Bibliography (sample) September, 1987, (Appendix F).
- b. Current Awareness Bibliography (CAB) Direct Input Procedures, DTIC, May 1983 (annotated 1986-87).
- c. Current Awareness Bibliography (CAB) on Diskette Project Implementation Plan, DAITC, May 1988 (Appendix A).
- d. Current Awareness Bibliography User Needs Assessment (survey document), DAITC, June, 1988 (Appendix C).
- e. Current Awareness Bibliography User Needs Assessment Summary, DAITC, August 1988 (Appendix B).
- f. DLA ADS Life Cycle Management Specifications, DLA, July, 1985.
- g. Major Project 731.4201, Electronic Document System (EDS) Update, DTIC, February, 1987.
- h. Major Project 733 13 3100, Technical Report Database Optical Media (CD-ROM) Prototype, DTIC, November, 1987.
- i. Major Project 733 13 3200, Current Awareness Bibliography (CAB) on Diskette Project Statement, DTIC, July 1988 (Appendix D).
- j. Non-Standard Media Distribution Project Statement, DTIC, September, 1986, (Appendix E).
- k. Organization, Missions, and Functions, DTIC, August, 1987.

1.3 TERMS AND ABBREVIATIONS

<u>Term</u>	<u>Definition</u>
Accession number	The AD number is composed of a transaction type prefix and a uniquely assigned serial number for ADP and document processing and control.
AD	Accession Document.
ADN	Accession Document Number.
ADP	Automated Data Processing.
ASCII	American Standard Code for Information Interchange; a computer coding system used to represent the alphabetic, numerical, and punctuation characters.

ATN	Automated Technical Abstract Bulletin Notice.
Bibliography	Collection of citations to reports, usually limited to one or more specific subject categories. Provides data on each report such as title, accession number, classification, author, date of report, abstract, and other items.
CAB	Current Awareness Bibliography.
CAB Program	Current Awareness Bibliography Program. A customized, automated bibliography service based on the information needs of DTIC users.
CD-ROM	Compact Disk Read-Only Memory. A computer storage medium used to retrieve stamped information.
CGA	Color Graphics Adapter - a hardware display add-on for IBM PCs that includes three color signals (red, green, and blue) and a resolution of 640 by 200 pixels.
DAITC	The Defense Applied Information Technology Center.
Diskette	A 5 1/4" magnetic computer storage medium to be used with the CAB on Diskette system.
DROLS	Defense RDT&E (Research, Development, Technology, and Engineering) On-Line System.
DTIC	The Defense Technical Information Center.
DTIC 2000	The planning document designed to take DTIC into the 21st century.
DTIC-B	The Office of User Services.
DTIC-EA	The Information Research and Technology Division of the Office of Information Systems and Technology.
DTIC-F	The Directorate of Document Services.
DTIC-HAR	The Retrieval Analysis Branch of the Analysis Division of the Directorate of Database Services.
DTIC-Z	The Directorate of Telecommunications and ADP Systems.
EGA	Extended Graphics Adapter - a hardware display add-on for IBM PCs that includes six color signals (two each for red, green, and blue) and a resolution of 640 by 350 pixels.

Mainframe	A classification of computers usually referring to a machine capable of supporting twenty or more simultaneous users, several megabytes of memory, and a high-performance central processing unit (CPU).
Master File	Compilation of data on each CAB profile within a specific cycle. Includes ID line, search terms, title, requester's name, search control number, user code, and other optional data such as index request and AD number limitations.
Mouse	A graphical user interface input device made popular with the Apple Macintosh microcomputer; the point-and-shoot device.
New Master File	Updated, most current Master File.
Profile	List of data under one CAB search control number. Includes ID line, terms (subject, field and group, contract number, etc.) title, requester's name, index request, and AD number restrictions.
Prototype	An implementation of an information system designed to prove feasibility; not intended to be the final, productional system.
RAM	Random Access Memory used by the computer as primary, or scratch pad, storage, as opposed to secondary, or permanent, storage.
Semimonthly	Twice a month.
TR	The Technical Reports citation database.
TRESP	The DAITC facility management contractor.
VGA	Video Graphics. Array - a hardware display add-on for IBM PCs that supports 256 colors from a pallatte of 262,144 and a resolution of up to 640 x 480 pixels.
WORM	Write Once, Read Many optical disk drive.

SECTION 2 SYSTEM SUMMARY

2.1 BACKGROUND

The CAB on Diskette system has been approved for design and development by the Defense Technical Information Center's Office of Information Systems and Technology. The system will allow the current CAB users to receive the bibliography on a diskette suitable for an IBM PC or PC-compatible database management system.

Under the current system, the user receives a printed copy of his or her customized bibliography. Although each individual CAB has indices on the contract number, subject, corporate author, personal author, report number, and title, these indices are only available for the current CAB mailing and not on a cumulative basis. With the CAB on Diskette system, however, users will be able to add the bibliographies to a personalized database on an IBM PC hard disk, with the potential of keeping the database on a Write Once Read Many (WORM) drive. This gives individual users the power to personalize their database and to access the data in ways that best meet their needs.

2.2 OBJECTIVES

The major goals of the CAB on Diskette system are as follows:

- a. To determine the feasibility of producing Current Awareness Bibliographies on diskette as well as in hard copy.
- b. To provide DTIC CAB users with an electronic format of the Current Awareness Bibliography.
- c. To provide CAB users with an off-the-shelf database management system that matches the features that they requested in the User Needs Assessment and is compatible with the computer equipment that they have available. Detailed requirements are given in Section 3.1, Specific Performance Requirements.

The objectives above relate to the following DTIC 2000 goals:

- 4.2 Establish the kinds of information storage needed.
- 4.7 Use new technologies to expand the media in which DTIC products are provided.

2.3 EXISTING METHODS AND PROCEDURES

CAB is a profile-based service, in which the potential CAB recipient works with a DTIC information retrieval specialist to establish a "profile" that describes the user's interests. The profile is most likely to be a "subject profile" relating to the subject of the literature. DTIC's computer will match each user's

individual profile against the new reports that have arrived at DTIC during the preceding two weeks. The data sent to CAB users is part of the Technical Reports (TR) Database. The data is manually input from DD Form 1473, then data is pulled from the Technical Reports Database and sent to interested users, who will automatically be mailed a bibliography with complete information on the reports matching his or her profile (see Appendix F). The information will include, but not be limited to, personal author, corporate author, title, subject terms, and abstract. The user is encouraged to review his or her profile and modify it as needed to ensure that the CABs are as useful as possible.

a. **Organizational/Personnel Responsibilities**

<u>Unit</u>	<u>Responsibilities</u>
DTIC-HAR	Support the CAB User Community and distribute CABs; maintains user profiles.
DTIC-ZD	Monitors DROLS and associated automated information systems.

b. **Equipment Available**

<u>Equipment Description</u>	<u>Remarks</u>
UNISYS 1182	Classified system - holds the bibliographic data.
UNISYS 1161	Unclassified system - updates are performed here.

c. **Inputs and Outputs**

<u>Description</u>	<u>I or O</u>	<u>Frequency</u>	<u>High/Med./Low</u>	<u>Remarks</u>
CABs	O	Semimonthly	High - 3200	Mailed
TR (Working file)	I	Daily	300	Entered from DD Form 1473.
User profiles (Working file)	I	Daily		Modified by DTIC Database Services.

1

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the 1161 to
the 1182.

1

Copied from
the 1161 to
the 1182.

Current Awareness Bibliography Existing System Hierarchy

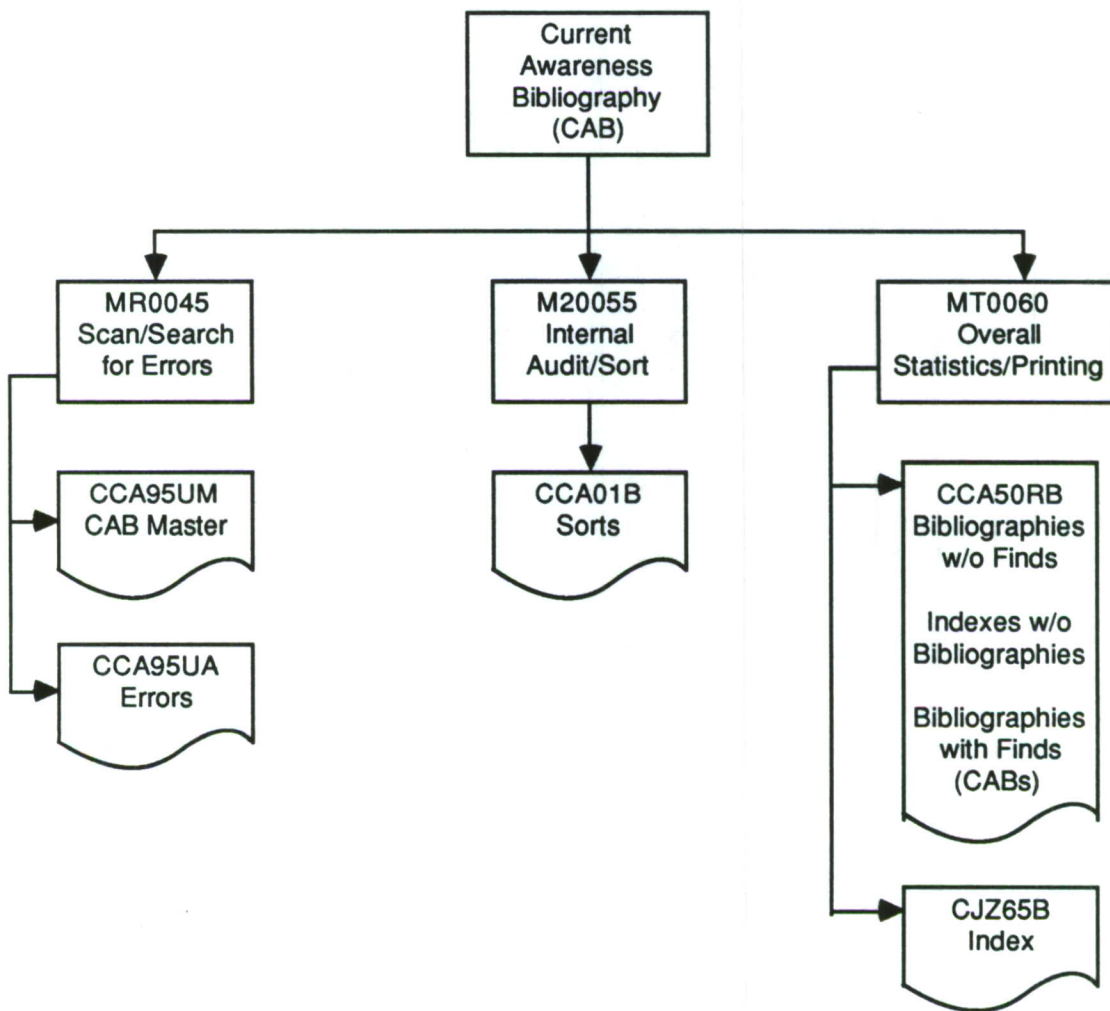
Functional Description

19 Aug 88

Current Awareness Bibliography (CAB) on Diskette

2.3 Existing Methods and Procedures

Existing System Hierarchy Chart



The MIT/MITRE system, a separate run of the CAB system, has the same format as above, except that the input tape is the MIT/MITRE tape, and the Overall Statistics process is numbered MT0065.

Current Awareness Bibliography Existing System I/O Chart

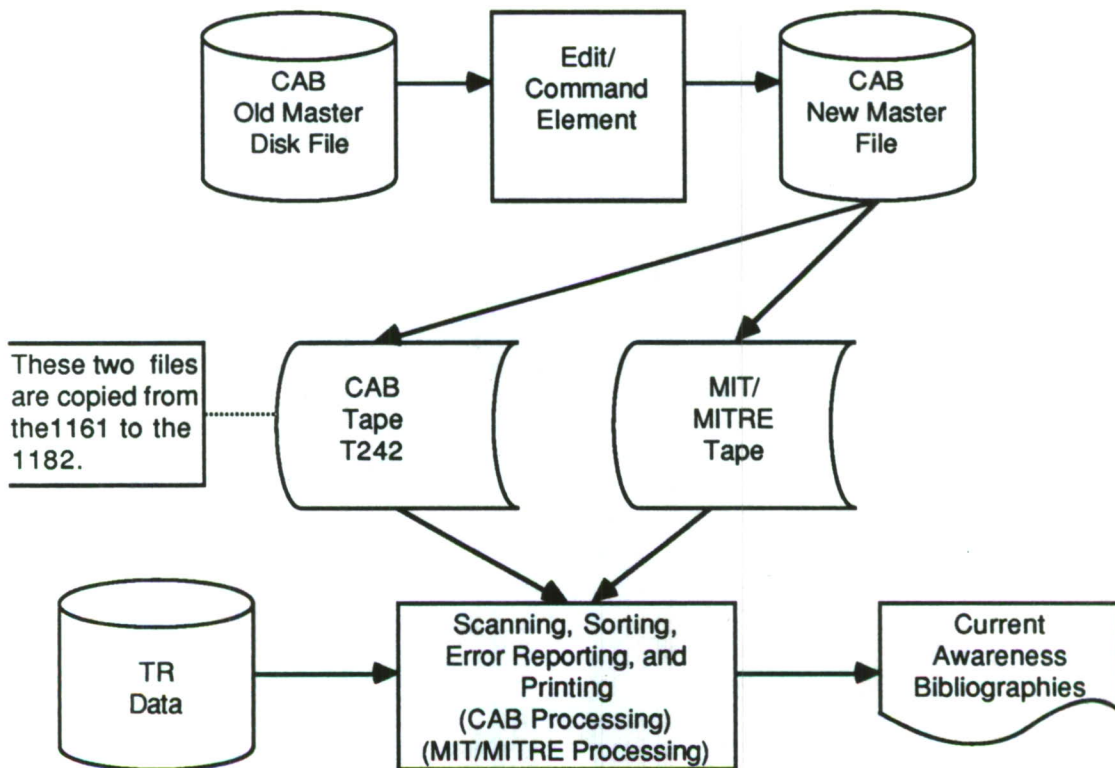
Functional Description

19 Aug 88

Current Awareness Bibliography (CAB) on Diskette

2.3 Existing Methods and Procedures

Existing System I/O Chart



2.4 PROPOSED METHODS AND PROCEDURES

The feasibility of producing Current Awareness Bibliographies on diskette as well as in hard copy will be tested through development of a prototype CAB on Diskette system (see Appendix C). In preparation for prototype development, a CAB User Needs Assessment was mailed to CAB users to survey their requirements and compile a list of users interested in participating in the prototype.

The prototype CAB on Diskette system will provide CAB users with an enhancement to the existing hard copy CAB system. All capabilities currently available with the existing system will continue to be available. The additional capability to produce CABs on diskette will be incorporated into the current system. This addition will require changes in the existing CAB mainframe software to implement sending CAB output to diskette.

Since CAB User Needs Assessment respondents interested in participating in the prototype CAB on Diskette numbered 206, it is expected that a significant percentage of current CAB production will be output to diskette when the system is marketed and becomes operational. CAB on Diskette prototype participation will be limited to four users chosen from the CAB User Needs Assessment respondents interested in participating in the prototype. It is proposed that the system design include a separate run for CAB on Diskette just as a separate run is now utilized for MIT/MITRE with the existing system. Adding a separate run for the CAB on Diskette will minimize impact on current hard copy CAB production and will facilitate clearer determination of the resources required for CAB on Diskette production.

Since CAB on Diskette will be a microcomputer-based product, current CAB hardware and software will be supplemented by microcomputer hardware and software. The microcomputer hardware utilized will correspond to the hardware available to the majority of current CAB users as specified in responses to the "CAB User Needs Assessment."

Potential CAB on Diskette retrieval software will be identified through a market analysis update that will include the following procedures:

1. Review of vendor literature and documentation
2. Product demonstrations
3. Discussions with current users

Software, identified through the market analysis as likely to meet CAB requirements, will undergo a preliminary selection process. This selection process will include testing the software against a list of evaluation criteria, including those software capabilities desired by the majority of survey respondents who answered the software capabilities section. Features common to all robust software will also be included in the selection criteria. Software requirements identified through the survey are presented in subsection f of Section 3.1, Specific Performance Requirements.

As a result of the preliminary selection process, several information storage and retrieval software packages will be procured for preliminary testing

at the DAITC in order to validate claimed capabilities. A report presenting the results of the testing and recommending a software package will be delivered to the DTIC project officer, along with a demonstration of the software package. The software recommended must meet requirements outlined in Section 3.1 and allow manipulation of CAB data on diskette by CAB on Diskette users.

The CAB data that is output to diskette by the system will be output in a format usable with the selected retrieval software. A batch file will be provided by the contractor recommending the software to facilitate the appending of data by CAB users to their local microcomputer CAB database with each CAB issue. A facility will be provided to allow users to implement the classification and availability changes contained in the quarterly Automated Technical Abstract Bulletin Notes (ATN) to the data maintained in their local microcomputer CAB database. The CAB users may then accumulate CABs over long periods for continued reference utilizing online storage with rapid access via information search and retrieval software. The recommended software will be compatible with WORM technology to allow storage of massive amounts of accumulated data. Magnetic storage will also be supported. The retrieval software recommended will be an off-the-shelf product readily available for purchase by CAB users.

The DTIC project officer will review the software recommendation and reject or select the software for use with the CAB on Diskette system. Selected software will be procured by a government appointed contractor for use in CAB on Diskette prototype development.

The final stage of the prototype development process will include actual CAB on diskette database design, development, and test and evaluation. The DTIC project officer will select users to participate in the test of the prototype from the pool of potential participants identified through the survey.

Training will be provided for the DTIC project officer, DTIC-Z participants, and the CAB user prototype test participants. Complete user and system documentation will be developed. User support will be provided as necessary and documented. After the prototype test, a written evaluation of the prototype, including recommendations for changes and enhancements, will be delivered to the DTIC project officer.

2.4.1 SUMMARY OF IMPROVEMENTS

The following benefits will be obtained from the proposed CAB on diskette system:

- (a) CAB on Diskette users will receive Current Awareness Bibliographies on diskette. The diskette distribution media will enable loading of CAB information onto user-site microcomputers.
- (b) The new CAB on Diskette product will include recommended information storage and retrieval software to provide users with a means of accumulating CABs, further refining searches, creating ad hoc reports and bibliographies, and tracking DoD-funded research in selected areas.
- (c) The availability of accumulated CAB information to the busy researcher or information specialist should eliminate the need for downloading information from the TR database in his or her area of interest.

2.4.2 SUMMARY OF IMPACTS

The proposed CAB on Diskette System is expected to have the following impacts:

2.4.2.1 EQUIPMENT IMPACTS

The proposed system will require the same equipment as the current system. In addition, microcomputer equipment will be procured for evaluators of the CAB on Diskette prototype. Responses to the CAB User Needs Assessment indicated that the IBM Personal Computer and compatibles are the most widely used personal computers in the CAB user community. Thus, the following personal computer equipment configuration will be procured in support of the CAB on Diskette prototype:

- Advance (Zenith 248)
- 80287 math co-processor
- RGB color monitor
- Dot matrix printer
- Mouse
- Hard disk
- Floppy disk
- Internal 2400 baud modem
- ISI 525 WC WORM drive

An autoloader will be procured for DTIC-Z to facilitate output of CAB data to diskettes.

2.4.2.2 SOFTWARE IMPACTS

Additional mainframe software will be required to output the data in packed format. The system specification for CAB on Diskette will indicate whether or not the CAB on Diskette output data will be required in packed format.

Modifications to the existing CAB mainframe software will be required to output the CAB information to diskette. The profile software must be modified to flag those profiles that require Current Awareness Bibliographies output to diskette. Current CAB output programs must be modified to recognize the new "flag," and implement the output to diskette function.

Personal computer information storage and retrieval software will be selected and procured by DTIC to provide the CAB data manipulation capabilities most requested by CAB users. Licensing arrangements and other vendor-approved methods of distributing software to prototype participants will be explored as desirable alternatives to purchasing multiple copies of the selected software package. DTIC will retain the right to copy and distribute all personal computer software developed at the DAITC. At a minimum, personal computer batch files will be developed to facilitate the accumulation of CAB data in the local database by CAB users.

