A LOGISTICS SOURCE MATERIAL SYSTEM FOR THE AIR FORCE
LOGISTICS MANAGEMENT. (U) GEORGE WASHINGTON UNIV
WASHINGTON DC INST FOR MANAGEMENT SCIE.

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FINAL REPORT ON
A LOGISTICS SOURCE MATERIAL SYSTEM
THE AIR FORCE LOGISTICS MANAGEMENT CENTER

by

W. E. Caves
W. H. Marlow
Shelemyahu Zacks

STUDENTS FACULTY STUDY RESEARCH DEVELOPMENT FUTURE CAREER CREATIVITY COMMUNITY LEADERSHIP TECHNOLOGY FRONTIER DESIGN ENGINEERING APPLIED SCIENCE

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SELECTION
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Program in Logistics
GWU/IMSE/Serial T-476/83
30 August 1983

THE GEORGE WASHINGTON UNIVERSITY
School of Engineering and Applied Science
Washington, DC 20052

Institute for Management Science and Engineering

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The Logistics Source Materials System is used by the Air Force Logistics Management Center to collect, categorize, store, retrieve, and manage logistics source materials. It is based on the IBM Storage and Information Retrieval System installed on an IBM 4331 computer. The present report describes two data bases constructed from computer tape files produced by the Defense Logistics Studies Information Exchange, Fort Lee, VA, and a
20. Abstract (Cont'd)

data entry program DATENT which was written to facilitate manual entries. An approach to a possible "Handbook of Models and Source Data" is also presented.
The Logistics Source Materials System is used by the Air Force Logistics Management Center to collect, categorize, store, retrieve, and manage logistics source materials. It is based on the IBM Storage and Information Retrieval System installed on an IBM 4331 computer. The present report describes two data bases constructed from computer tape files produced by the Defense Logistics Studies Information Exchange, Fort Lee, VA, and a data entry program DATENT which was written to facilitate manual entries. An approach to a possible "Handbook of Models and Source Data" is also presented.
1. Summary

The Logistics Source Materials System (LSMS) is used by the Air Force Logistics Management Center (AFLMC) to collect, categorize, store, retrieve, and manage logistics source materials. In the present report, attention is confined to descriptions and specifications covering governmental and non-governmental research projects and studies, their associated models and data bases, and similar materials for Air Force logistics and logistics management. Examples of the latter are published and unpublished articles, books, conference proceedings, histories, proposals, and government regulations.

The LSMS is based on the IBM Storage and Information Retrieval System (STAIRS) installed on the IBM 4331 computer at the AFLMC. As described in [9], STAIRS is a multi-user system for the storage and retrieval of documents. Organized data bases may contain formatted and non-formatted data and inquiries proceed through step-by-step dialogues using convenient commands such as BROWSE, SEARCH, SELECT, SORT, PRINT, and so on. STAIRS can be used together with many other systems and programs so that the major operational concern in extending the LSMS is for efficient loading of data into STAIRS.
Sections 2 and 3 of the present report describe two data bases constructed from computer tape files produced by the Defense Logistics Studies Information Exchange (DLSIE), Fort Lee, VA, namely, the DLSIE studies tape [6] and the DLSIE models tape [7]. These were used (see [4]) to produce data bases which are major prototypes for the LSMS in the sense that they are large files of data which have been transformed into formats acceptable as input for STAIRS.

Section 4 describes a data entry program DATENT (see [5] and [8]) which was written to facilitate manual entry of logistics source materials into STAIRS. Use of such a program is convenient for entering a wide variety of documents into the STAIRS system.

Section 5 outlines an approach to a possible "Handbook of Models and Source Data" which is presented in [10]. Such a handbook would extend the "AFLMC Bibliography" (see [2] and [3]) and other sources of logistics models such as the preeminent DLSIE models data base used for Section 3. The series of six reports in [1] is used as the example in [10] to illustrate the approach to such a handbook.

The following recommendations are made in Section 6.

1. The DLSIE studies and models tapes should be loaded into STAIRS and analyzed as two data bases of the LSMS.

2. The DATENT program should be implemented at the AFLMC to assist manual input of data to the LSMS.

3. The AFLMC should establish requirements for machine readable STAIRS inputs from its major sources of data.

4. A "Handbook of Models and Source Data," as illustrated by [10], should not be implemented for any sizable number of logistics models; it would be too expensive and it could not be expected to improve on the practice of using the DLSIE data bases, and others, to identify sources which could then be pursued as appropriate to obtain detailed information.

5. The AFLMC Bibliography [3] should continue to be maintained as a separate data base in the LSMS.
2. The DLSIE studies tape

As described in Reference [6], DLSIE produced a magnetic tape file version of a custom bibliography, namely, the "DLSIE studies tape," as a one-time accommodation to assist the Program in Logistics in completing the present subcontract with the AFLMC. Production was achieved by altering standard computer programs used by DLSIE whereby all "write to printer" commands were replaced by "write to tape." Reference [4] treats the de-editing of the tape and the generation of input for STAIRS. The present section describes products obtained from this tape.

The custom bibliography was produced by DLSIE on 1 August 1983 with resulting output of a magnetic tape file rather than a standard computer printout. All such bibliographies are collections of study abstracts, each one of which summarizes a single document by means of a one- or two-page computer printout. In the present case, the search criteria were the following.