2.4.2.3 ORGANIZATIONAL IMPACTS

Current DTIC staff involved in CAB production will maintain the same responsibilities. Staff from DTIC-EA, DTIC-B, DTIC-F, DTIC-HAR, and DTIC-Z will contribute to the production of CAB on Diskette. Project administration will be provided by DTIC-EA. The Office of User Services and Marketing, DTIC-B, will handle marketing considerations. A DTIC committee composed of representatives from B, L, E, and A will address pricing issues. DTIC-Z will implement the CAB special program modifications to enable output to diskette. Once the product is operational, it will be turned over to DTIC-HAR for program management and to DTIC-Z for operation and maintenance.

2.4.2.4 OPERATIONAL IMPACTS

The current CAB semimonthly cycle will remain in place. The timeliness of the CAB on Diskette data will match the timeliness of hard copy CAB data. CAB operational procedures will remain essentially the same. The CAB on Diskette run will be added to the CAB and MIT/MITRE runs to minimize impact on the current CAB production system.

2.4.2.5 DEVELOPMENT IMPACTS

DTIC will provide manpower to modify the existing CAB mainframe programs to enable CAB output to diskette.

2.4.2.6 OTHER IMPACTS

User-level documentation for the CAB on Diskette system will be provided by a government selected contractor. Microcomputer system level documentation for the CAB on Diskette system will be provided by a government selected contractor. DTIC CAB documentation will be modified by the appropriate DTIC offices and/or directorates to include the system changes necessitated by the addition of the CAB on Diskette capability.

2.5 ASSUMPTIONS AND CONSTRAINTS

- a. The assumption is made that CAB data will be available in American Standard Code for Information Interchange (ASCII) format.
- b. Since IBM PC and compatible users represent the largest percentage of CAB User Needs Assessment respondents, the CAB on Diskette system will be designed for the IBM PC and compatible family of microcomputers. This limitation makes the proposed CAB on Diskette unavailable to users of other microcomputers who expressed interest in receiving CAB data on diskettes. The possibility of eliminating this constraint through expanding

CAB on Diskette distribution to include other microcomputer systems at a later date will be evaluated by DTIC.

- c. The assumption is made that an autoloader or other similar mechanical device will be procured to facilitate the production of CAB diskettes at DTIC for the operational system.

Autoloaders are hardware devices that can be purchased as stand-alone devices, peripherals, or as part of diskette duplication systems. Autoloaders and accompanying software were devised to meet the requirements of the microcomputer software industry in supplying the capability to bulk load diskettes for duplication purposes. Typically, blank diskettes are stored in a loading bin that automatically feeds the autoloader copy drive. The autoloader may be treated as a peripheral to the host microcomputer system enabling software selection of multiple master files stored on the microcomputer hard disk for job streaming of the "copy to diskette" process. This autoloader application is the one that has the most applicability to the needs of the proposed CAB on Diskette system. The operational speed and the size of the loading bin vary with model and vendor.

SECTION 3 DETAILED CHARACTERISTICS

3.1 SPECIFIC PERFORMANCE REQUIREMENTS

This section presents a delineation of system requirements. A requirements analysis was conducted in a non-traditional fashion for CAB on Diskette due to the large number of CAB users and their great geographical diversity. To define CAB user needs, a CAB User Needs Assessment was designed and mailed to CAB users on July 11 (CAB cycle 17). The CAB User Needs Assessment was printed on noticeable tan paper and included in the Current Awareness Bibliography packet. A copy of the CAB User Needs Assessment as mailed to end users appears in Appendix C.

The CAB User Needs Assessment surveyed the CAB users to determine the microcomputer hardware and software that they had available. Information as to how they used hard copy CABs was gathered, along with user preferences for capabilities available with information search and retrieval software. An occupation fill-in was included in the survey to determine whether the CAB User Needs Assessment respondent was an information specialist or a CAB end user. Information specialists were considered to be intermediaries. All other occupations were tallied as end users. Of 312 occupation respondents, 51 were information specialists. The remaining 261 were end users. Of 337 CAB survey respondents, 206 were interested in participating in the CAB on Diskette prototype.

An overview of the requirements presented by the users through the CAB User Needs Assessment is presented in the paragraphs below. The specific numbers upon which this requirements overview is based may be perused in Appendix B, Current Awareness Bibliography User Needs Assessment Summary.

- a. IBM personal computers and compatible equipment must be supported. Of 337 respondents, 261 regularly used IBM PC and compatible equipment.
- b. Memory required by the selected IBM PC and compatible search and retrieval software must be kept to a minimum. Most respondents indicated that they had at least 512K of RAM. However, 71 percent of the PC users indicated that they owned one or more memory resident software packages or peripherals with memory resident drivers, thus reducing the amount of RAM actually available for use on their systems.
- c. The selected search and retrieval software should be usable with DOS version 3.0 or above. Only 16 of 212 respondents were using earlier versions of DOS.
- d. The selected search and retrieval software must support a variety of printers. Epson dot matrix printers and HP Laserjet printers were owned by the greatest number of CAB users.
- e. Commonly available IBM PC and compatible graphics adapters must be supported. Sixty-two percent of respondents specified that they had either EGA or CGA or compatible graphics adaptors.

- f. The search and retrieval software capabilities required by the greatest number of respondents are presented below. Respondents were allowed to check as many choices as desired. Choices within the three categories below are presented in descending order according to frequency chosen.

Search properties:

- (1) Boolean
- (2) Controlled vocabulary
- (3) Search on any field
- (4) Wild card
- (5) Free-text

Display formats:

- (1) Display with abstracts
- (2) Display any field
- (3) Page scroll
- (4) Number of Documents per hit
- (5) Display without abstracts

Output capabilities:

- (1) Transfer to printer
- (2) Transfer to disk
- (3) Sorts
- (4) Combine multiple searches
- (5) Transfer to word processor.

- g. Support of the transfer to word processor feature requires that selected retrieval software include the ability to transfer data to commonly used word processors. Forty-three percent of respondents were using either Word Perfect or Wordstar.

The remaining objectives are taken from the CAB on Diskette Project Implementation Plan, Appendix A.

- h. Be able to interface with the TR Database to the extent that data from the TR Database can be downloaded and appended by the user to the local database. The capability to interface with the TR Database on CD-ROM will be dependent upon the retrieval software chosen for the CD-ROM product.
- i. Provide output in the form of hardcopy bibliographies (see Appendix F).
- j. CAB data on diskette must be easily appendable to a local cumulative database on either hard disk or optical media (WORM drive). Communications software will be recommended to facilitate uploading of CAB data to the DoD Gateway Information System (DGIS).
- k. Resemble the TR Database in terms of field names and canned display formats (see Appendix F) unless a change is approved by the DTIC project officer.

- l. Provide for storage and retrieval information by field, proximity searching, free-text searching, use of wild cards, and storage of profiles.
- m. Be able to store profiles that can be run against the cumulative database or the data on the update floppy diskette.

3.1.1 ACCURACY REQUIREMENTS

The same accuracy requirements utilized for the hard copy CAB system will be utilized for CAB on Diskette.

3.1.2 TIMING

Timing requirements utilized for the hard copy CAB system will also be utilized for CAB on Diskette.

3.2 SYSTEM FUNCTIONS

The requirements specified above in Section 3.1 will be used in the selection of hardware and software to support the CAB on Diskette system. Until the selection of the information search and retrieval software is accomplished, complete hierarchical inter-relationships of CAB on Diskette system components will not be known. Upon retrieval software selection, subsystem function charts will be created to include design requirements imposed by the choice of retrieval software.

Thus, the CAB on Diskette System Hierarchy Chart included in this section presents only major functions now expected to be integral to the CAB on Diskette system. System function descriptions for the high-level hierarchy chart appear in Appendix G.

CAB on Diskette Proposed System Hierarchy Chart

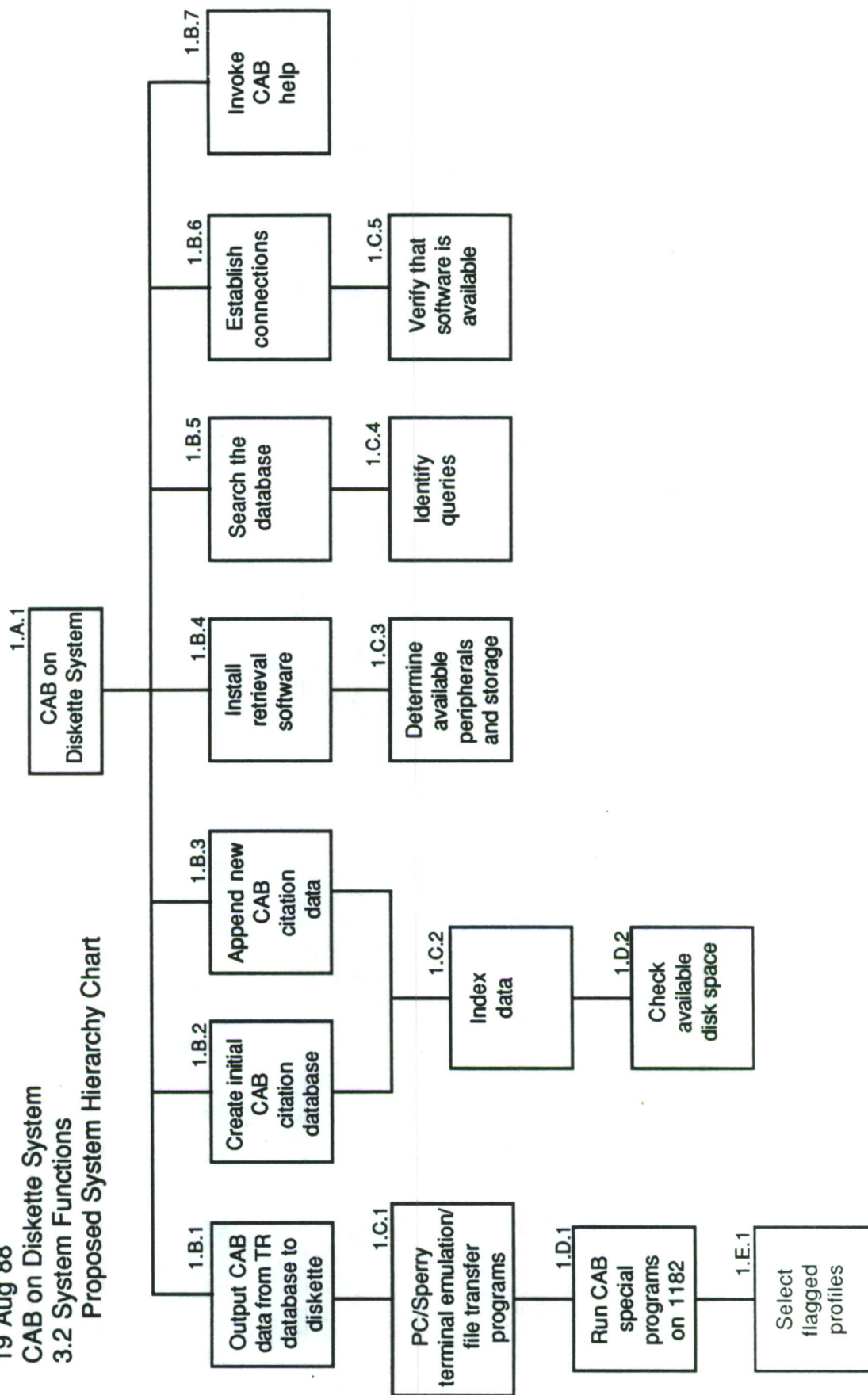
Functional Description

19 Aug 88

CAB on Diskette System

3.2 System Functions

Proposed System Hierarchy Chart



3.3 INPUTS - OUTPUTS

The Process Input - Output Table verbally tracks the flow of data through the proposed CAB on Diskette system. Only high-level data I/O is presented.

Process - Input - Output Table

<u>Reference #</u>	<u>Process Block</u>	<u>Input Data</u>	<u>Output Data</u>
1.E.1	Select flagged profiles	CAB new master	Extracted CAB on Diskette new master profiles
1.D.1	Run CAB on Diskette special programs	CAB old master	CAB new master
1.C.1	PC Sperry terminal emulation and file transfer programs	CABs (1182)	CABs tranferred to PC (diskette)
1.B.2	Create initial PC CAB database	Individual CAB on Diskette	Indexed, searchable CAB database
1.B.3	Append new CAB data	Individual CAB on Diskette	Updated personal CAB database
1.B.5	Search the database	User query	Display of query results; Stored query results; Printed query results.

A hard copy CAB appears in Appendix F. At a minimum, search results must provide comparable levels of information, although greater capability is expected. Precise functional capabilities will be determined by the information search and retrieval software selected.

The charts that follow are included to pictorially show the flow of data through the proposed CAB on Diskette system using an input flow/output format. The CAB on Diskette System I/O Chart illustrates the high-level changes on the mainframe system anticipated to support the proposed CAB on Diskette system. The CAB on Diskette PC System I/O Chart illustrates the flow of data for the proposed CAB on Diskette PC system component. Both charts will be refined as the system design progresses.

CAB on Diskette Proposed System I/O Chart

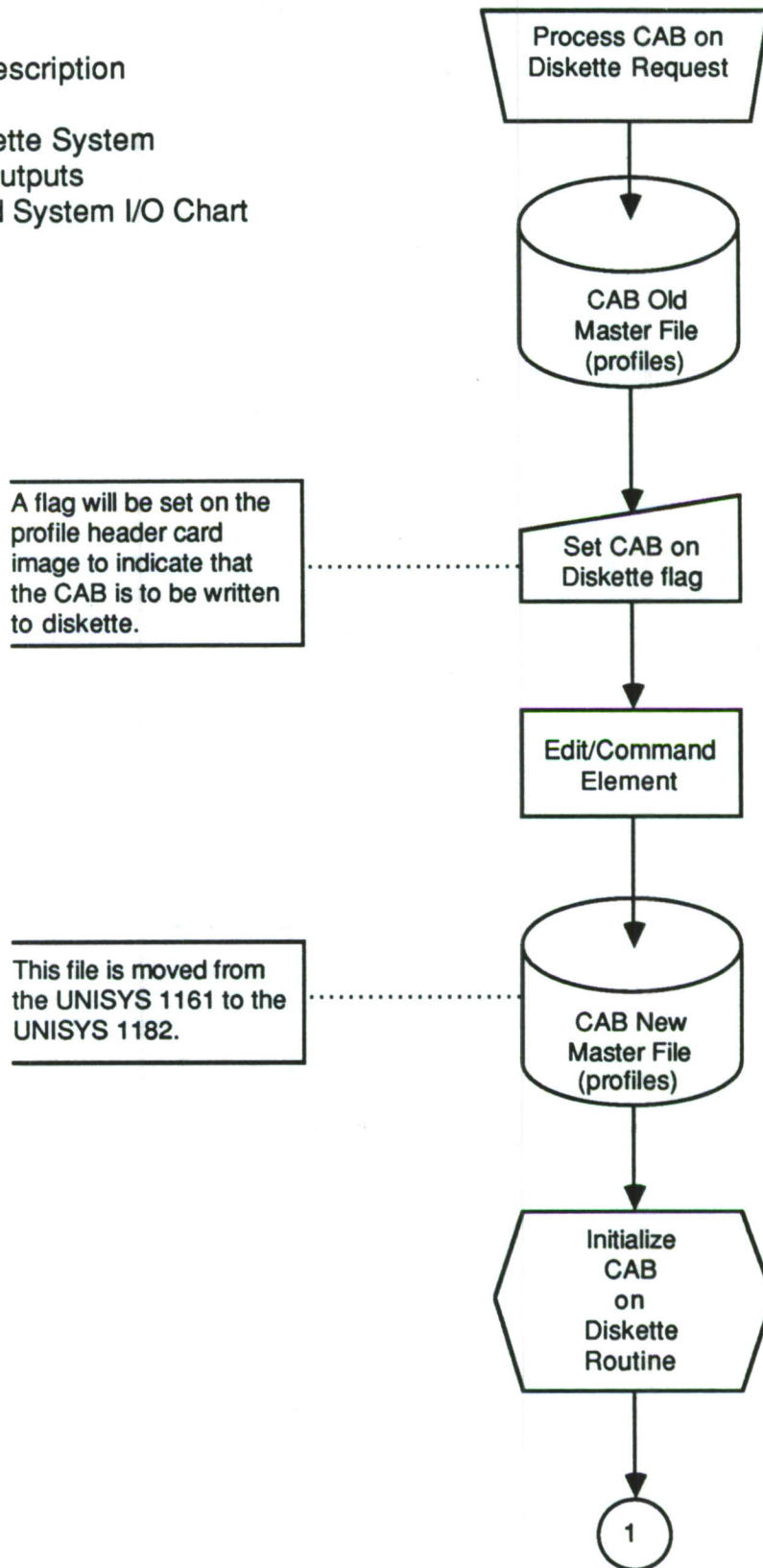
Functional Description

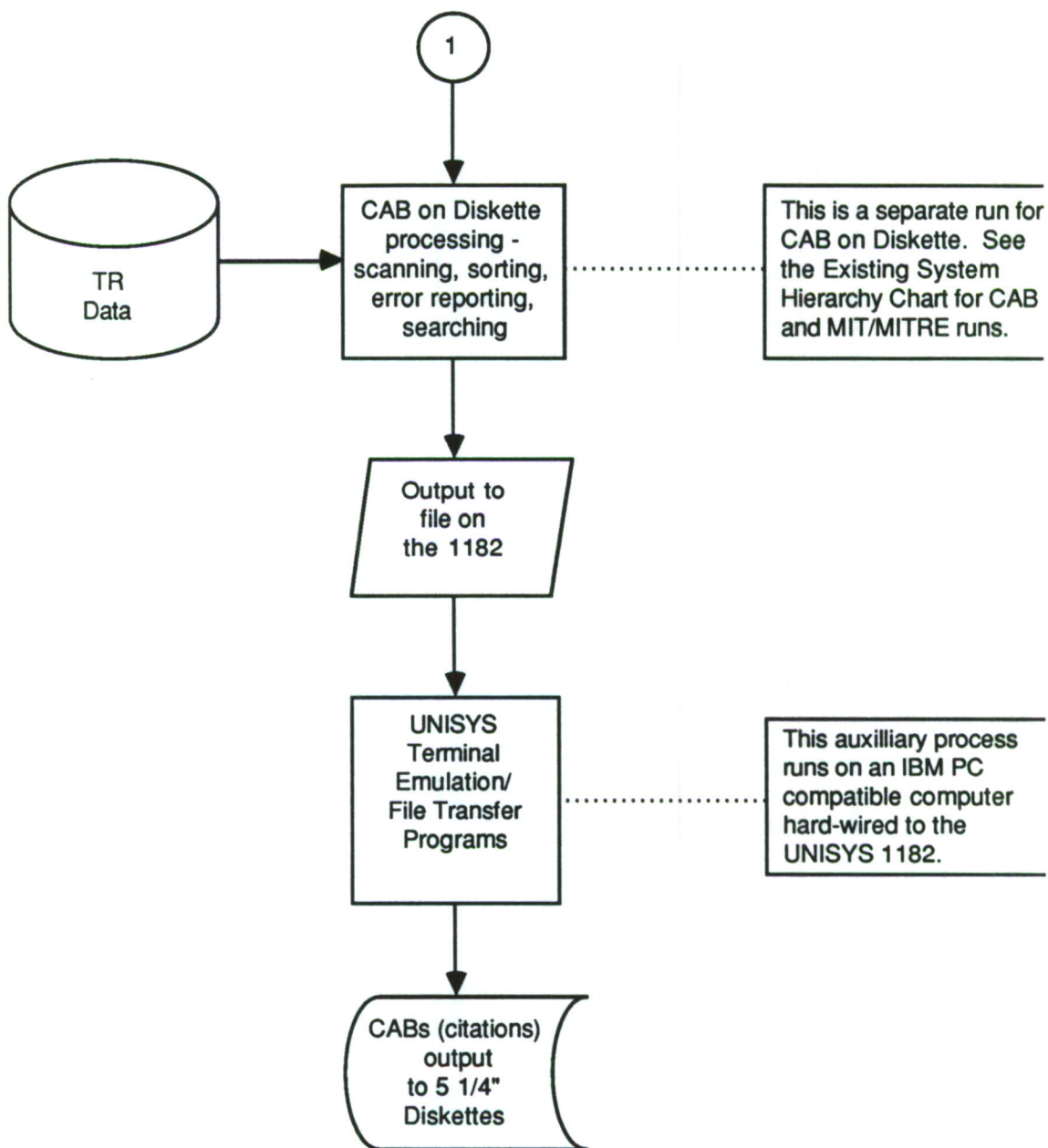
19 Aug 88

CAB on Diskette System

3.3 Inputs - Outputs

Proposed System I/O Chart





CAB on Diskette

Proposed PC System I/O Chart

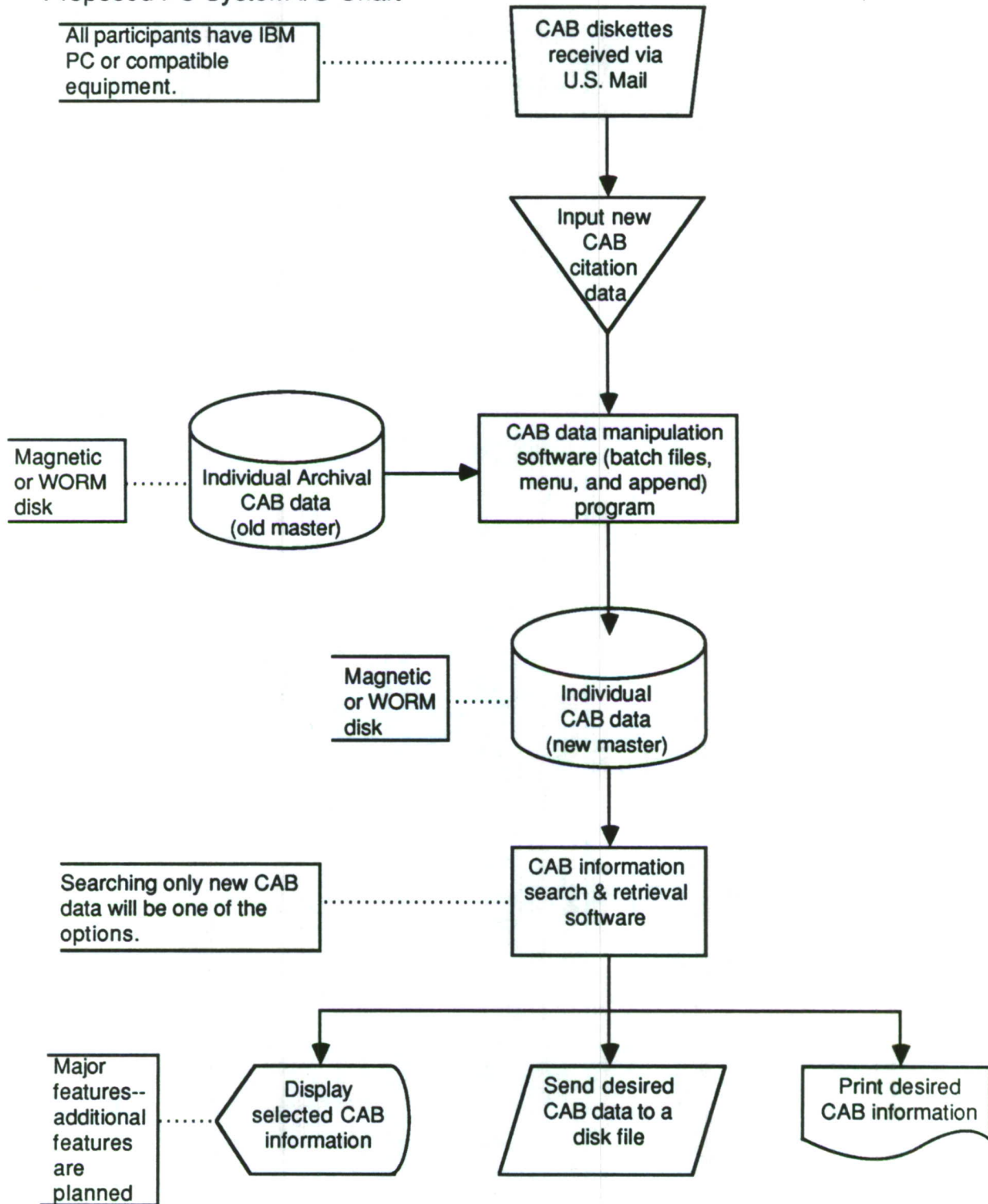
Functional Description

19 Aug 88

CAB on Diskette System

3.3 Inputs - Outputs

Proposed PC System I/O Chart



3.4 DATA CHARACTERISTICS

CAB data used for the mainframe component of the CAB on Diskette system will require essentially the same amount of storage as used for the current system. Implementation of a CAB on Diskette capability adds an enhancement to the current CAB system by providing output of CAB data to diskette. The addition of a one byte flag to the profile header card image of each CAB on Diskette participant is anticipated. This one byte change will have a negligible effect on storage space required.

Current CABs have an average individual size of 41.07 records (no hit profiles not included). The average individual CAB size with the no hit profiles included is 34.07 records. Each record has an average size of 1620 bytes. This yields an average CAB size of approximately 66 kilobytes. Thus, the average CAB will easily fit on one PC diskette. The largest CAB sent (CAB Cycle 17) was 1235 records in length. This yields a CAB Cycle 17 largest CAB size of approximately 2 megabytes. The maximum size of a CAB will vary, and could represent a fewer or greater number of records in future cycles. Alternative overflow handling techniques will be explained in greater detail in the system specification.

IBM PC formatted floppy diskettes (5 1/4") vary in capacity from 360K (double density) to 1.2 megabytes (quad density). To avoid the necessity for mailing many diskettes to CAB users with large bibliographies, the possibility of packing the CAB output data is being discussed with DTIC-Z. PC software to automatically unpack the data for the CAB on Diskette user would then be mandatory. The question of packing the data for mailing will be discussed in greater detail in the CAB on Diskette System Specification.

Storage on a local CAB user's system is not likely to be available to handle biweekly input of CABs in the size range of 2 megabytes or more. Thus, the WORM drive storage alternative is being planned for these large CAB users. Delivery of 26 CABs per year will require in the vicinity of 52 megabytes of storage for individuals whose profiles routinely yield large CABs. This capacity is available through use of optical disk technology. WORM technology provides the required update capability. Adequate archival storage is expected to be available through use of the small 5.25" WORM disks. Due to the lack of standards in the WORM drive area, use of a particular drive must be recommended to large CAB users to assure software compatibility. The ISI 525 WC, providing 115 megabytes of storage per media side, is currently being evaluated for use with the CAB on Diskette system.

More details on storage requirements and the characteristics of CAB data including data elements and number of characters per data element included in each record will be provided in the CAB on Diskette System Specification.

3.5 FAILURE CONTINGENCIES

The proposed prototype CAB on Diskette system will be an addition to the existing CAB system that will provide an alternative form of output. The failure contingencies in place for the current hard copy CAB production system will remain in place. The prototype CAB on Diskette will be run in parallel with the hard copy system. An isolated failure in any part of the CAB on Diskette production system will necessitate a return to the hard copy CAB until recovery takes place.

SECTION 4 ENVIRONMENT

4.1 EQUIPMENT ENVIRONMENT

The equipment required for hard copy CAB production will also be utilized in CAB on Diskette production. See Section 2.3, Existing Methods and Procedures, for a discussion of hard copy CAB production procedures.

The following microcomputer equipment will be utilized in the CAB on Diskette prototype.

<u>Equipment</u>	<u>Number</u>	<u>Additional Information</u>
a. Microcomputer system: Advance Zenith 248 80287 math co-processor RGB color monitor Dot matrix printer (ALPS) Mouse	5	Four of these systems will be utilized in the field by prototype participants. One system will be utilized by the contractor developing the prototype.
b. Storage Devices: ISI 525 WC WORM Drive	5	WORM drive utilization will provide storage for far greater amounts of cumulated CAB data.
Hard Disk Drive	5	
Floppy Disk Drive	5	Input CAB data.
c. Other Equipment: Surge Protector	5	Prevent electrical spike damage to equipment.
Internal 2400 Baud Modem	5	Communications.

The equipment listed above is provided during the identification phase to present an overview of expected equipment needs for CAB on Diskette through prototype development. The operational CAB on Diskette is expected to require additional equipment at DTIC such as a diskette autoloader. Equipment data will be further refined and finalized during the design phase of CAB on Diskette.

4.2 SUPPORT SOFTWARE ENVIRONMENT

The support software information gathered during the requirements identification phase is for general planning purposes and is not intended to be specific. Detailed support software requirements will be developed during the design phase and presented in the CAB on Diskette System Specification.

<u>Support Software</u>	<u>Description</u>
Profile software	Need modification to flag that CAB is to go to diskette
CAB special programs	Need modification to send output from flagged profiles to diskette.

4.3 INTERFACES

The interface information available during the design phase is for general planning purposes and is not intended to be specific. Detailed interface information will be presented in the CAB on Diskette System Specification. DLA Form 1554 will be utilized in the system specification.

4.3.1 EXTERNAL INTERFACES

This section covers planned CAB on Diskette interfaces with other systems and subsystems.

<u>Interfacing Element</u>	<u>Requirements</u>	<u>Method of Data Exchange</u>
TR Database	TBD	Telecommunications
CD-ROM TR Database	Dependent upon availability of CD-ROM and indices used.	CD-ROM drive is assumed to be a peripheral on system utilizing CAB on Diskette (feasibility of providing software compatible with the CD-ROM database is to be assessed).

4.3.2 INTERNAL INTERFACES

This section covers planned CAB on Diskette interfaces internal to the CAB on Diskette system.

<u>Interfacing Element</u>	<u>Requirements</u>	<u>Method of Data Exchange</u>
Existing CAB System (DTIC-Z)	Provide CAB data in ASCII format.	Floppy Diskette.
PC WORM drive	Automate accumulation and access of data on this peripheral.	Peripheral access will utilize device driver software. Automated accumulation of CAB data will require MS-DOS batch (.bat) file.
PC Magnetic disk	Automate accumulation and access of data on this peripheral.	Peripheral access will utilize device driver software. Automated accumulation of CAB data will require MS-DOS batch (.bat) file.

4.4 SECURITY AND PRIVACY

CAB on Diskette will be a profile-based unclassified system.

SECTION 5 COST FACTORS

5.1 COST FACTORS

CAB on Diskette project costs will be spread over several budget years. DTIC resources required through fiscal year 91 are estimated below on a personpower per milestone basis:

Milestone	DTIC-EA		DTIC-B	DTIC-F	DTIC-HAR	DTIC-Z	Contractor
	PO/CL						
1	24/	8					
2	24/	8			24		80
3	40/	8			16		120
4	24/	8			16		120
5	16/	8			8		120
6							208
7	24						
8							24
9	80/	16					
10	24					360	
11	24						120
12	8						40
13	8						40
14	8						40
15	8						40
16	8					40	40
17	8					16	40
18	8						296
19	8						24
20	24				24		
21	24				24		
22	160/	24			80	24	120
23	160						
24	24					24	
25						120	
26	8					24	8
27	8					8	24
28	80/	24		40	40	40	
29	40/	8		24			
30	40/	8	24		24		
31	24/	4	24		24		
32	16/	2	80		16		
33	24/	4	120		16		
34	16				16	24	
35	80/	16			40		
TOTAL	1,072/	146	248	64	368	680	1504

TOTAL DTIC HOURS:	2,578
TOTAL CONTRACTOR HOURS:	1,504
TOTAL FOR PROJECT:	4,082

- b. Other Resources - The following funds have been requested for FYs 88-89 for contractor support and equipment:

	<u>Contractor Support</u>	<u>Equipment</u>
FY88	\$59.8K	
FY89	120K	25K
FY90		25K

Costing considerations include a study of the relative expenditure required to produce and mail the current hard copy CABs versus the production and mailing cost of the proposed CAB on Diskette. Data in this area will be gathered during prototype testing.

Although the hard copy CAB is provided as a free service, the CAB on Diskette will be priced according to production and mailing costs. The benefit and cost-savings to be realized by end-users of the proposed CAB on Diskette must not be ignored. See Section 2.4.1, "Summary of Improvements" to review the benefits of the proposed CAB on Diskette system.

SECTION 6 SYSTEM DEVELOPMENT PLAN

6.1 SYSTEM DEVELOPMENT PLAN

This section presents the developmental milestones integral to successful completion of the CAB on Diskette system. The detailed schedule of events presented herein is dynamic and is expected to be updated during the development of the system. The CAB on Diskette system development plan corresponds to the overall CAB on Diskette management plan completed by the DTIC project officer.

The CAB on Diskette project schedule follows:

<u>Milestone</u>	<u>ESD</u>	<u>ECD</u>	<u>Responsible Organization</u>
1. Development and approval of project statement	25 Apr 88	17 Jun 88	DTIC-EA
2. Prepare user survey questionnaire	16 May 88	6 Jun 88	CDC
3. Conduct a survey of CAB/DROLS users	7 Jun 88	19 Aug 88	CDC
4. Prepare a detailed specification of the system	22 Aug 88	23 Sep 88	CDC
5. Recommend information storage and retrieval software for testing	22 Aug 88	30 Sep 88	CDC
6. Test and evaluate information storage and retrieval software	26 Sep 88	28 Oct 88	CDC
7. Software selection	31 Oct 88	2 Nov 88	DTIC-EA
8. Software procurement	3 Nov 88	30 Dec 88	TRESP
9. Submit system change request	28 Nov 89	30 Dec 89	DTIC-EA
10. Implement system changes	2 Jan 89	2 Jun 89	DTIC-Z
11. Implement CAB on Diskette database structure	2 Jan 89	2 Jun 89	CDC
12. Implement CAB on Diskette display formats	2 Jan 89	2 Jun 89	CDC

<u>Milestone</u>	<u>ESD</u>	<u>ECD</u>	<u>Responsible Organization</u>
13. Implement CAB on Diskette report formats	2 Jan 89	2 Jun 89	CDC
14. Implement DROLS to CAB on Diskette connection	2 Jan 89	4 Aug 89	CDC
15. Implement CAB on Diskette to WORM connection	2 Jan 89	4 Aug 89	CDC
16. Implement TR Database on CD-ROM to CAB on Diskette connection	2 Jan 89	4 Aug 89	CDC
17. Implement CAB on Diskette on hard disk connection	2 Jan 89	4 Aug 89	CDC
18. Prepare draft documentation for use during the test and evaluation of the prototype	5 Jun 89	4 Aug 89	CDC
19. Obtain permission from the software vendor to copy the software for purposes of the test (or otherwise avoid software licensing infringement)	5 Jun 89	4 Aug 89	CDC
20. Select a group of users to participate in the test and evaluation of the prototype CAB on Diskette	5 Jun 89	4 Aug 89	DTIC-EA DTIC-HAR
21. Select a group of profiles to be used for the test of the prototype CAB on Diskette	5 Jun 89	4 Aug 89	DTIC-EA DTIC-HAR
22. Test and evaluate the prototype	7 Aug 89	3 Nov 89	CDC DTIC-EA DTIC-HAR DTIC-Z
23. Determine the feasibility of CAB on Diskette in an operational environment	6 Nov 89	29 Dec 89	DTIC-EA
24. Refine system changes	2 Jan 90	2 Feb 90	DTIC-Z

<u>Milestone</u>	<u>ESD</u>	<u>ECD</u>	<u>Responsible Organization</u>
25. Implement refined system changes	2 Feb 90	2 May 90	DTIC-Z
26. Deliver system and user documentation for Z review	2 Apr 90	2 May 90	CDC DTIC-Z
27. Deliver final system and user documentation	2 May 90	2 Jun 90	CDC DTIC-EA DTIC-Z
28. Establish standard operating procedures for production and distribution of CAB on Diskette	2 May 90	2 Jul 90	DTIC-EA DTIC-F DTIC-HAR DTIC-Z
29 Determine whether special mailing materials are required and request them	2 Jul 90	16 Jul 90	DTIC-EA DTIC-F
30. Determine product pricing	2 Jul 90	2 Aug 90	DTIC-B
31. Prepare product announcement	2 Aug 90	2 Sep 90	DTIC-B DTIC-HAR
32. Prepare promotional brochure for the product	2 Aug 90	2 Oct 90	DTIC-B DTIC-HAR
33. Develop a marketing plan for CAB on Diskette	2 Aug 90	2 Nov 90	DTIC-B DTIC-HAR
34. Make CAB on Diskette an operational product	2 Nov 90	2 Feb 91	DTIC-EA
35. Conduct a 6-month product evaluation	2 Feb 91	2 Aug 91	DTIC-EA DTIC-HAR



APPENDICES

Appendix A

Current Awareness Bibliography (CAB) on Diskette Project Implementation Plan

EXECUTIVE SUMMARY

Project Implementation Plan

Current Awareness Bibliography (CAB) On Diskette

1. Background:

With the advent of the microcomputer and its implications for accessing databases, DTIC is looking for other formats in which to present its data. DTIC users have shown an interest in receiving bibliographic data (from DTIC's Technical Reports (TR) database) in the form of demand bibliographies and current awareness bibliographies (CABs) on diskette. CAB is a profile-based service which keeps researchers informed concerning the latest DoD-funded research in a particular area defined by the CAB user. CAB On Diskette is a new service which will afford the user the ability to further manipulate, reformat, and cummulate the information which is now provided in the hard copy CABs.

2. Technical Approach:

The prototype CAB On Diskette will be developed by Ms. Karen Kaye of Control Data Corporation (CDC) and her assistant. Ms. Kaye will provide project leadership for this effort. CAB On Diskette will be developed on a Zenith 248 or compatible microcomputer system using the information storage and retrieval package recommended in the software evaluation phase of the project. The database will be developed during the time period from Sep 88 to Jan 89. The prototype product will be tested and evaluated, and a recommendation will be provided by Mar 89.

3. Milestones:

- | | |
|--|--------|
| 1. User needs survey | Aug 88 |
| 2. Software evaluation, selection, and procurement | Dec 88 |
| 3. Database development, test, and evaluation | Mar 89 |

4. Resources:

1. 1100 professional man-hours
2. 120 clerical man-hours
3. Zenith 248 or compatible microcomputer system, ISI 525

WORM system with WORMTOS operating system, software, and telecommunications support.

4. Project funding provided by Defense Technical Information Center, Office of Information Systems and Technology.

PROJECT IMPLEMENTATION PLAN

DEFENSE APPLIED INFORMATION TECHNOLOGY CENTER

1. **TITLE:** Current Awareness Bibliography (CAB) On Diskette

2. **SPONSOR:** Defense Technical Information Center
Office of Information Systems and Technology
Point of Contact: Ms. Carol Jacobson
Technical Information
Specialist
(202) 274-7661

3. **BACKGROUND:**

The Defense Technical Information Center (DTIC) is responsible for providing, acquiring, storing, retrieving, disseminating, utilizing, and enhancing scientific and technical information for the Department of Defense (DoD) activities, DoD contractors and potential contractors, and other U. S. Government agencies and their contractors. Traditionally, this role has been limited to information in paper copy and microfiche format.

In 1981, DTIC initiated a project to determine the feasibility of accepting various forms of input from participating agencies and providing additional services to these organizations. Four types of input were considered, camera-ready copy of technical reports for primary distribution, microfiche copy of technical reports for secondary distribution, combination hard copy/microfiche technical reports for secondary distribution, and documentless DD forms 1473. At least one example of each type of input was entered into the Technical Reports (TR) Database on the Defense RDT&E OnLine System (DROLS) and further disseminated. Thus, the feasibility of accepting technical reports in the above formats was demonstrated.

With the advent of the microcomputer and its implications for accessing databases, many database producers and distributors are looking for other formats in which to present their data. Some database producers such as BioSciences Information Services are providing their users with current awareness bibliographies on diskettes in recognition of the extensive use of microcomputers for accessing databases. Other database producers and database distributors, such as Public Affairs Information Service, H. W. Wilson Co., BRS Information Technologies, and Dialog Information, are looking to optical media as yet another means of information transfer. These database producers and database distributors are making portions of databases available on CD-ROM and distributing the compact disks to their users. In some cases, database producers are making their databases available on CD-ROM through third party vendors such as SilverPlatter Information, Inc. These third parties vary in the amount of service they provide from simply a subscription

service to a provider of hardware, software, and the subscription service.

Over the past several years, DTIC has received numerous requests to distribute technical information in non-standard forms. In a number of instances, users have shown an interest in receiving bibliographic data, in the form of demand bibliographies as well as current awareness bibliographies (CABs), on diskette. In addition, some users have requested that DTIC provide a portion of its TR Database in a CD-ROM format.

Current Awareness Bibliography Description:

In 1976, DTIC launched its Current Awareness Bibliography (CAB) service in recognition of the difficulty that its users have in keeping current in the diverse, highly specialized research sponsored by the Department of Defense (DoD). CAB is a free service which alerts users to the technical reports on DoD-funded research, in their area of interest, most recently added to the DTIC collection. CAB is a profile-based service. The potential CAB recipient works with a DTIC information retrieval specialist to establish a "profile" which describes the user's interests. The profile is most likely to be a "subject profile." DTIC's computer will match each user's individual profile against the new reports which have arrived at DTIC during the preceding 2-week period. The user will automatically be mailed a bibliography with concise but complete information on the reports which matched his or her profile (see enclosure). The information will include, but not be limited to personal author, corporate author, title, subject terms, and abstract. The user is encouraged to review his or her profile and modify it as needed to insure that the CABs will be of the greatest possible value. The DTIC point of contact for the CAB service is Mr. Thomas Jones, DTIC-HAR, (202) 274-7206, of the DTIC Database Services Directorate. CAB is one of DTIC's more popular services. Currently, 478 DTIC users have active CAB profiles. During a recent CAB cycle, 3,233 CAB profiles were generated.

To request the CAB service, a user need only call DTIC-HAR at (202) 274-7206, write, or use DTIC Form 64, Request for DTIC Database Products.

Proposal:

Given the advancements in technology, the proliferation of microcomputers, and the continuing interest in keeping abreast in the latest information on DoD-funded research, an enhancement to the CAB product is being proposed. The new product will be called CAB on diskette and will afford the CAB user many features which are not available with the print product.

The new product will provide users with a means of cumulating CABs, further refining searches, creating adhoc reports and bibliographies, and tracking DoD-funded research in selected areas. CAB on diskette will be a time saving tool for the busy researcher or information specialist in that it will eliminate the need for

downloading information in his or her area of interest from the TR Database.

This effort will consist of the development of a prototype CAB on diskette. During the development of the prototype, an abbreviated user needs survey will be conducted to determine the hardware/software being used by current CAB users. Information storage and retrieval software which matches user requirements will be selected and procured, and the database will be developed.

4. **OBJECTIVE:**

The objective is to design, develop, document, test, deliver, and have accepted a microcomputer-based unclassified CAB On Diskette product with retrieval software.

The new CAB On Diskette product would be required to meet the following specifications:

- a. Be able to interface with the TR Database on DROLS to to the extent that data from the TR Database on DROLS can be downloaded and appended by the user to the local database. The capability to interface with the TR Database on CD-ROM will be dependent upon the retrieval software chosen for the CD-ROM product.
- b. Provide output in the form of hard copy bibliographies (See Enclosure 1);
- c. CAB data on diskette must be easily appendable to a local cumulative database on either hard disk or optical media (WORM drive). Communications software will be recommended to facilitate uploading of CAB data to the DoD Gateway Information System.
- d. Resemble the TR Database in terms of field names and canned display formats (See Enclosure 2). Changes in this area must be approved by the DTIC project officer; It should be noted that retrieval software priced toward the higher end of the spectrum is most likely to provide display format flexibility.
- e. Provide for storage and retrieval information by field, proximity searching, free-text searching, use of wild cards, and storage of profiles;
- f. Be able to be used with the Zenith 248, IBM PC/XT, IBM PC/AT, and other compatibles;

- g. Be able to store profiles which can be run against the cumulative database or the data on the update floppy diskette (the concept of a user-defined universe is not implied);

5. TECHNICAL APPROACH:

During the prototype phase of this project, the feasibility of expanding CAB from a hard copy service to a hard copy and diskette service will be determined. The development, test, and evaluation of the prototype product will take approximately 11 months ending in March 1989.

The technical approach will consist of the preparation of a functional specification of CAB On Diskette. The results of the user needs survey will be the basis for the development of the functional specification. The functional specification will include a description of the enhanced capabilities provided by the magnetic media. The functional specification will be prepared in accordance with the Life Cycle Management format, and it will require approval by the DTIC project officer.

After the functional specification is accepted, a detailed system specification will be prepared. The system specification will include a description of the desired database design; screen layouts; reports; display formats; as well as connections to the DoD Gateway Information System (DGIS), DROLS, the WORM drive, the hard disk, and the TR Database on CD-ROM. The system specification will also include a listing of the evaluation criteria to be used in the selection of retrieval software. The system specification will be prepared in accordance with the Life Cycle Management format, and it will require approval by the DTIC project officer.

Appropriate information storage and retrieval software will be identified.(1) Prior to recommending software packages to be acquired for review purposes, a market analysis update will be completed. Review of vendor literature and documentation, product demonstrations, and discussions with existing users of software under consideration will be completed as part of the market analysis. Thus, appropriate information storage and retrieval software will be identified. Copies of the software will be acquired for review purposes. The software will be tested and evaluated against the mandatory and desirable characteristics identified in

*****Footnote (1) The number of retrieval software packages to be tested will be determined through the market analysis update, and will require approval by the DTIC project officer prior to procurement and testing. Time estimates included in this document are based upon the test and evaluation of 3 software packages.

the functional specification. The test and evaluation will be based upon actual CAB data. Data conversion will be accomplished prior to testing if necessary. A report describing the results of the test and recommending a software package will be reviewed by the DAITC staff and the DTIC project officer. A demonstration of the recommended software package will be provided for the DTIC project officer.

The final stage of the prototype will include database development, test, and evaluation. Complete user and system documentation for use during prototype test and evaluation will be prepared. Potential users who will be participating in the test of the prototype and the DTIC project officer will need to be trained. After the prototype test, a complete written evaluation, including recommendations for changes to the prototype, will be submitted for approval to the DTIC project officer.

6. DELIVERABLES:

- a. CAB On Diskette Questionnaire - 6 Jun 88
- b. CAB On Diskette Functional Specification - 8 Aug 88
- c. CAB On Diskette System Specification - 16 Sept 88
- d. Synopsis of retrieval software recommended for procurement and test through the market analysis update. 23 Sept 88
- e. Test and Evaluation Report for Software - 23 Dec 88
(This change in date reflects both other project work requiring analyst time as well as planned vacation time for project lead).
- f. CAB On Diskette User Manual - TBD
- g. CAB On Diskette System Manual - TBD
- h. CAB On Diskette Operations Manual (if deemed necessary)
- TBD
- i. Test and Evaluation Report for the Prototype - 17 Mar 89
- j. The contractor must provide training for the DTIC project officer and up to 8 potential users. Training will occur in Alexandria, VA.
- k. The DAITC shall allow for briefings as necessary with the DTIC project officer, to include review of any deliverables due during that time period.
- l. The DAITC shall provide monthly status reports to the

DTIC project officer.

- m. The DAITC shall advise the DTIC project officer immediately of any problem that may affect the delivery schedule.
- n. The PIP is recognized as a working document, and it is accepted that changes to the document are likely to occur during the life of the project. All changes will require the approval of the DTIC project officer prior to taking effect.
- o. Deliverables will be initialed by the DTIC project officer upon acceptance.

7. MAJOR MILESTONES:

- a. Prepare user survey questionnaire.

Deliverable: CAB On Diskette Questionnaire

Estimated completion date: 6 Jun 88

- b. Conduct a survey of CAB/DROLS users.

Deliverable: Report on user community views and contractor recommendations of the mandatory and desirable characteristics of CAB On Diskette (i.e., Functional Specification).

Estimated completion date: 8 Aug 88

- c. Prepare a detailed specification of the system.

Deliverable: CAB On Diskette System Specification

Estimated completion date: 16 Sept 88

- d. Recommend appropriate retrieval software for procurement and testing.

Deliverable: Synopsis of retrieval software recommended for procurement and testing as a result of the market analysis update. (Approval of DTIC project officer required prior to initiation of procurement procedures).

Estimated completion date: 23 Sept 88

- e. Test and evaluation software package procurement. (This milestone will be accomplished by TRESP).

Deliverable: Copies of the software selected for testing.

Estimated completion date: 30 Sept 88

- f. Test and evaluate information storage and retrieval software identified through market analysis update.

Deliverable: Report describing test and evaluation of software and recommendation of the software package to be procured for the prototype. Demonstration of the recommended software for the DTIC project officer.

Estimated completion date: 23 Dec 88

- g. Software selection. (This milestone will be accomplished by the DTIC project officer.):

Estimated completion date: 6 Jan 89

**ALL SUBSEQUENT DATES TO BE DETERMINED UPON
SELECTION OF THE SOFTWARE TO BE USED IN DEVELOPMENT
OF THE PROTOTYPE CAB ON DISKETTE.**

- h. Prototype Software procurement. (This milestone will be accomplished by TRESP.):

Deliverable: Copies of the selected software as necessary for prototype development.

Estimated completion date:

- i. Implement CAB On Diskette database structure including required display and report formats.

Estimated completion date:

- j. Implement DROLS to CAB On Diskette connection.

Estimated completion date:

- k. Implement CAB On Diskette to WORM connection.

Estimated completion date:

- l. Implement TR Database on CD-ROM to CAB On Diskette connection.

Estimated completion date: (The completion of this milestone depends on the availability of DTIC's CD-ROM product.)

- m. Implement CAB On Diskette to hard disk connection.

Estimated completion date:

- n. Prepare draft documentation for use during the test and evaluation of the prototype.

Deliverables: User Manual, System Manual, and Operations Manual (if deemed necessary)

Estimated completion date:

- o. Obtain permission from the software vendor to copy the software for purposes of the test (or otherwise avoid software licensing infringement).

Estimated completion date:

- p. Select a group of users to participate in the test and evaluation of the prototype CAB On Diskette. (This milestone will be accomplished by the DTIC project officer).

Estimated completion date:

- q. Select a group of profiles to be used for the test of the prototype CAB On Diskette. (This milestone will be accomplished by the DTIC project officer.)

Estimated completion date:

- r. Test and evaluate prototype.

Deliverable: Test and evaluation report for the prototype experience.

Estimated completion date:

- s. Train Project Officer and up to 8 potential users.

Deliverable: Training class

L User support.

Deliverable: Ongoing user support as required for the prototype.

8. RESOURCES:

The following are the staffing requirements for the effort through December, 1988; follow-on work will require additional resources:

Staffing: 2 systems analyst/programmers (DBMS) - 1100 professional man-hours

**1 technical aid - 140 clerical
man-hours**

The following are the staffing requirements for the initial five man-month effort; follow-on work will require additional resources:

Staffing: 2 systems analyst/programmers (DBMS) - 480 professional man-hours

**1 technical aid - 90 clerical
man-hours**

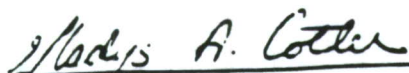
**Project Funding: Defense Technical Information Center
Office of Information Systems and Technology**

**Hardware: Zenith 248, IBM PC/XT, IBM PC/AT, or compatible with
ISI 525 WORM drive (including access to required
manuals)**

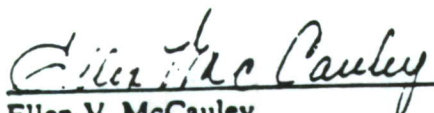
**Software: To be determined
Most retrieval software is currently priced within
the range of \$100. to \$40K with complete
toolkits representing the high end.**

Telecommunications: To be determined

Accepted:



Gladys A. Cotter
Defense Applied Information Technology Center

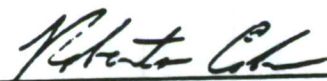


Ellen V. McCauley
Director
Office of Information Systems and Technology

Concurrence:



Carol Jacobson
Technical Information Specialist
Defense Technical Information Center



Roberta Cohen
Technical Information Specialist
Defense Technical Information Center



William Spanos
Program Manager
Control Data Corporation

ADDENDUM

CAB ON DISKETTE		
MILESTONE	PROFESSIONAL HOURS	CLERICAL HOURS
a. User survey	90	10
b. Functional Specification	130	40
c. System Specification	130	22
d. Rec SW/Mkt. Analysis	130	18
total	480	90
e. TRESP procurement	0	
f. T&E Software	620	50
g. SW Selection	0	
total	620	50
---PROTOTYPE PHASE---		
h. TRESP procurement	0	
i. DBMS Structure	168	
j. DROLS Connection	128	
k. Worm Connection	24	
l. CD-ROM Connection	48	
m. Hard Disk Connection	16	
n. Draft Manuals-3	248	48
o. Vendor License	2	
p. T&E Users-Carol	0	
q. Profiles-Carol	0	
r. T&E Report	128	20
s. User Training	48	
t. User Support	88	
total	898	68
PROJECT TOTAL	1998	208

INDIVIDUAL TASKING BREAKOUTS

PROFESSIONAL

- a. 50 hours survey preparation, 40 hours create, refine survey
- b. Compile survey results, write report
- c. 80 hours system specification design, 50 hours write report
- d. 66 hours sw synopsis, 48 hours demos, review of demo diskettes, 16 hours specification review, info calls to vendors, existing users
- e. TRESP
- f. 60 hours data acquisition issues, meetings/discussion., 120 hours. data conversion, T&E 3 pkgs @ 80 hours each, 60 hours compile results, write report, 140 hours database formats
- g. DTIC Project Officer
- h. TRESP
- i. --t. best guess estimates, will be refined & broken down into specific tasks/required hours at point of software selection

CLERICAL

- a. 10 hours format report
- b. 30 hours input results, miscellaneous, 10 hours format report
- c. format complex report with graphics
- d. 8 hours vendor literature calls, filing literature., 10 hours format report
- e. format lengthy report with graphics & tables

Appendix B

**Current Awareness Bibliography (CAB)
User Needs Assessment Summary**

Current Awareness Bibliography User Needs Assessment Summary

There were a total of 337 responses to the survey, out of 3500 sent. The numbers listed correspond to the question numbers on the survey.

NOTE: Some totals may not correspond to the sum of the entries because the total was the number of respondents who checked the box but did not list a specific item. For example, someone may have checked 'Mouse' but did not give the brand of mouse.

2. Occupations - 312 responses:

Occupation	Total
Engineer	115
Information Specialist	51
Chemist/Physicist	27
Analyst	21
Other	124

3. Usage - Respondents checked more than one box:

Reason	Total
Check for new developments in an area of interest	312
Check for new scientific developments	260
Circulate to others	109
Identify fellow researchers	85
Track the progress of a contract	31
Check for duplication	28
Track the progress of an agency	19
Other	26

Six of the other responses were bibliography-related.

4. Microcomputers:

Although the questionnaire asked for the microcomputer system that was used most often, 75 respondents checked more than one computer.

Computer	Total
IBM PC compatible	261
Apple Macintosh	73
Other	12

5. RAM - 224 responses:

Memory	Total	Memory	Total
640K	96	512K	29
1 Meg.	48	Other	95

Other responses ranged from "?" to 80 Megabytes.

6. Peripherals:

Printers			
Brand	Total	Brand	Total
Draft	188	Letter	123
Epson	61	Epson	23
ALPS	23	ALPS	18
Apple	16	Apple	8
IBM	16	Diablo	8
Okidata	12	IBM	6
HP	5	HP	6
Panasonic	5	Other	45
Other	38		
Laser	163		
HP	64		
Apple	46		
Other	36		

309 respondents had access to a printer.

Mice		Modems	
Brand	Total	Brand	Total
Total	148	Total	151
Macintosh	41	Hayes	75
Microsoft	35	Racal-Vadic	11
Logitech	25	Other	49
PC Mouse	5		
Other	26		

CD-ROM		WORM	
Brand	Total	Brand	Total
Total	13	Total	2
Hitachi	5	Commodore	2
Apple	4		
Philips	3		
Amdek	1		
Interdyne	1		

Other peripherals included disk drives, plotters, and Bernoulli boxes.

7. Graphics - 317 responses:

Type	Total	Type	Total
EGA	126	VGA	24
CGA	72	Didn't know	33
HGC	42	Other	20

Eleven of the other responses were Apple Macintosh.

8. Fixed Disks - 240 responses:

Size	Total	Size	Total
10-20 Meg.	176	70-80 Meg.	8
30-40 Meg.	74	Greater than 80 Meg.	14
50-60 Meg.	11		

9. IBM or compatible software:

Database - 233 responses:

Type	Total
dBASE	118
Enable	17
Other	98

File Transfer - 134 responses:

Program	Total
Kermit	29
PROCOMM	11
Other	98

DOS Front-end - 219 responses:

Program	Total	Program	Total
Microsoft Windows	68	WindowDOS	9
Sidekick	59	Fixed Disk Organizer	7
DOSshell	18	Spotlight	1
1dir	16	The Desk Organizer	1
GEM	14	Top View	0
Direc-Tree	9	Other	40

CD-ROM subscriptions - 13 responses (one of each)

BIP	Hitachi CD-ROM Reader	OCLC
Bibliofile	Hydrodata	PC Tools
Bookshelf (3)	NDS	PAIS
Census PCBSS	NTIS (Dialog)	Ulrichs

Word Processing - 355 responses:

Program	Total	Program	Total
Word Perfect	92	Display Write	5
Wordstar	62	Samna	4
Multimate	41	Perfect Writer	2
Microsoft Word	37	Other	91
PC-Write	21		

Eighteen of the others responses were Enable.

Telecommunications - 217 responses:

Program	Total	Program	Total
Crosstalk	53	PC-Talk	12
PROCOMM	43	Q-Modem	6
Smartcom	39	Other	64

Among the other responses there were eight Kermit and nine Enable answers.

DOS Version - 212 responses:

Version	Total	Version	Total	Version	Total	Version	Total
1.20	1	2.12	1	3.01	1	3.26	1
2.00	3	2.2	1	3.10	49	3.30	31
2.10	6	2.30	1	3.20	81	3.31	4
2.11	3	3.0	16	3.21	10	4.00	1

Other software - 152 responses (some multiple). Of those responses, Lotus appeared 45 times.

10. Computer communications networks - 183 responses:

Network	Total
Ethernet	55
Apple	35
Other	107

Eighty-nine respondents were planning to network within the next 12 months.

11. Planning to buy software and hardware - 163 responses.

Most of the respondents were planning to buy Macintoshes or IBM PC compatible computers.

12. Had used other bibliographic databases - 124 respondents, multiple answers.

Database	Total
Dialog	66
NASA	16
Other	115

13. Interested in the prototype testing - 206.

Forty-four of those respondents are from Maryland, Washington DC, or Virginia.

14. Database properties - 225 respondents answered this section.

Search Properties			
Property	Total	Property	Total
Boolean (and, or, not)	165	Synonyms (auto query expansion)	82
Controlled vocabulary (keyword)	151	Adjacency	70
Any field	135	Proximity	62
Wild card	123	Natural language	57
Free-text	115	Hypertext	38
Save and re-execute queries	106	Log retrieval responses	35
Range	83	Point and shoot query entires	22

Display Formats			
Property	Total	Property	Total
Ability to display citations with abstracts	182	Keyword list displayed	109
Page scroll (up and down)	165	Record by record	100
Ability to display any field	163	User-defined display format	92
Number of documents per hit	140	Hits highlighted	76
Ability to display citations without abstracts	127	Number of hits per document	64
Keyword displayed in context	114	Field by field	51

Output Capabilities			
Property	Total	Property	Total
Transfer to printer	178	Transfer to a database	105
Transfer to disk	169	Custom report forms	93
Combine results of multiple searches	142	Transfer to spreadsheet	40
Sorts (record, field, values in field)	141	Stack hits	27
Transfer to word processor	107	Transfer to WORM	9

Appendix C

Current Awareness Bibliography (CAB) User Needs Assessment

(survey document)

CURRENT AWARENESS BIBLIOGRAPHY USER NEEDS ASSESSMENT

The Defense Technical Information Center is in the process of determining the feasibility of providing Current Awareness Bibliographies (CABs) on diskettes as well as in hard copy. To help us better understand your needs, please complete the questionnaire below and mail by July 15, 1988. If you have any questions about the questionnaire or about the proposed product, contact Ms. Carol Jacobson, (202) 274-7661 or AUTOVON: 284-7661.

1. DTIC user code: _____ 2. Occupation: _____
3. How do you use the information provided in your Current Awareness Bibliography?
(Please check all that apply.)
 - ☐ Check for duplication
 - ☐ Check for new developments in the scientific and technical community
 - ☐ Check for new developments in your area of interest
 - ☐ Identify fellow researchers
 - ☐ Track progress of a contract
 - ☐ Track progress of a particular agency
 - ☐ Circulate to colleagues
 - ☐ Other _____
list
4. Microcomputer system that you use most often:
(Please check the appropriate box and list the make and model of the equipment.)

☐ Apple _____ make/model	☐ Hewlett Packard _____ make/model	☐ IBM _____ make/model
☐ Atari _____ make/model	☐ Commodore _____ make/model	☐ Zenith _____ make/model
☐ Compaq _____ make/model	☐ Other IBM Clone _____ make/model	☐ Other Micro _____ make/model
5. Please enter the amount of Random Access Memory (RAM) that you have available on your microcomputer: _____
6. Microcomputer peripherals:
 - ☐ Draft quality printer _____
brand
 - ☐ Letter quality printer _____
brand
 - ☐ Laser printer _____
brand
 - ☐ Mouse _____
brand
 - ☐ Modem _____
make/model
 - ☐ CD-ROM (Compact Disc - Read-Only Memory) drive _____
make/model
 - ☐ WORM (Write Once Read Mostly) drive _____
make/model
 - ☐ Other _____
list

7. If you have graphics capability, please check all of the following that apply:

- | | |
|---|--|
| ☐ Color Graphics Adapter (CGA) or Emulation | ☐ Video Graphics Array (VGA) or Emulation |
| ☐ Enhanced Graphics Adapter (EGA) or Emulation | ☐ Don't know |
| ☐ Hercules Graphics Card (HGC) or Emulation | ☐ Other _____
list |

8. If your microcomputer has a fixed disk, indicate the size of the hard disk.

- | | | |
|-----------------------------------|-----------------------------------|---|
| ☐ 10-20 MB | ☐ 50-60 MB | ☐ Greater than 80 MB |
| ☐ 30-40 MB | ☐ 70-80 MB | ☐ Don't know |

If you checked IBM, Compaq, Zenith, or IBM clone in question #4, please answer question #9 about your software. If you do not have an IBM or compatible, please skip to question #10.

9. IBM or compatible software:

- ☐ Database _____
brand
- ☐ File transfer _____
brand
- ☐ Text search _____
brand
- ☐ DOS front end, desktop manager or windows (Please check all that apply.)
- | | | |
|---|--|--|
| ☐ 1dir | ☐ GEM | ☐ The Desk Organizer |
| ☐ Direc-Tree | ☐ Microsoft Windows | ☐ TopView |
| ☐ DOSshell | ☐ Sidekick | ☐ WindowDOS |
| ☐ Fixed Disk Organizer | ☐ Spotlight | ☐ Other _____
list |
- ☐ CD-ROM discs/subscriptions _____
list
- ☐ Word processing (Please check appropriate box.)
- | | | |
|---|---|--|
| ☐ DisplayWrite | ☐ PC-Write | ☐ WordPerfect |
| ☐ Microsoft Word | ☐ Perfect Writer | ☐ WordStar |
| ☐ MultiMate | ☐ Samna | ☐ Other _____
list |
- ☐ Telecommunications software (Please check appropriate box.)
- | | | |
|------------------------------------|----------------------------------|--|
| ☐ CrossTalk | ☐ Procom | ☐ Smartcom |
| ☐ PC-Talk | ☐ Q-Modem | ☐ Other _____
list |
- ☐ Version of MS-DOS _____
list
- ☐ Other often used software _____
list

10. Do any computers at your site communicate with each other?

☐ Yes ☐ No

If yes, what type of network do you have? _____

list name

Plans to network in next 12 months?

☐ Yes ☐ No

11. Do you plan on buying new hardware and/or software in the coming year? ☐ Yes ☐ No
If yes, what kind of hardware and/or software?

12. Do you use other bibliographic databases? ☐ Yes ☐ No
If yes, which other databases do you use?

13. Would you like to participate in the test of the prototype CAB On Diskette? ☐ Yes ☐ No
If yes, please list your name, address, telephone number, and user code.

If you are familiar with database searching, please answer the following questions:

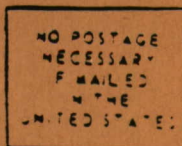
14. What search capabilities would you expect from this product?
- | | |
|--|--|
| ☐ adjacency | ☐ on any field |
| ☐ Boolean (and, or, not) | ☐ point and shoot query entry |
| ☐ controlled vocabulary (keyword) | ☐ proximity |
| ☐ free-text | ☐ range |
| ☐ hypertext (dynamic links) | ☐ save and re-execute queries |
| ☐ log retrieval responses | ☐ synonyms (auto query expansion) |
| ☐ natural language | ☐ wild card |
15. What display formats would you expect?
- | | |
|---|--|
| ☐ ability to display any field(s) | ☐ keyword list displayed |
| ☐ ability to display citations with abstracts | ☐ number of documents per hit |
| ☐ ability to display citations without abstracts | ☐ number of hits per document |
| ☐ field by field | ☐ page scrolling (up and down) |
| ☐ hits highlighted | ☐ record by record |
| ☐ keyword displayed in context | ☐ user definable display format |
16. What output capabilities would you expect from this product?
- | | |
|---|---|
| ☐ combine results of multiple searches | ☐ transfer to disk |
| ☐ custom report forms | ☐ transfer to printer |
| ☐ sorts (record, field, values in field) | ☐ transfer to spreadsheet |
| ☐ stack hits | ☐ transfer to word processor |
| ☐ transfer to database | ☐ transfer to WORM |

**Thank you for participating in the Current Awareness Bibliography User Needs Assessment.
Please fold this document in thirds, tape closed, and mail by July 15, 1988.**

Fold here first.

DEFENSE TECHNICAL INFORMATION CENTER
CAMERON STATION
ALEXANDRIA, VA 22304-6145

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, \$300



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MS. CAROL JACOBSON
DEFENSE TECHNICAL INFORMATION CENTER
CAMERON STATION
DTIC-EA
ALEXANDRIA, VA. 22304-6145



Fold here second.

Tape closed - please do not use staples.

Appendix D

**Current Awareness Bibliography (CAB)
on Diskette Project Statement**

DEFENSE LOGISTICS AGENCY
Inter-Office Memorandum

13 JUL 1988

IN REPLY
REFER TO

DTIC-L (Ms. Mullen/46886/kdr//dticl/krice/220.01/proj-733133200)

SUBJECT: Major Project 733 13 3200, Current Awareness
Bibliography (CAB) on Diskette

TO: DTIC-E

1. DTIC-DD approved the enclosed major project and MBO Milestone Chart on 1 Jul 88.

3. The subsidiary cost code (SCC) established for this project is 733133200. To ensure that all time spent on this project is properly charged, the project officer should instruct the participants to report their expended time via the Labor Exception Report (LER) card. Upon completion of the project, an analysis will be performed of the costs and time-charging methods and furnished to the Administrator. The SCC must not be used as the home code for any employee.

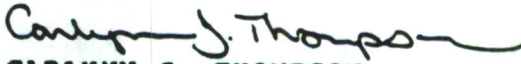
4. We prepare a monthly management information report to keep the Administrator informed of the ongoing status of the DTIC major projects. To assist us in preparing a timely report, activity occurring on the project should be furnished DTIC-LP by the 10th of each month, either in writing or verbally. If no report is received, it is assumed there was no activity and will be reported as such.

5. Major changes to a project are to be provided in writing to the Administrator through DTIC-L for recommendation. Major changes include such things as suspension, cancellation, lengthy delay (over 3 months), or completion of the project.

6. This project supplements DLA General Objective 3, Technological Advancement. The assigned DTIC Management By Objective (MBO) goal number is 03.A.23.

7. If you have any questions, contact Ms. Margaret Mullen, X46886.

1 Encl


CARLYNN J. THOMPSON
Director, Office of Policy, Plans,
and Resource Management

cc:
Project Officer
Coordinating Individuals (IOM only)
DTIC-L (MBO Focal Point)(MBO Milestone Chart)

Ms. Jacc n, DTIC-EA

PROJECT STATEMENT

1. PROJECT TITLE: Current Awareness Bibliography (CAB) On Diskette
2. PROJECT NUMBER: 733 13 3200
3. OBJECTIVE: This project relates to the following DTIC 2000 goals: 4.2, Establish the kinds of information storage needed and 4.7, Use new technologies to expand the media in which DTIC products are provided. The objective is to determine the feasibility of producing Current Awareness Bibliographies on diskette as well as in hard copy.
4. BACKGROUND:

The Defense Technical Information Center (DTIC) is responsible for providing, acquiring, storing, retrieving, disseminating, utilizing, and enhancing scientific and technical information for the Department of Defense (DoD) activities, DoD contractors and potential contractors, and other U.S. Government agencies and their contractors. Traditionally, this role has been limited to information in paper copy and microfiche format.

In 1981, DTIC initiated a project to determine the feasibility of accepting various forms of input from participating agencies and providing additional services to these organizations. Four types of input were considered, camera-ready copy of technical reports for primary distribution, microfiche copy of technical reports for secondary distribution, combination hard copy/microfiche technical reports for secondary distribution, and documentless DD Forms 1473. At least one example of each type of input was entered into the Technical Reports (TR) Database on the Defense RDT&E Online System (DROLS) and further disseminated. Thus, the feasibility of accepting technical reports in the above formats was demonstrated.

With the advent of the microcomputer and its implications for accessing databases, many database producers and distributors are looking for other formats in which to present their data. Some database producers such as BioSciences Information Services are providing their users with current awareness bibliographies on diskettes in recognition of the extensive use of microcomputers for accessing databases. Other database producers and database distributors, such as Public Affairs Information Service, H. W. Wilson Co., BRS Information Technologies, and Dialog Information Services, Inc., are looking to optical media as yet another means of information transfer. These database producers and database distributors are making portions of databases available on CD-ROM and distributing the compact disks to their users. In some cases, database producers are making their databases available on CD-ROM through third party vendors such as SilverPlatter Information, Inc. These third parties vary in the amount of service they provide from simply a subscription service to a provider of hardware, software, and the subscription service.

Over the past several years, DTIC has received numerous requests to distribute technical information in non-standard forms. In a number of instances, users have shown an interest in receiving bibliographic data, in the form of demand bibliographies as well as Current Awareness Bibliographies (CABs), on diskette. In addition, some users have requested that DTIC provide a portion of its TR Database in a CD-ROM format.

5. CURRENT STATUS:

Given the advancements in technology, the proliferation of microcomputers, and the continuing interest in keeping abreast in the latest information on DoD-funded research, an enhancement to the CAB product is being proposed. The new product will be called CAB on diskette and will afford the CAB user many features which are not available with the print product.

The new product will provide users with a means of accumulating CABs, further refining searches, creating ad hoc reports and bibliographies, and tracking DoD-funded research in selected areas. CAB on diskette will be a time-saving tool for the busy researcher or information specialist in that it will eliminate the need for downloading information in his or her area of interest from the TR Database.

This effort will consist of the development of a prototype CAB on diskette. During the development of the prototype, an abbreviated user-needs survey will be conducted to determine the hardware/software being used by current CAB users. Information storage and retrieval software which matches user requirements will be selected and procured, and the database will be developed.

6. PLAN OF ACTION:

The project has four phases:

a. Product Design and Development - The mandatory and desirable characteristics of CAB On Diskette will be determined by assessing user needs. A survey form will be designed and distributed to CAB users during a regular CAB cycle. The results of the user-needs survey will be the basis for the development of the functional specification. The functional specification will include a description of the enhanced capabilities provided by the magnetic media.

After the functional specification is accepted, a detailed system specification will be prepared. The system specification will include a description of the database design; screen layouts; reports; display formats; as well as connections to the DoD Gateway Information System (DGIS), DROLS, the WORM drive, the hard disk, and the TR Database on CD-ROM.

Appropriate information storage and retrieval software will be identified. Copies of the software will be acquired for review

purposes. The software will be tested and evaluated against the mandatory and desirable characteristics identified in the functional specification. A report describing the results of the test and recommending a software package will be prepared. The recommended software will be procured. The final stage will involve the development of the prototype CAB On Diskette and the preparation of complete user and system documentation. The estimated date for the delivery of the prototype is Aug 89.

b. Evaluation of Prototype - Potential users who will be participating in the test of the prototype will be identified. These users and the DTIC project officer will need to be trained. After the prototype test, a complete written evaluation, including recommendations for changes to the prototype, will be prepared. It is estimated that the product will become operational in Jul 90.

c. Marketing - Marketing considerations include pricing, announcement, and advertising. The project officer and the Office of User Services and Marketing (DTIC-B) will determine the pricing structure for the product and request the necessary system changes for billing purposes. A product announcement will be made, and promotional materials will be designed and distributed to potential users. Other means of advertising the new product will be explored. A complete marketing plan for CAB On Diskette will be developed by Nov 90.

d. Evaluation of Operational Product - Once the product is operational, it will be turned over to DTIC-HAR. CAB On Diskette should be monitored by DTIC-HAR and the project officer for the first 6 months that it is an operational product. It should then be evaluated for possible enhancements. A written evaluation of the operational product will be available in Aug 91.

7. PROJECT SCHEDULE:

		ESD	ECD
Milestone	1. Development and approval of project statement.	25 Apr 88	17 Jun 88
PHASE I	2. Prepare user survey questionnaire.	20 Jun 88	15 Jul 88
	3. Conduct a survey of CAB/DROLS users.	18 Jul 88	19 Aug 88
	4. Prepare a detailed specification of the system.	22 Aug 88	23 Sep 88
	5. Test and evaluate information storage and retrieval software.	26 Sep 88	28 Oct 88
	6. Software selection.	31 Oct 88	2 Nov 88

	ESD	ECD
7. Software procurement.	3 Nov 88	30 Dec 88
8. Implement CAB On Diskette database structure.	2 Jan 89	2 Jun 89
9. Implement CAB On Diskette display formats.	2 Jan 89	2 Jun 89
10. Implement CAB On Diskette report formats.	2 Jan 89	2 Jun 89
11. Implement DROLS to CAB On Diskette connection.	2 Jan 89	2 Jun 89
12. Implement CAB On Diskette to WORM connection.	2 Jan 89	2 Jun 89
13. Implement TR Database on CD-ROM to CAB On Diskette connection.	2 Jan 89	2 Jun 89
14. Implement CAB On Diskette to hard disk connection.	2 Jan 89	2 Jun 89
15. Prepare draft documentation for use during the test and evaluation of the prototype.	5 Jun 89	4 Aug 89
16. Obtain permission from the software vendor to copy the software for purposes of the test (or otherwise avoid software licensing infringement).	5 Jun 89	4 Aug 89
17. Select a group of users to participate in the test and evaluation of the prototype CAB On Diskette.	5 Jun 89	4 Aug 89
18. Select a group of profiles to be used for the test of the prototype CAB On Diskette.	5 Jun 89	4 Aug 89
19. Test and evaluate the prototype.	7 Aug 89	3 Nov 89
20. Determine the feasibility of CAB On Diskette in an operational environment.	6 Nov 89	29 Dec 89

	ESD	ECD
21. Submit system change requests.	2 Jan 90	2 Feb 90
22. Implement system changes.	2 Feb 90	2 May 90
23. Establish standard operating procedures for production and distribution of CAB On Diskette.	2 May 90	2 Jul 90
24. Determine whether special mailing materials are required and request them.	2 Jul 90	16 Jul 90
25. Determine product pricing.	2 Jul 90	2 Aug 90
26. Prepare product announcement.	2 Aug 90	2 Sep 90
27. Prepare promotional brochure for the product.	2 Aug 90	2 Oct 90
28. Develop a marketing plan for CAB On Diskette.	2 Aug 90	2 Nov 90
29. Make CAB On Diskette an operational product.	2 Nov 90	2 Feb 91
30. Conduct a 6-month product evaluation.	2 Feb 91	2 Aug 91

8. RESOURCES:

a. Personpower - Estimated hours per milestone:

Milestone	DTIC-EA PO/CL	DTIC-B	DTIC-F	DTIC-HAR	DTIC-Z	Contractor
1	24/ 8					
2	40/ 8			24		80
3	24/ 8			16		120
4	24/ 8			16		120
5	16/ 8			8		120
6						24
7						24
8	24					120
9	8					40
10	8					40
11	8					40
12	8					40
13	8					40
14	8					40
15	8					24
16	8					24

Milestone	DTIC-EA PO/CL	DTIC-B	DTIC-F	DTIC-HAR	DTIC-Z	Contractor
17	24			24		
18	24			24		
19	160/ 24			80		120
20	160					
21	80/ 16					
22	24				360	
23	80/ 24		40	40	40	
24	40/ 8		24			
25	40/ 8	24				
26	24/ 4	24		24		
27	16/ 2	80		16		
28	24/ 4	120		16		
29	16			16		
30	80/ 16			40		
TOTAL:	1,008/146	248	64	344	400	1,016

TOTAL FOR PROJECT: 3,226

b. Other Resources - The following funds have been requested for FYs 88-89 for contractor support and equipment:

	Contractor Support	Equipment
FY 88	\$59.8K	
FY 89	120K	25K
FY 90		25K

NOTE: The \$59.8K will be moved from Purchased Services/Commercial Object Class 25.27, E Non-std media in the Mar 88 Checkbook.

9. BACKGROUND MATERIAL:

a. Non-Standard Media Distribution Project Statement, Major Project Number 733.13 01, 3 Nov 86.

b. Handbook for Users of the Defense Technical Information Center, DLAH 4185.8, Dec 85.

c. CAB Brochure

10. PROJECT OFFICER:

a. Carol E. Jacobson - DTIC-EA Carol E. Jacobson Date 5/2/88

b. Coordination:

DTIC-EA Carol E. Jacobson Date 5/2/88
 DTIC-EB Steve White Date 5/5/88

DTIC-E	<u><i>E. J. [Signature]</i></u>	Date	<u>5/6/88</u>
DTIC-B	<u><i>[Signature]</i></u>	Date	<u>5/19/88</u>
DTIC-F	<u><i>[Signature]</i></u>	Date	<u>5/26/88</u>
DTIC-HAR	<u><i>Laura E. Adams</i></u>	Date	<u>5/24/88</u>
DTIC-HA	<u><i>J. E. Murphy</i></u>	Date	<u>5/24/88</u>
DTIC-H	<u><i>[Signature]</i></u>	Date	<u>5-24-88</u>
DTIC-Z	<u><i>Paul J. Wilgus</i></u>	Date	<u>5-25-88</u>
DTIC-L	<u><i>Carly J. Thompson</i></u>	Date	<u>5-27-88</u>

11. APPROVING OFFICIAL: *Paul A. Robey, Jr.* Date 7-1-88
 Paul A. Robey, Jr.
 Deputy Administrator

MBO MILESTONE CHART

Report Date

03.A.23

Goal: DEVELOP A PROTOTYPE CURRENT AWARENESS BIBLIOGRAPHY (CAB) ON DISKETTE

MILESTONE		Year	88												89												90												Responsible Office or Person
		Month	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M																
1. CONDUCT USER SURVEY			○																						DTIC-E														
2. PREPARE DETAILED SPECIFICATION OF SYSTEM					○																				DTIC-E														
3. SELECT/PROCURE SOFTWARE								○																	DTIC-E														
4. DESIGN PROTOTYPE													○												DTIC-E														
5. PREPARE DOCUMENTATION																○									DTIC-E														
6. TEST AND EVALUATE PROTOTYPE																		○							DTIC-E														
7. DETERMINE WHETHER IT IS A VIABLE OPERATIONAL PRODUCT																					*				DTIC-E														

Remarks:

LEGEND ○ Plan ⊖ Completed Plan * Major Decision Point △ Revision ▲ Completed Revision

Appendix E

**Non-standard Media
Distribution Project Statement**

PROJECT STATEMENT

1. PROJECT TITLE: Non-Standard Media Distribution
2. PROJECT NUMBER:
3. OBJECTIVE: This project relates to the following DTIC 2000 goals: 4.2, Establish the kinds of information storage needed and 4.7, Use new technologies to expand the media in which DTIC products are provided. The objective is to determine the feasibility of developing, accepting, announcing, and distributing products on non-standard media.
4. BACKGROUND: The Defense Technical Information Center (DTIC) is responsible for providing, acquiring, storing, retrieving, disseminating, utilizing, and enhancing scientific and technical information for Department of Defense (DoD) activities, DoD contractors and potential contractors, and other U. S. Government agencies and their contractors. Traditionally, this role has been limited to information in paper copy and microfiche format.

In 1981, DTIC initiated a project to determine the feasibility of accepting various forms of input from participating agencies and providing additional services to these organizations. Four types of input were considered, camera ready copy of technical reports for primary distribution, microfiche copy of technical reports for secondary distribution, combination hard copy/microfiche technical reports for secondary distribution, and documentless DD forms 1473. At least one example of each type of input was entered into the Technical Reports (TR) database on the Defense RDT&E OnLine System (DROLS) and further disseminated. Thus, the feasibility of accepting technical reports in the above formats was demonstrated.

5. CURRENT STATUS: With the advent of the microcomputer and its implications for accessing databases, many database producers and distributors are looking for other formats in which to present their data. Some database producers such as BioSciences Information Services are providing their users with current awareness bibliographies on floppy disk in recognition of extensive use of microcomputers for accessing databases. Other database producers, such as National Technical Information Service (NTIS), are looking to optical media as yet another means of information transfer. These database producers are making portions of their databases available on CD-ROM disks. The disks are being distributed through third party vendors such as Digital Equipment Corporation and SilverPlatter Information, Inc. These third parties vary in the amount of service they provide from simply a subscription service to a provider of hardware, software, and the subscription service.

Over the past year, DTIC has received numerous requests to distribute technical information in non-standard forms. In Feb 86

the Vice Commander, Air Force Space Technology Center (AFSTC) requested that DTIC provide AFSTC with assistance in the distribution of the Space Systems Data Base (SSDB), a personal computer-based database. The database deals with the Military Space Systems Technology Plan and the Strategic Defense Initiative (SDI). SSDB is a classified database. Aerospace Corporation is developing the database. It is anticipated that the database will be distributed on floppy disk, removeable hard disk, and/or CD-ROM. In Apr 86 and Jun 86, DTIC received requests from Rome Air Development Center (RADC) for assistance in the distribution of some large computer programs that are used by the Air Force and its community of contractors to characterize the electromagnetic phenomena associated with newly developed systems or with existing systems undergoing modification. These programs are available on magnetic tape. In Mar 86, DTIC received a request from the Electromagnetic Compatibility Analysis Center (ECAC) to provide assistance in the distribution of Aircraft Inter-Antenna Propagation with Graphics (AAPG) Program Computer Program and user manuals. AAPG is available on magnetic tape, and the user manuals are available in hard copy. A final example is the Users' Guide for the Communications Assessment Program (CAP) - Revision I and associated software. This report was submitted to DTIC for inclusion in the TR database and for secondary distribution. The hard copy report was accompanied by a diskette with the CAP software. Presently, DTIC has no procedures for acquiring, storing, retrieving, duplicating, and disseminating materials such as these.

6. PLAN OF ACTION: There are four phases to this project.

PHASE I - RESEARCH

The first phase involves the approval of the project statement and an investigation into the state-of-the-art in the area of non-standard media. The project officer will review the literature dealing with selected types of non-standard media such as compact disc read only memory (CD-ROM) and prepare an annotated bibliography on the subject. The bibliography will be produced using the gateway technology and will be used as a demonstration product.

PHASE II - FEASIBILITY STUDY

The second phase deals with demonstrating the cost effectiveness and technical feasibility of DTIC accepting and distributing data on non-standard media. In-house and outside personnel will be used to form a project team for this effort. The outside participants will be activities such as AFSTC, RADC, and ECAC, that have voiced an interest in having DTIC distribute non-standard media for them. The team will conduct a cost-benefit analysis and prepare a recommendation. If the effort is to DTIC's benefit, the team will investigate the feasibility of incorporating the data into an existing database vs. creating a new database.

PHASE III - PROCEDURES

The third phase deals with establishing procedures and guidelines for non-standard media. Requests for programing changes will be initiated. The physical requirements for storing non-standard media will be determined, and an impact statement will be prepared. Guidelines for input, cataloging, and indexing will be established. Procedures for duplication, order processing, and mailing non-standard media will be formulated. In addition, procedures for registering users of the new product(s) will be established. A marketing strategy for the new product(s) will be developed. Part of this strategy will address the procedures for training. Finally, a pricing structure will be developed.

PHASE IV - TEST AND EVALUATION

The final phase deals with the test and evaluation of the new product(s). Work flow patterns will be coordinated with impacted directorates and finalized. The project officer will determine the necessary hardware and software, and procurement actions will be taken. Contractor assistance will be necessary for the mastering and duplication of some of the new products. In addition, contractor assistance will be needed for the development and/or modification of software. The necessary paperwork to obtain contractor assistance will be prepared, and the contract(s) will be let. An extensive test of the input of the selected product(s) will be conducted, and a written evaluation will be prepared. If the decision is made to continue with the new product(s), policy statements will be prepared.

7. PROJECT SCHEDULE:

		ESD	ECD
PHASE I - RESEARCH			
Milestone	1. Development and approval of project statement.	2 Sep 86	24 Oct 86
	2. Review the literature in the area of non-standard media.	27 Oct 86	28 Nov 86
	3. Prepare a report on the state-of-the-art of non-standard media as distribution media.	1 Dec 86	30 Jan 87
PHASE II - FEASIBILITY STUDY			
	4. Demonstrate the feasibility of accepting and distributing data on non-standard media.	2 Feb 87	27 Mar 87
	5. Identify DTIC-H, DTIC-F, DTIC-L, and DTIC-Z project representatives.	30 Mar 87	10 Apr 87

	ESD	ECD
Milestone 6. Identify outside participants.	13 Apr 87	1 May 87
7. Identify the constraints in terms of acquiring, selecting, cataloging, indexing, inputting, retrieving, duplicating, distributing, marketing, pricing, etc. non-standard media.	4 May 87	24 Jul 87
8. Identify necessary programing changes.	27 Jul 87	18 Sep 87
9. Evaluate the constraints in terms of costs and benefits to DTIC.	21 Sep 87	11 Dec 87

If the effort is evaluated to be cost-beneficial to DTIC, the following milestones should be completed.

10. Determine feasibility of including the citations to the data in the TR database vs. creating a new database.	14 Dec 87	14 Feb 88
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PHASE III - PROCEDURES

11. Initiate requests for programing changes.	15 Feb 88	7 Mar 88
12. Determine storage requirements.	8 Mar 88	8 Apr 88
13. Establish cataloging guidelines for non-standard media input.	9 Apr 88	9 Jun 88
14. Establish indexing guidelines for non-standard media input.	10 Jun 88	10 Jul 88
15. Establish procedures for the duplication of non-standard media.	11 Jul 88	11 Sep 88
16. Establish procedures for order processing of non-standard media.	12 Sep 88	12 Oct 88

	ESD	ECD
Milestone 17. Establish procedures for mailing non-standard media.	13 Oct 88	13 Nov 88
18. Develop a marketing strategy for the new product(s).	9 Apr 88	13 Nov 88
19. Develop training procedures.	9 Apr 88	13 Nov 88
20. Develop the pricing structure for the new product(s).	9 Apr 88	14 Dec 88
21. Establish procedures for registering users for non-standard products.	14 Nov 88	14 Dec 88

PHASE IV - TEST AND EVALUATION

22. Coordinate and finalize non-standard media flow plans with contributors and in-house personnel.	15 Dec 88	15 Jan 89
23. Determine the hardware and software necessary for the experiment.	16 Jul 88	16 Oct 88
24. Procure the necessary hardware and software.	17 Oct 88	17 Mar 89
25. Prepare the necessary paperwork for the service contract(s).	18 Mar 89	4 Apr 89
26. Initiate input of selected non-standard media.	5 Apr 89	12 Apr 89
27. Evaluate the non-standard media input for turnaround time, flow problems, duplication, and mailroom.	13 Apr 89	13 Jun 89
28. Evaluate the project. If the decision is made to continue, write policy for input.	14 Jun 89	31 Jul 89
29. Prepare technical report.	1 Aug 89	31 Oct 89

8. RESOURCES:

a. Personpower - Estimated hours per milestone:

Milestone	DTIC-E (PO)	DTIC-E (CL)	DTIC-B	DTIC-F	DTIC-H	DTIC-L	DTIC-Z
1	24	8					
2	80						
3	160	20					
4	160						
5	24	8					
6	40	8					
7	240		40	40	40	40	40
8	120		16	20	20	16	80
9	240		40	40	40	40	40
10	120						80
11	80	4					16
12	40			16			16
13	32	16			120		
14	32	16			120		
15	32	16		120			
16	32	16		120			
17	32	16		120			
18	32	16	120				
19	32	16	120				
20	40	16	40	40	40	40	40
21	32	16		40			
22	40	16	40	40	40	40	40
23	56						16
24	32	16					8
25	32	16					
26	16			8	8	8	8
27	160						
28	120						
29	240	32					
TOTAL:	2,320	272	416	604	428	184	384

TOTAL FOR PROJECT: 4,608

b. Other Resources - The following funds have been requested for FYs 87-89 for contractor support and equipment:

	Contractor Support	Equipment
FY 87	\$45K	\$ 5K
FY 88	80K	35K
FY 89	85K	35K

9. BACKGROUND MATERIAL:

a. Air Force Space Technology Center letter, 25 Feb 86,
subject: Coordination on Data Base Dissemination.

b. DTIC-E letter, 14 Mar 86, subject: Coordination on Database Dissemination.

c. Electromagnetic Compatibility Analysis Center letter, 3 Mar 86, subject: Computer Model Distribution Request.

d. Rome Air Development Center letter, 22 Apr 86, subject: Distribution of Computer Programs.

e. Rome Air Development Center letter, 26 Jun 86, subject: Distribution of Computer Programs.

10. PROJECT OFFICER:

a. Carol E. Jacobson - DTIC-EA Carol E. Jacobson Date 4 Sep 86

b. Coordination:

DTIC-EA J. J. Munn Date 9/4/86

DTIC-EB Ed. J. Hitt Date 9/4/86

DTIC-E John H. Currey Date 9/4/86

DTIC-B Paul H. Hager Date 9/4/86

DTIC-F John H. Hager Date 9-4-86

DTIC-H William H. Hager Date 9/4/86

DTIC-L John H. Hager Date 9/16/86

DTIC-Z David D. Wilby Date 9/4/86

11. APPROVING OFFICIAL:

Paul A. Robey, Jr. Date 10/2/86
Paul A. Robey, Jr.
Deputy Administrator

Please have PO review and let me know what resources would be needed to shorten the time frame - I may retire prior to FY90. Could we eliminate Phase II?

Thank,
P. Robey

Report: Date

Coal: DETERMINE THE FEASIBILITY OF DEVELOPING, ACCEPTING, AND DISTRIBUTING PRODUCT ON NON-STANDARD MEDIA

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1. DETERMINE THE FEASIBILITY OF DEVELOPING, ACCEPTING, ANNOUNCING, AND DISTRIBUTING PRODUCTS ON NON-STANDARD MEDIA

MILESTONE	Year		Month												Responsible Office or Person	
	88	89	O	N	D	J	F	M	A	M	J	J	A	S		O
1. Prepare final report.																DTIC-E
2. Test and evaluate.																DTIC-E, -B, -F, -H, -Z
3. Establish service contract.																DTIC-E
4. Procure hardware/software.																DTIC-E, -Z
5. Prepare marketing package.																DTIC-E, -B
6. Establish procedures for duplication, order processing, and mailing.																DTIC-E, -F

Remarks:

DIIC NEW MISSION/DEVELOPMENT

100001

18 JUL 80
DIIC-LAF

PROGRAMS SEC/COMM/ICM															
Request Class 23.27															
Item Summary															
Project Code	FY 80 Program	Fiscal Year 1987 Execution Program				Director's Request		Total Recommended		Fiscal Year 1988 Budget		FY 1989		Remarks	
		1 Str	2 Str	3 Str	4 Str	Requested	Recommended	Budget	Req	Second	Req	Second			
DIIC-E SUBTOTAL															
E-Local Automation Model	731.12	0.0	70.0	0.0	0.0	70.0	70.0		70.0				40.0		
E-Local Document System	731.42	0.0	0.0	50.0	0.0	50.0	50.0		75.0				100.0		
E-DBMS	731.11	0.0	125.0	0.0	0.0	125.0	125.0		150.0				200.0		
E-Non-Standard Media Disk	731.42	0.0	0.0	0.0	0.0	0.0	0.0		0.0				0.0		
E-Technology Forecast	731.36	0.0	12.5	12.5	12.5	50.0	50.0		50.0				50.0		
E-Advanced Distribution	731.42	0.0	0.0	0.0	0.0	0.0	0.0		50.0				50.0		
E-Voice Recognition	731.30	0.0	0.0	0.0	0.0	0.0	0.0		100.0				100.0		
E-University Web Grants	731.96	0.0	0.0	0.0	0.0	0.0	0.0		100.0				100.0		
						390.0	200.0		675.0				725.0		
DIIC-B SUBTOTAL															
B-1-Alternative Architectures	731.86	0.0	100.0	50.0	50.0	250.0	100.0		150.0				150.0		
B/1-Project Control Report Software	731.90	0.0	1.0	0.0	0.0	1.0	1.0		0.0				0.0		
B/1-Field of Function Data	731.00	0.0	75.0	0.0	0.0	75.0	25.0		0.0				0.0		
						326.0	126.0		150.0				150.0		
DIIC-B SUBTOTAL															
B-DBMS Training	710.25	0.0	50.0	50.0	0.0	100.0	0.0		100.0				100.0		
B-DBMS	710.25	0.0	10.0	10.0	10.0	40.0	40.0		60.0				60.0		
						140.0	120.0		160.0				180.0		
DIIC-B SUBTOTAL															
B-Replace DBMS Software	731.00	0.0				0.0	0.0		400.0				0.0		
B-ADP Replacement	731.00	0.0				0.0	0.0		200.0				200.0		
B-Parameter Tech Upgrade	731.00	0.0	12.5	12.5	12.5	50.0	50.0		50.0				50.0		
B-DBMS Space	731.01	0.0				0.0	0.0		0.0				250.0		
						50.0	50.0		850.0				500.0		
DIIC-B SUBTOTAL															
Totals		0.0	036.0	205.0	135.0	130.0	900.0		1035.0				1555.0		
101M. PUBLIC SEC/COMM/ICM		213.5	1012.6	1232.0	1281.4	039.7	3904.5		5200.0				6176.0		

ENCLOSURE

DDIC NEW MISSION/DEVELOPMENT

(10000)

10-20-74
OFFICE

Equipment Subject Class 3) Item Number	Project Code	FY 86 Actual	Fiscal Year 1987 Execution Program				Directors Requested	Total DDIC Accumulated	Authorization Budget	Fiscal Year 1988 Budget		FY 1989	
			1 Str	2 Str	3 Str	4 Str				Estimate	Req	Estimate	Req
E/I- Hardware/Software (M)	731.32	0.0	0.0	0.0	12.0	0.0	20.0	20.0		25.0		25.0	
E/I- Common Command Language Software	731.11	0.0	0.0	2.0	0.0	1.0	3.0	3.0		5.0		5.0	
E/I- Local Instructional Model (1st-Phase)	731.12	0.0	0.0	0.0	30.0	0.0	30.0	30.0		70.0		70.0	
E/I- S&S	733.11	0.0	0.0	0.0	0.0	0.0	0.0	0.0		75.0		100.0	
E/I- Hardware/Software Updates	733.11	0.0	0.0	10.0	10.0	0.0	20.0	20.0		25.0		30.0	
E/I- CS-400 Reader	731.42	0.0	0.0	0.0	0.0	5.0	5.0	5.0		5.0		5.0	
E/I- Microprocessors (1st CS-400)	731.42	0.0	0.0	0.0	0.0	0.0	0.0	0.0		30.0		30.0	
E/I- S&S	731.11	0.0	0.0	0.0	0.0	0.0	0.0	0.0		1.5		0.0	
E/I- Voice Recognition Adapter Equip	731.34	0.0	0.0	0.0	0.0	0.0	0.0	0.0		10.0		10.0	
E/I- Improved Search/Retrieval Tech	731.22	0.0	0.0	0.0	0.0	0.0	0.0	0.0		100.0		500.0	
Totals		0.0	0.0	12.0	52.0	14.0	78.0	78.0		346.5		700.0	
1074. COM/PLM		178.3	776.1	566.0	1068.9	2127.5	4538.5	2078.5		5307.3		3435.7	

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 CARNEGIE-MELLON UNIV PITTSBURGH PA
 ROBOTICS INST
 CMU-RI-TR-87-11
 (ETL-0484)
 A AD-A183 878

*DAAG29-84-K-0005
 MASSACHUSETTS INST OF TECH
 CAMBRIDGE ARTIFICIAL INTELLIGENCE
 LAB
 AI-M-897
 AD-A183 807

*DACA78-85-C-0003
 CARNEGIE-MELLON UNIV PITTSBURGH PA
 ROBOTICS INST
 CMU-RI-TR-87-11
 (ETL-0484)
 A AD-A183 878

*F33815-83-C-1078
 MASSACHUSETTS UNIV AMHERST DEPT
 OF COMPUTER AND INFORMATION
 SCIENCE
 (AFVAL-TR-87-1052)
 F AD-A183 782

*N00014-75-C-1111
 YALE UNIV NEW HAVEN CT DEPT OF
 COMPUTER SCIENCE
 YALEU/CSD/RR-489
 AD-A183 583

*N00014-88-K-0108
 YALE UNIV NEW HAVEN CT DEPT OF
 COMPUTER SCIENCE
 YALEU/CSD/RR-514
 AD-A183 582
 YALEU/CSD/RR-489
 AD-A183 553

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 MASSACHUSETTS INST OF TECH
 CAMBRIDGE ARTIFICIAL INTELLIGENCE

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 AI-M-930
 AD-A183 815
 AI-M-907
 AD-A183 831
 AI-M-897
 AD-A183 807
 AI-M-933
 AD-A183 918

*N00014-85-K-0855
 PITTSBURGH UNIV PA LEARNING
 RESEARCH AND DEVELOPMENT CENTER
 UPITT/LRDC/ONR/LSP-2
 AD-A183 832

*N00001-86-D-0087
 SYSTEMS EXPLORATION INC SAN DIEGO
 CA
 (NOSC-TR-1084)
 F AD-A183 881

*NSF-IRI86-16844
 MASSACHUSETTS INST OF TECH
 CAMBRIDGE ARTIFICIAL INTELLIGENCE
 LAB
 AI-M-933
 AD-A183 918

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 CONTRACT INDEX-1
 CA200H

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SUBJECT INDEX

- ADAPTIVE SYSTEMS
 Multilayer Networks of Self-Interested Adaptive Units.*
 AD-A183 782
- AIR STRIKES
 Knowledge Acquisition
 Methodology.*
 AD-A183 551
- ALGORITHMS
 Solving a Class of Spatial Reasoning Problems: Minimal-Cost Path Planning in the Cartesian Plane.*
 AD-A183 900
- ANTIMISSILE DEFENSE SYSTEMS
 SDIO (Strategic Defense Initiative Office) Technical Information Management Center Bibliography of Unclassified Reports: January - December 1989.*
 AD-A183 875
- ARTIFICIAL INTELLIGENCE
 Ten Problems in Artificial Intelligence.*
 AD-A183 552
 .. Integrated Processing in Planning and Understanding.*
 AD-A183 553
 Simplifying Decision Trees.*
 AD-A183 615
 Toward a Requirements Apprentices: On the Boundary between Informal and Formal Specifications.*
 AD-A183 831
 Workshop on AI (Artificial Intelligence) and Simulation (2nd) Held in Seattle, Washington on 14 July 1987.*
 AD-A183 738
 Probabilistic Solution of Ill-Posed Problems in Computational Vision.*
 AD-A183 807
 Toward a Theory of Curriculum for Use in Designing Intelligent Instructional Systems.*
- COMPUTER AIDED INSTRUCTION
 Toward a Theory of Curriculum for Use in Designing Intelligent Instructional Systems.*
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- COMPUTER APPLICATIONS
 Probabilistic Solution of Ill-Posed Problems in Computational Vision.*
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 Knowledge Acquisition
 Methodology.*
 AD-A183 551
 The Programmer's Apprentices: A Program Synthesis Scenario.*
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- COMPUTERIZED SIMULATION
 Workshop on AI (Artificial Intelligence) and Simulation (2nd) Held in Seattle, Washington on 14 July 1987.*
 AD-A183 738
 Multilayer Networks of Self-Interested Adaptive Units.*
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 Knowledge Acquisition
 Methodology.*
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 Integrated Processing in Planning and Understanding.*
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 Simplifying Decision Trees.*
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 Integrated Processing in Planning and Understanding.*
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 Multilayer Networks of Self-Interested Adaptive Units.*
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 Automated Logistics Planning Using Historical Analogies.*
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- LOGISTICS SUPPORT
 Automated Logistics Planning Using Historical Analogies.*
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- MATHEMATICAL ANALYSIS
 Multilayer Networks of Self-Interested Adaptive Units.*
 AD-A183 782
- NAVAL ARCHITECTURE
 Practical Applications of Artificial Intelligence, Expert Systems at NAVSEA.*
 AD-A183 942
- PROBLEM SOLVING
 Solving a Class of Spatial Reasoning Problems: Minimal-Cost Path Planning in the Cartesian Plane.*
 AD-A183 900
- ROBOTS
 Survey of Mobile Robots.*
 AD-A183 888
 1988 Year End Report for Road Following at Carnegie-Mellon.*
 AD-A183 879
- SYSTEMS ENGINEERING
 The Programmer's Apprentices: A Program Synthesis Scenario.*
 AD-A183 918

SUBJECT INDEX-1
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- AIR FORCE WRIGHT AERONAUTICAL LABS
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* * *
- AFWAL-TR-87-1052
Multilayer Networks of Self-Interested Adaptive Units.
AD-A183 782
- AMERICAN ASSOCIATION FOR ARTIFICIAL INTELLIGENCE MENLO PARK CA
* * *
- Workshop on AI (Artificial Intelligence) and Simulation (2nd) Held in Seattle, Washington on 14 July 1987.
AD-A183 736
- ARMY ENGINEER TOPOGRAPHIC LABS FORT BELVOIR VA
* * *
- ETL-0464
1986 Year End Report for Road Following at Carnegie-Mellon.
AD-A183 879
- ASSOCIATION OF SCIENTISTS AND ENGINEERS OF THE NAVAL SEA SYSTEMS COMMAND WASHINGTON DC
* * *
- Practical Applications of Artificial Intelligence, Expert Systems at NAVSEA.
AD-A183 942
- CARNEGIE-MELLON UNIV PITTSBURGH PA
ROBOTICS INST
* * *
- CMU-RI-TR-87-11
1986 Year End Report for Road Following at Carnegie-Mellon.
(ETL-0464)
AD-A183 879
- MASSACHUSETTS INST OF TECH CAMBRIDGE
ARTIFICIAL INTELLIGENCE LAB
* * *
- Survey of Mobile Robots.
(NAVSEA-450-80G-TR-0004)
AD-A183 888
- AI-M-897

- Probabilistic Solution of Ill-Posed Problems in Computational Vision.
AD-A183 807
- AI-M-907
Toward a Requirements Apprentice: On the Boundary between Informal and Formal Specifications.
AD-A183 831
- AI-M-930
Simplifying Decision Trees.
AD-A183 815
- AI-M-933
The Programmer's Apprentice: A Program Synthesis Scenario.
AD-A183 918
- MASSACHUSETTS UNIV AMHERST DEPT OF COMPUTER AND INFORMATION SCIENCE
* * *
- Multilayer Networks of Self-Interested Adaptive Units.
(AFWAL-TR-87-1052)
AD-A183 782
- NAVAL OCEAN SYSTEMS CENTER SAN DIEGO CA
* * *
- NDSC-TR-1084
Knowledge Acquisition Methodology.
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- NAVAL POSTGRADUATE SCHOOL MONTEREY CA
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- * * *
- Solving a Class of Spatial Reasoning Problems: Minimal-Cost Path Planning in the Cartesian Plane.
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- NAVSEA-450-80G-TR-0004
Survey of Mobile Robots.
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* * *
- UPIIT/LRDC/ONR/LSP-2
Toward a Theory of Curriculum for Use in Designing Intelligent Instructional Systems.
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- STRATEGIC DEFENSE INITIATIVE ORGANIZATION WASHINGTON DC
* * *
- SDIO (Strategic Defense Initiative Office) Technical Information Management Center Bibliography of Unclassified Reports: January - December 1986.
AD-A183 875
- SYSTEMS EXPLORATION INC SAN DIEGO CA
* * *
- Knowledge Acquisition Methodology.
(NDSC-TR-1084)
AD-A183 551
- YALE UNIV NEW HAVEN CT DEPT OF COMPUTER SCIENCE
* * *
- YALEU/CSD/RR-489
Integrated Processing in Planning and Understanding.
AD-A183 853
- * * *
- YALEU/CSD/RR-514
Ten Problems in Artificial Intelligence.
AD-A183 552

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PERSONAL AUTHOR INDEX

- BARTO, ANDREW G. . . .
Multilayer Networks of Self-Interested Adaptive Units.
AD-A183 782
- BIRNBAUM, LAWRENCE
Integrated Processing in Planning and Understanding.
AD-A183 553
- DAVIS, MARK J. . . .
Automated Logistics Planning Using Historical Analogies.
AD-A183 837
- FISHWICK, PAUL A. . . .
Workshop on AI (Artificial Intelligence) and Simulation (2nd) Held in Seattle, Washington on 14 July 1987.
AD-A183 738
- FLYNN, ANITA M. . . .
Survey of Mobile Robots.
AD-A183 888
- FRASER, BONNIE D. . . .
Knowledge Acquisition Methodology.
AD-A183 551
- HARTMAN, PATRICK J. . . .
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- KANADE, TAKEO
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- LESGOLD, ALAN M. . . .
- MARROQUIN, J. . . .
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- MITTER, S. . . .
Probabilistic Solution of Ill-Posed Problems in Computational Vision.
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- MODJESKI, RICHARD B. . . .
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- OMENS, CHRISTOPHER C. . . .
Ten Problems in Artificial Intelligence.
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- POGGIO, TOMASO
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- QUINLAN, J. R. . . .
Simplifying Decision Trees.
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Workshop on AI (Artificial Intelligence) and Simulation (2nd) Held in Seattle, Washington on 14 July 1987.
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- RICH, CHARLES
- SCHANK, ROGER C. . . .
Ten Problems in Artificial Intelligence.
AD-A183 552
- STELZNER, MARILYN
Workshop on AI (Artificial Intelligence) and Simulation (2nd) Held in Seattle, Washington on 14 July 1987.
AD-A183 738
- THORPE, CHARLES
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- WATERS, RICHARD C. . . .
Toward a Requirements Apprentice: On the Boundary Between Informal and Formal Specifications.
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- ZIEGLER, BERNARD P. . . .
- Toward a Requirements Apprentice: On the Boundary Between Informal and Formal Specifications.
AD-A183 831
- The Programmer's Apprentice: A Program Synthesis Scenario.
AD-A183 918
- Solving a Class of Spatial Reasoning Problems: Minimal-Cost Path Planning in the Cartesian Plane.
AD-A183 800
- 1986 Year End Report for Road Following at Carnegie-Mellon.
AD-A183 879
- Toward a Requirements Apprentice: On the Boundary Between Informal and Formal Specifications.
AD-A183 831
- The Programmer's Apprentice: A Program Synthesis Scenario.
AD-A183 918

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Intelligence) and Simulation (2nd)
Held in Seattle, Washington on 14
July 1987.
AD-A183 736

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REPORT NUMBER INDEX

AFWAL-TR-87-1052
AD-A183 782

AI-M-897
AD-A183 807

AI-M-907
AD-A183 831

AI-M-930
AD-A183 815

AI-M-933
AD-A183 818

CMU-RI-TR-87-11
AD-A183 879

ETL-0484
AD-A183 879

NAVSEA-450-90G-TR-0004
AD-A183 888

NDSC-TR-1084
AD-A183 551

UPITT/LRDC/ONR/LSP-2
AD-A183 832

YALEU/CSD/RR-488
AD-A183 553

YALEU/CSD/RR-514
AD-A183 552

REPORT NUMBER INDEX-1
UNCLASSIFIED CA200H

UNCLASSIFIED

TITLE INDEX

1986 Year End Report for Road
Following at Carnegie-Mellon.
AD-A183 878

Automated Logistics Planning Using
Historical Analogies.
AD-A183 837

Integrated Processing in Planning
and Understanding.
AD-A183 553

Knowledge Acquisition Methodology.
AD-A183 551

Multilayer Networks of Self-
Interested Adaptive Units.
AD-A183 782

Practical Applications of
Artificial Intelligence, Expert
Systems at NAVSEA.
AD-A183 942

Probabilistic Solution of Ill-Posed
Problems in Computational Vision.
AD-A183 807

The Programmer's Apprentice: A
Program Synthesis Scenario.
AD-A183 918

SDIO (Strategic Defense Initiative
Office) Technical Information
Management Center Bibliography of
Unclassified Reports: January -
December 1986.
AD-A183 875

Simplifying Decision Trees.
AD-A183 815

Solving a Class of Spatial
Reasoning Problems: Minimal-Cost
Path Planning in the Cartesian
Plane.
AD-A183 800

Survey of Mobile Robots.
AD-A183 888

Ten Problems in Artificial
Intelligence.
AD-A183 552

Toward a Requirements Apprentices:
On the Boundary between Informal
and Formal Specifications.
AD-A183 831

Toward a Theory of Curriculum for
Use in Designing Intelligent
Instructional Systems.
AD-A183 832

Workshop on AI (Artificial
Intelligence) and Simulation (2nd)
Held in Seattle, Washington on 14
July 1987.
AD-A183 736

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. CA200H

AD-A183 942 12/8 18/8.1

ASSOCIATION OF SCIENTISTS AND ENGINEERS OF THE NAVAL SEA
SYSTEMS COMMAND WASHINGTON DC

AD-A183 918 12/5

MASSACHUSETTS INST OF TECH CAMBRIDGE ARTIFICIAL
INTELLIGENCE LAB

(U) Practical Applications of Artificial Intelligence,
Expert Systems at NAVSEA.

(U) The Programmer's Apprentice: A Program Synthesis
Scenario.

APR 87 38P

PERSONAL AUTHORS: Hartman, Patrick J. ;

DESCRIPTIVE NOTE: Memorandum rept.,

NOV 88 47P

UNCLASSIFIED REPORT

PERSONAL AUTHORS: Rich, Charles ; Waters, Richard C. ;

REPORT NO. AI-M-933

CONTRACT NO. N00014-88-K-0124, NSF-IRI88-18844

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the Annual Technical
Symposium (24th), 1987.

ABSTRACT: (U) This paper examines the historical oscillations of Artificial Intelligence. It shows how to select problems which can be solved with the aid of Expert Systems; it also identifies areas such as common sense reasoning, automated machine learning, and complex design synthesis which are beyond the state of the art now and will be for years to come. Artificial Intelligence programs are able to diagnose faults and classify solutions in narrowly defined specialties even when the data is 'fuzzy', but they have not exhibited autonomous 'thinking'. Just as conventional computer programming has alleviated the burden of calculating, AI Expert Systems will streamline the processing of logical data. Both of these computer techniques are cost effective when they are applied to well defined tasks since computers are faster than people and error free for routine tasks. Expert Systems require significant development effort, but with them we can perform tasks which were not possible before. These programs are fundamentally different than those which performed numerical calculations in the past. They process information - the rules by which equipment and people act. Certain situations will always occur which require a 'real expert', but every engineer can use an assistant and they are being developed.

DESCRIPTORS: (U) *ARTIFICIAL INTELLIGENCE, *NAVAL ARCHITECTURE, SYNTHESIS, COSTS, AUTOMATION, LEARNING MACHINES, COMPUTERS, METHODOLOGY, COMPUTER PROGRAMMING, COMPUTATIONS, NUMERICAL ANALYSIS, MILITARY APPLICATIONS, SYMPOSIA

IDENTIFIERS: (U) Expert systems

AD-A183 942 *

AD-A183 918

UNCLASSIFIED

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. CA200H

AD-A183 900 12/9

AD-A183 878 12/9 17/7

NAVAL POSTGRADUATE SCHOOL MONTEREY CA

CARNEGIE-MELLON UNIV PITTSBURGH PA ROBOTICS INST

(U) Solving a Class of Spatial Reasoning Problems: Minimal-Cost Path Planning in the Cartesian Plane.

(U) 1988 Year End Report for Reed Following at Carnegie-Mellon.

DESCRIPTIVE NOTE: Doctoral thesis.

DESCRIPTIVE NOTE: Annual rept. 18 Jan 88-14 Jan 87.

JUN 87 428P

MAY 87 88P

PERSONAL AUTHORS: Richbourg, Robert F. ;

PERSONAL AUTHORS: Therpe, Charles ; Kanada, Takeo ;

UNCLASSIFIED REPORT

REPORT NO. CMU-RI-TR-87-11

CONTRACT NO. DACA78-88-C-0003, ARPA Order-5351

ABSTRACT: (U) This work presents an algorithm to solve a two-dimensional weighted-region problem that requires finding the least-cost regions. Such regions have a constant cost rate per unit distance accrued by paths passing through them. Conventional graph search applies standard search strategies to graphs whose links represent the only possible paths. We use Snell's law as a local-optimality criterion to create corresponding graphs for the weighted-region problem; the nodes in our graphs represent areal subdivisions of the physical environment. The performance of our Snell's-law-based algorithm is compared to that of a dynamic-programming, wavefront-propagation technique. Test results show average-case superiority of the Snell's-law-based algorithm, as measured by time, space and solution-path cost. We present a criterion to predict the time for the wavefront-propagation algorithm and the Snell's-law algorithm to solve problems; this allows the selection of the fastest algorithm. We also develop improvements to the wavefront-propagation algorithm that decrease its average-case time requirements and we prove properties of Snell's law when applied to the weighted-region problem.

DESCRIPTORS: (U) *ALGORITHMS, *PROBLEM SOLVING, *ARTIFICIAL INTELLIGENCE, PATHS, THESES, ALGORITHMS, COSTS, GRAPHS, PHYSICAL PROPERTIES, RANGE(DISTANCE), RATES, REASONING, SEARCHING, SNELL'S LAW, STRATEGY, TWO DIMENSIONAL, WAVEFRONTS

IDENTIFIERS: (U) *Spatial reasoning

AD-A183 900

UNCLASSIFIED

PAGE 2 CA200H

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes progress in vision and navigation for outdoor mobile robots at the Carnegie Mellon Robotics Institute during 1986. This research was sponsored by DARPA as part of the Strategic Computing Initiative. Our work during 1986 culminated in two demonstration systems. The first system drives the Terregator, a desk-sized robot with six wheels, around the network of campus sidewalks. This system, named Sidewalk II, uses a video camera to follow sidewalks and a laser rangefinder to detect and avoid stairs. Sidewalk II makes extensive use of map data, for visual predictions and for path planning. The second system, Park Navigation, uses the Navlab, our new Chevrolet Van robot. The Park system concentrated on vision for following difficult roads, including curves, dirt and leaves, shadows, puddles, and both moving and fixed obstacles. We developed computer vision techniques for handling difficult roads, and built range finder programs for detecting and avoiding obstacles. Keywords: Autonomous navigation.

DESCRIPTORS: (U) *ROBOTS, METHODOLOGY, VISION, LASERS, RANGE FINDING, PATHS, PLANNING, ROADS, VISION, BARRIERS, MOTION, MOBILE, OUTDOOR, ROBOTICS, DEMONSTRATIONS, CAMERAS, AUTONOMOUS NAVIGATION, PREDICTIONS

IDENTIFIERS: (U) CODGER computer program, CODGER(Communications Database with Geometric Reasoning).

AD-A183 878

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. CA200H

AD-A183 878

CONTINUED

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AD-A183 875 15/3.1 5/2

STRATEGIC DEFENSE INITIATIVE ORGANIZATION WASHINGTON DC

(U) SDIO (Strategic Defense Initiative Office) Technical
Information Management Center Bibliography of
Unclassified Reports: January - December 1986.

DEC 86 68P

UNCLASSIFIED REPORT

ABSTRACT: (U) This bibliography lists the Strategic
Defense Initiative Organization Technical Information
Management Centers holdings of publications pertaining to
such topics as Software Testing Measures, Digital
Beamforming Arrays, Experimental Electromagnetic
Launchers, Rail Guns, Artificial Intelligence, Microwave
Imaging, Optical Technology, Soviet Military Power, and
Soviet Laser Developments.

DESCRIPTORS: (U) *ANTIMISSILE DEFENSE SYSTEMS,
ARTIFICIAL INTELLIGENCE, ELECTROMAGNETISM, LAUNCHERS,
OPTICS, COMPUTER PROGRAMS, TEST AND EVALUATION, USSR,
ARRAYS, BEAM FORMING, DIGITAL SYSTEMS, IMAGES, MICROWAVES,
ELECTRIC GUNS, STRATEGIC WARFARE, BIBLIOGRAPHIES

IDENTIFIERS: (U) Strategic Defense Initiative

AD-A183 878

AD-A183 875

UNCLASSIFIED

PAGE

3

CA200H

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. CA200H

AD-A183 832

12/9

PITTSBURGH UNIV PA LEARNING RESEARCH AND DEVELOPMENT
CENTER

AD-A183 832 CONTINUED

(U) Toward a Theory of Curriculum for Use in Designing
Intelligent Instructional Systems.

DESCRIPTORS: (U) *COMPUTER AIDED INSTRUCTION.
*ARTIFICIAL INTELLIGENCE. CONTROL SYSTEMS. STUDENTS.
INSTRUCTIONAL MATERIALS. TEACHING METHODS. LEARNING.
EDUCATION. THEORY. COGNITION

DESCRIPTIVE NOTE: Technical rept..

IDENTIFIERS: (U) PE01153N, MURN007524

AUG 87 48P

PERSONAL AUTHORS: Legold, Alan M. ;

REPORT NO. UPITT/LRDC/ONR/LSP-2

CONTRACT NO. N00014-85-K-0855

PROJECT NO. RR04208

TASK NO. RR0420800

UNCLASSIFIED REPORT

ABSTRACT: (U) Implicit in the approaches being taken by current efforts to create intelligent computer-based instruction is the notion that curriculum is almost an epiphenomenon of knowledge-driven instruction. Early computer-based instruction had little control structure other than an absolutely rigid curriculum and was insensitive to the subtleties of different students' partial knowledge. There was a reaction in the direction of representing the students' knowledge as a subset of the target or goal knowledge to be taught and simply deciding de novo after each piece of instruction what piece of missing knowledge to teach the student. Goal knowledge is as important to intelligent machine activity as it is to human activity, and that it also must be well understood and explicitly represented in an instructional system if that system is to be successful in fostering learning. This report presents an architecture for representing curriculum or goal knowledge in intelligent tutors and is first step toward a theory of curriculum that can inform the design of such systems. The later part of the report focuses on the concept of prerequisite that is the basis for existing computer-assisted instruction and shows how that concept has been inadequate in the past. A new approach, in which the prerequisite relationship is always dependent on the instructional subgoal (curriculum) context, is introduced.

AD-A183 832

AD-A183 832

UNCLASSIFIED

PAGE

4

CA200H

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. CA200H

AD-A183 807 12/8

MASSACHUSETTS INST OF TECH CAMBRIDGE ARTIFICIAL INTELLIGENCE LAB

(U) Probabilistic Solution of Ill-Posed Problems in Computational Vision.

DESCRIPTIVE NOTE: Memorandum rept..

MAR 87 41P

PERSONAL AUTHORS: Marroquin, J.; Mitter, S.; Poggio, Tomaso;

REPORT NO. AI-M-887

CONTRACT NO. N00014-88-K-0124, DAAG29-84-K-0008

UNCLASSIFIED REPORT

ABSTRACT: (U) Computational vision is a set of inverse problems. The authors review standard regularization theory, discuss its limitations, and present new stochastic (in particular, Bayesian) methods for their solution. They derive efficient algorithms and describe parallel implementations on digital parallel SIMD architectures, as well as a new class of parallel hybrid computers. Keywords: Stochastic methods; Artificial intelligence; Problem solving; Probabilistic approach. (Author)

DESCRIPTORS: (U) *ARTIFICIAL INTELLIGENCE, *VISION, *COMPUTER APPLICATIONS, ALGORITHMS, EFFICIENCY, PROBABILITY, SOLUTIONS(GENERAL), INVERSION, COMPUTATIONS, HYBRID COMPUTERS, PARALLEL ORIENTATION, PROBLEM SOLVING, STOCHASTIC PROCESSES

IDENTIFIERS: (U) *Computer vision, NUMRSR0202

AD-A183 807

AD-A183 782 12/7 23/3

MASSACHUSETTS UNIV AMHERST DEPT OF COMPUTER AND INFORMATION SCIENCE

(U) Multilayer Networks of Self-Interested Adaptive Units.

DESCRIPTIVE NOTE: Final rept. Sep 83-Sep 86.

JUL 87 149P

PERSONAL AUTHORS: Barto, Andrew G.;

CONTRACT NO. F33815-83-C-1078

PROJECT NO. 2312

TASK NO. R1

MONITOR: AFVAL
TR-87-1082

UNCLASSIFIED REPORT

ABSTRACT: (U) This report describes research directed toward refining and evaluating learning methods for multilayer networks of neuron-like adaptive units. We define a learning rule called the Associative Reward-Penalty, or A sub R-P, rule that has strong ties to both the theory of adaptive pattern classification and stochastic learning automata. We state a convergence result that has been proven for a single A sub R-P unit can reliably learn nonlinear associative mappings. The behavior of these networks is discussed in terms of the collective behavior of stochastic learning automata in team decision problems. A number of methods for learning in multilayer networks are compared, including the A sub R-P method and the error back-propagation method. These methods, or variants of them, outperform the other methods applied to the test problem, with error back-propagation showing a significant speed advantage over the other methods. The A sub R-P and error back-propagation are compared and contrasted in terms of their respective approaches to gradient following.

DESCRIPTORS: (U) *ADAPTIVE SYSTEMS, *LEARNING, *COMPUTERIZED SIMULATION, *MATHEMATICAL ANALYSIS, ADAPTIVE SYSTEMS, AUTOMATA, BEHAVIOR, CLASSIFICATION, CONVERGENCE, DECISION MAKING, LAYERS, LEARNING, NETWORKS, PATTERNS, STOCHASTIC PROCESSES, TEAMS(PERSONNEL).

AD-A183 782

UNCLASSIFIED

PAGE 5 CA200H

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. CA200H

AD-A183 782 CONTINUED

AD-A183 738 12/9 12/5 12/4

VARIATIONS, ARTIFICIAL INTELLIGENCE, LEARNING CURVES,
ALGORITHMS, ERRORS, NETWORK ANALYSIS(MANAGEMENT)

AMERICAN ASSOCIATION FOR ARTIFICIAL INTELLIGENCE MEMLO
PARK CA

IDENTIFIERS: (U) PEG1102F, WJAFVAL2312R104

(U) Workshop on AI (Artificial Intelligence) and
Simulation (2nd) Held in Seattle, Washington on 14
July 1987.

JUL 87 140P

PERSONAL AUTHORS: Fishwick, Paul A.; Modjeski, Richard B.;
Ziegler, Bernard P.; Reddy, Ramana; Stelzner, Marilyn;

UNCLASSIFIED REPORT

ABSTRACT: (U) The Second Artificial Intelligence (AI)
and Simulation Workshop was held during the National
Conference on Artificial Intelligence on July 14, 1987 at
the University of Washington, Seattle. The abstracts and
papers pertain to such topics as: Artificial Intelligence;
Computer Science; Computer Simulation Modeling; Expert
Systems; Knowledge Based Simulation; Computer Modeling;
Operations Research; Qualitative Simulation; and
Simulation.

DESCRIPTORS: (U) *COMPUTERIZED SIMULATION, *ARTIFICIAL
INTELLIGENCE, COMPUTERS, MODELS, OPERATIONS RESEARCH,
SYMPOSIA, WORKSHOPS

IDENTIFIERS: (U) Expert Systems

AD-A183 782

AD-A183 738

UNCLASSIFIED

PAGE

8

CA200H

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. CA200H

AD-A183 888

12/8

MASSACHUSETTS INST OF TECH CAMBRIDGE ARTIFICIAL INTELLIGENCE LAB

(U) Survey of Mobile Robots.

DESCRIPTIVE NOTE: Final technical rept..

DEC 85 48P

PERSONAL AUTHORS: Flynn, Anita M. ;

MONITOR: NAVSEA

450-90G-TR-0004

UNCLASSIFIED REPORT

ABSTRACT: (U) This document consisting of text and graphics reports on a survey of robots developed from 1967 to the present. The report outlines the work which has been done in the past on mobile robots and summarizes certain projects currently being pursued. Special emphasis is placed on how these efforts have approached or solved the problem of modeling the environment and using the model for the purposes of navigation. Keywords: Algorithms; Artificial Intelligence; Autonomous Vehicles; Laser Range Finders; Manipulator; Map Making; Obstacle Avoidance; Path Planning; Sensors; Sonar; Vision.

DESCRIPTORS: (U) *ROBOTS, MANIPULATORS, ALGORITHMS, ARTIFICIAL INTELLIGENCE, AVOIDANCE, BARRIERS, DETECTORS, GRAPHICS, LASER APPLICATIONS, MAPPING, MOBILE, MODELS, NAVIGATION, PATHS, PLANNING, RANGE FINDING, SONAR, SURVEYS, VEHICLES, VISION

AD-A183 837

15/5

NAVAL POSTGRADUATE SCHOOL MONTEREY CA

(U) Automated Logistics Planning Using Historical Analogies.

DESCRIPTIVE NOTE: Master's thesis.

JUN 87 113P

PERSONAL AUTHORS: Davis, Mark J. ;

UNCLASSIFIED REPORT

ABSTRACT: (U) The current method for creating tactical logistics estimates in the Army inadequately incorporates historical data on the actual consumption of supplies. The automated-logistics-planning system described in this thesis addresses this deficiency. The program developed in this research produces general estimates for selected supply items by referencing equations and variables from current Army planning documents and performing the necessary calculations. The program uses reasoning to identify previous operations which are analogous to the current operation. Separate criteria are used to identify the strongest analogies to the current operation for each of five categories of supply items. Information contained in the historical records of the three strongest analogies in each category is used to revise the general estimates. The revised estimates are hopefully more accurate in predicting actual supply requirements for the current operation than the estimates generated by formula alone. Theses.

DESCRIPTORS: (U) *LOGISTICS PLANNING, *LOGISTICS SUPPORT, ARMY PLANNING, AUTOMATION, CONSUMPTION, DOCUMENTS, EQUATIONS, ESTIMATES, FORMULATIONS, LOGISTICS, LOGISTICS PLANNING, REASONING, SUPPLIES, THESES, ARMY OPERATIONS, ARTIFICIAL INTELLIGENCE, TACTICAL WARFARE

AD-A183 888

AD-A183 837

UNCLASSIFIED

PAGE

7

CA200H

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. CA200H

AD-A183 831 12/8 12/5

MASSACHUSETTS INST OF TECH CAMBRIDGE ARTIFICIAL INTELLIGENCE LAB

(U) Toward a Requirements Apprentice: On the Boundary between Informal and Formal Specifications.

JUL 88 27P

PERSONAL AUTHORS: Rich, Charles ;Waters, Richard C. ;

REPORT NO. AI-M-907

CONTRACT NO. N00014-85-K-0124

UNCLASSIFIED REPORT

ABSTRACT: (U) Requirements acquisition is one of the most important and least well supported parts of the software development process. The Requirements Apprentice (RA) will assist a human analyst in the creation and modification of software requirements. Unlike current requirements analysis tools, which assume a formal description language, the focus of the RA is on the boundary between informal and formal specifications. The RA is intended to support the earliest phases of creating a requirement, in which incompleteness, ambiguity, and contradiction are inevitable features. From an artificial intelligence perspective, the central problem the RA faces is one of knowledge acquisition. It has to develop a coherent internal representation from an initial set of disorganized statements. To do so, the RA will rely on a variety of techniques, including dependency-directed reasoning, hybrid knowledge representation, and the reuse of common forms (cliche's). The Requirements Apprentice is being developed in the context of the Programmer's Apprentice project, whose overall goal is the creation of an intelligent assistant for all aspects of software development.

DESCRIPTORS: (U) *ARTIFICIAL INTELLIGENCE, PROGRAMMING LANGUAGES, ACQUISITION, COHERENCE, COMPUTER PROGRAMS, INTERNAL, MODIFICATION, PARTS, REQUIREMENTS.

AD-A183 831

UNCLASSIFIED

AD-A183 815 12/8 12/4

MASSACHUSETTS INST OF TECH CAMBRIDGE ARTIFICIAL INTELLIGENCE LAB

(U) Simplifying Decision Trees.

DEC 88 17P

PERSONAL AUTHORS: Quinlan, J. R. ;

REPORT NO. AI-M-930

CONTRACT NO. N00014-88-K-0124

UNCLASSIFIED REPORT

ABSTRACT: (U) Many systems have been developed for constructing decision trees from collections of examples. Although the decision trees generated by these methods are accurate and efficient, they often suffer the disadvantage of excessive complexity that can render them incomprehensible to experts. It is questionable whether opaque structures of this kind can be described as knowledge, no matter how well they function. This paper discusses techniques for simplifying decision trees without compromising their accuracy. Four methods are described, illustrated, and compared on a test-bed of decision trees from a variety of domains.

DESCRIPTORS: (U) *ARTIFICIAL INTELLIGENCE, *DECISION MAKING, DECISION THEORY, FAULT TREE ANALYSIS, ACCURACY, TEST BEDS, INFORMATION PROCESSING

IDENTIFIERS: (U) *Decision Trees

AD-A183 815

PAGE 8 CA200H

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. CA200H

AD-A183 553

12/9

YALE UNIV NEW HAVEN CT DEPT OF COMPUTER SCIENCE

(U) Integrated Processing in Planning and Understanding.

DESCRIPTIVE NOTE: Research rept..

DEC 86 208P

PERSONAL AUTHORS: Birnbaum, Lawrence ;

REPORT NO. YALEU/CSD/RR-488

CONTRACT NO. N00014-78-C-1111, N00014-88-K-0108

UNCLASSIFIED REPORT

ABSTRACT: (U) Programs that plan and understand must make many decisions about which paths of inquiry are likely to prove fruitful. In order to make such decisions rationally, and hence avoid the need for backtracking that inevitably results if they are made arbitrarily, relevant contextual information must be brought to bear. An integrated model of planning or understanding is one that attempts to take such contextual information into account as early as possible. An integrated model of understanding must take the understander's goals and hypotheses into account in making decisions about how to interpret an input. The relationship between syntax and semantics in language understanding is analyzed from such an integrated point of view. Next, the problems of lexical ambiguity and vagueness are addressed, previous attempts to solve these problems are analyzed, and their shortcomings are used to motivate requirements for a more complete solution. Finally, an integrated approach to inference in explanation-based understanding is presented. **Keywords:** Artificial intelligence, Language understanding, Opportunistic planning, Explanatory inference, Freudian slips

DESCRIPTORS: (U) *ARTIFICIAL INTELLIGENCE, *INFORMATION PROCESSING, *DECISION MAKING, AMBIGUITY, ARTIFICIAL INTELLIGENCE, HYPOTHESES, INTEGRATED SYSTEMS, LEXICOGRAPHY, MODELS, PLANNING, SEMANTICS, SYNTAX, PROBLEM SOLVING

AD-A183 553

UNCLASSIFIED

AD-A183 552

12/9

YALE UNIV NEW HAVEN CT DEPT OF COMPUTER SCIENCE

(U) Ten Problems in Artificial Intelligence.

DESCRIPTIVE NOTE: Research rept..

JAN 87 36P

PERSONAL AUTHORS: Schank, Roger C. ; Owens, Christopher C. ;

REPORT NO. YALEU/CSD/RR-514

CONTRACT NO. N00014-88-K-0108, AFOSR-88-0343

UNCLASSIFIED REPORT

ABSTRACT: (U) Researchers in Artificial Intelligence have had a difficult time defining the field's goals and assessing its progress. Some have focused on the task of modelling the human brain, others have focused on developing smart machines independent of the constraints of psychological or neurological realism. Over the years the notion of what is an AI task has changed, as problems once thought to be easy have turned out to be hard, and vice versa. This paper discusses some problems that are currently of interest to the field, and places them in the context of a more enduring question: What is intelligence? It attempts to enumerate a few essential aspects of intelligence that every human, animal or intelligent machine must, to some degree, exhibit.

DESCRIPTORS: (U) *ARTIFICIAL INTELLIGENCE, *ATTITUDES, *CONDITIONING(LEARNING), *PROBLEM SOLVING, *PREDICTIONS, INDEXES, *DECODING

IDENTIFIERS: (U) Interference, curiosity

AD-A183 552

CA200H

PAGE

9

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. CA200H

AD-A183 551 B/2 12/5 15/8

SYSTEMS EXPLORATION INC SAN DIEGO CA

(U) Knowledge Acquisition Methodology.

DESCRIPTIVE NOTE: Final rept..

JUN 87 51P

PERSONAL AUTHORS: Fraser, Bonnie D. ;

CONTRACT NO. N00001-86-D-0087

MONITOR: NOSC
TR-1094

UNCLASSIFIED REPORT

ABSTRACT: (U) The principal objective of the work described in this report was to develop unobtrusive, reliable, and effective techniques for acquiring the knowledge needed to build the Airstrike Planning Advisor (ASPA) expert system. This system will develop technologies, methodology, principles and standards for the use of expert systems in the Navy. The goal of this demonstration is to improve the timeliness and effectiveness of airstrike mission planning and decision making for a carrier wing. The technical issues are structured techniques for knowledge acquisition, knowledge validation, user-interface design guidelines and design tools, hybrid knowledge representation and integrated decision aids. An additional long-term goal is to provide guide-lines and insights that can be applied to other Navy expert systems. Artificial intelligence (AI) and behavioral sciences literature was reviewed for problems, lessons, and recommendations related to knowledge acquisition. A number of knowledge acquisition techniques were attempted as an initial step toward evaluating their usefulness in overcoming these problems.

DESCRIPTORS: (U) *DATA ACQUISITION, *COMPUTER PROGRAMMING, *AIR STRIKES, ACQUISITION, BEHAVIORAL SCIENCE, DECISION MAKING, MISSION PROFILES, ADVISORY ACTIVITIES, PLANNING, VALIDATION, METHODOLOGY, ARTIFICIAL INTELLIGENCE, WINGS, INTEGRATED SYSTEMS, NAVY, TIMELINESS, SYSTEMS ENGINEERING

IDENTIFIERS: (U) ASPA(Airstrike Planning Advisor), ASPA computer program, Expert systems, PE82757N, WUDN188532

AD-A183 551

UNCLASSIFIED

PAGE 10

CA200H

Appendix G

CAB on Diskette System Function Descriptions

(re: Hierarchy Chart Section 3.2)

SYSTEM FUNCTION DESCRIPTION

1. DOCUMENT TITLE Functional Description		2. RESPONSIBLE OFFICE DTIC	
3. DATE PREPARED 19 Aug 88	4. STATUS ☒ NEW ☐ REVISED	5. DESIGN ACTIVITY ACTION ☐ APPROVED ☐ REVISED	
6. SYSTEM AND/OR SUBSYSTEM NAME CAB on Diskette		7. SYSTEM AND/OR SUBSYSTEM ID 733 13 3200	
8. PARAGRAPH REFERENCE (Number and Title) 3.2 System Functions			
9. FUNCTIONAL PROCESS Output CAB data from TR Database to diskette.		10. FUNCTION CODE 1.B.1	
11. GENERAL DESCRIPTION OF FUNCTION			

CAB data must be transferred from the 1182 to IBM PC format diskettes.

12. DOCUMENTS ATTACHED (Decision Tables, Hierarchy Charts, Process-Input-Output Tables, Flowcharts, etc.)

SYSTEM FUNCTION DESCRIPTION

1. DOCUMENT TITLE Functional Description		2. RESPONSIBLE OFFICE DTIC	
3. DATE PREPARED 19 Aug 88	4. STATUS ☒ NEW ☐ REVISED	5. DESIGN ACTIVITY ACTION ☐ APPROVED ☐ REVISED	
6. SYSTEM AND/OR SUBSYSTEM NAME CAB on Diskette		7. SYSTEM AND/OR SUBSYSTEM ID 733 13 3200	
8. PARAGRAPH REFERENCE (Number and Title) 3.2 System Functions			
9. FUNCTIONAL PROCESS Create initial CAB databases.		10. FUNCTION CODE 1.B.2	
11. GENERAL DESCRIPTION OF FUNCTION Initial CAB database must be created on CAB on Diskette user site PC or compatible. CAB on Diskette information search and retrieval software must be utilized to index the initial CAB data and make it searchable. Space must be available on user magnetic or WORM drives to store the database.			
12. DOCUMENTS ATTACHED (Decision Tables, Hierarchy Charts, Process-Input-Output Tables, Flowcharts, etc.)			

SYSTEM FUNCTION DESCRIPTION

1. DOCUMENT TITLE Functional Description		2. RESPONSIBLE OFFICE DTIC	
3. DATE PREPARED 19 Aug 88	4. STATUS ☒ NEW ☐ REVISED	5. DESIGN ACTIVITY ACTION ☐ APPROVED ☐ REVISED	
6. SYSTEM AND/OR SUBSYSTEM NAME CAB on Diskette		7. SYSTEM AND/OR SUBSYSTEM ID 733 13 3200	
8. PARAGRAPH REFERENCE (Number and Title) 3.2 System Functions			
9. FUNCTIONAL PROCESS Append new CAB data		10. FUNCTION CODE 1.B.3	
11. GENERAL DESCRIPTION OF FUNCTION A custom batch file and CAB retrieval software must be utilized to add incoming CAB data to the user's archival CAB database. Available disk space must be verified.			
12. DOCUMENTS ATTACHED (Decision Tables, Hierarchy Charts, Process-Input-Output Tables, Flowcharts, etc.)			

SYSTEM FUNCTION DESCRIPTION

1. DOCUMENT TITLE Functional Description		2. RESPONSIBLE OFFICE DTIC	
3. DATE PREPARED 19 Aug 88	4. STATUS ☒ NEW ☐ REVISED	5. DESIGN ACTIVITY ACTION ☐ APPROVED ☐ REVISED	
6. SYSTEM AND/OR SUBSYSTEM NAME CAB on Diskette		7. SYSTEM AND/OR SUBSYSTEM ID 733 13 3200	
8. PARAGRAPH REFERENCE (Number and Title) 3.2 System Functions			
9. FUNCTIONAL PROCESS Install retrieval software		10. FUNCTION CODE 1.B.4	
11. GENERAL DESCRIPTION OF FUNCTION Selected retrieval software must be installed on user site IBM PC's or compatibles prior to initial CAB database creation. Available peripherals including storage devices must be identified to complete installation.			
12. DOCUMENTS ATTACHED (Decision Tables, Hierarchy Charts, Process-Input-Output Tables, Flowcharts, etc.)			

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8. PARAGRAPH REFERENCE (Number and Title) 3.2 System Functions			
9. FUNCTIONAL PROCESS Search the database.		10. FUNCTION CODE 1.B.5	
11. GENERAL DESCRIPTION OF FUNCTION Search capabilities will be determined by the retrieval software chosen. Software selected will comply with requirements identified through the CAB User Needs Assessment.			
12. DOCUMENTS ATTACHED (Decision Tables, Hierarchy Charts, Process-Input-Output Tables, Flowcharts, etc.)			

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6. SYSTEM AND/OR SUBSYSTEM NAME CAB on Diskette		7. SYSTEM AND/OR SUBSYSTEM ID 733 13 3200	
8. PARAGRAPH REFERENCE (Number and Title) 3.2 System Functions			
9. FUNCTIONAL PROCESS Establish connections.		10. FUNCTION CODE 1.B.6	
11. GENERAL DESCRIPTION OF FUNCTION Connecting to DROLS is a CAB on Diskette objective. Communications software must be available to perform this function.			
12. DOCUMENTS ATTACHED (Decision Tables, Hierarchy Charts, Process-Input-Output Tables, Flowcharts, etc.)			

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6. SYSTEM AND/OR SUBSYSTEM NAME CAB on Diskette		7. SYSTEM AND/OR SUBSYSTEM ID 733 13 3200	
8. PARAGRAPH REFERENCE (Number and Title) 3.2 System Functions			
9. FUNCTIONAL PROCESS Invoke CAB help.		10. FUNCTION CODE 1.B.7	
11. GENERAL DESCRIPTION OF FUNCTION Online user help must be available for all CAB functions.			
12. DOCUMENTS ATTACHED (Decision Tables, Hierarchy Charts, Process-Input-Output Tables, Flowcharts, etc.)			