Only completed documents with publication dates in 1978 or later

All documents sponsored or performed by the U.S. Air Force

All aircraft-related documents by all sponsors and all performers

All documents entered from periodical publishers (for all sponsors, all performers, and all topics)

A total of 5,774 documents satisfied these criteria. The machine-readable version was recorded on a reel of 9-track 1600 BPI tape. The printed version would have consisted of over 6,000 pages—about 2 1/2 standard cartons of paper—and it was not printed. Instead, a 145-page "DLSIE studies tape LD index," where one line appears for each document in the custom bibliography, and a 51-page "One percent sample from the DLSIE studies tape," were printed and included as appendixes to [6].

Figure 1 consists of a sample page from the index. The first entry in each line is the four-digit document number which records the serial location of the document on the tape. Second is the logistics document (LD) number which DLSIE assigns and uses to prepare custom bibliographies and to furnish microfiche copies of documents it distributes. The initial segment of the title appears third on each line and it is followed by the initial segment of the name of the performing organization (or name of the periodical publication).
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**Figure 1**
Figure 2 consists of a page from the one percent sample. All data for 58 documents appear in [6] accompanied by STAIRS identifiers. The entire sample consists of every 100th document where the sequencing of the tape—primary is agency and secondary is LD number, as used by DLSIE—was retained. The final columns in Figure 2 contain the serial document numbers for the tape and the line numbers within STAIRS paragraph codes. Generally there is one document per printed page as illustrated by Figure 2 but some documents require more than one page and others fit two per page. Even in the present compactly printed two-sided form, the complete bibliography of 5,774 documents would be about 11 inches thick.

3. The DLSIE models tape

As described in [7], a custom catalog of models was produced by DLSIE on 1 August 1983 with resulting output of a magnetic tape file, namely, the "DLSIE models tape," rather than a standard computer printout. All such catalogs are collections of model abstracts, each one of which summarizes a model by means of a one or two page computer printout. The search criteria were counterparts of those for the studies tape, namely, the following:

- Only completed models with publication dates in 1978 or later
- All models sponsored or performed by the U.S. Air Force
- All aircraft-related models by all sponsors and all performers
- All models entered from periodical publishers (for all sponsors, all performers, and all topics)

A total of 383 models satisfied these criteria and the machine-readable version of the catalog was recorded on a reel of 1600 BPI tape. The printed version would have consisted of about 400 pages and it was not printed. Instead, a 10-page "DLSIE models tape LD index," and a 39-page "Ten percent sample from DLSIE models tape," were printed and included as appendixes in [7].

Figure 3 consists of a sample page from the index and Figure 4 consists of a page from the printed sample. In a manner similar to that for the studies, the present sample consists of every 10th model where the sequencing of the tape—primary is agency and secondary is LD number—was retained. Generally there is one model per page but some models require more than one page. In its present compactly printed two-sided form, the entire custom catalog would be about 2 1/2 inches thick.
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<td>ABSTRACT</td>
<td>THIS DOCUMENT, VOLUME II OF THE MAIN STUDY, (LD 49971A), DESCRIBES THE USE OF THE COMPUTER PROGRAMS FOR THE VARIOUS COMPUTER PROGRAMS DEVELOPED TO FULFILL THE CONTRACT OBJECTIVES. IT SERVES AS A USER'S GUIDE FOR THE UTILIZATION OF SEVERAL INTERDEPENDENT COMPUTER PROGRAMS WHICH WERE DESIGNED TO PROVIDE THE SURVIVABILITY/VULNERABILITY ENGINEER WITH A TOOL FOR THE UTILIZATION OF FINITE ELEMENT MODELS IN THE SIMULATION OF STRUCTURAL FLIGHT LOADING OF WINGS AND WING COMPONENTS.</td>
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**Figure 2**

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<td>OPTIMIZATION OF STRATEGIC AIRLIFT IN-FLIGHT REFUELING.</td>
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<td>SIMULATOR LOGISTICS SUPPORT COST MODEL --- ACTUAL VS</td>
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Figure 3

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ABSTRACT

This volume is the last of the six volumes that describe the Sortie-Generation Model (SGM) System. It describes the process of constructing a spares data base for input to the SGM. An overview of the entire SGM System is contained in Volume One. The Executive Summary (LD No. 46241MA).

D-MODEL-RECOMMEND 117 SEE LD NO. 46241MA.
D-MODEL-INPUT 118 SEE LD NO. 46241MA.
D-MODEL-OUTPUT 119 SEE LD NO. 46241MA.
D-MODEL-ACRONYM 800 SGM
D-M-ACCESSION-DAT 816 FEB 82
D-M-CATEGORY 818 SIMULATION
D-M-USE-CATEGORY 822 ANALYSIS AND DIAGNOSIS
D-M-APPLIC-TECHN 826 DIGITAL COMPUTER
D-M-SOLUTION-TECH 828 OR (MISC)
D-M-COMPUTER-TYPE 830 HONEYWELL G-635
D-M-LANGUAGE-USED 832 FORTRAN
D-M-MIN-STORAGE 834 20K WORDS
D-M-RUN-TIME 836 8 CPU MIN
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D-START-DATE 850 O CT 78
D-LAST-UPDATED 970 FEB 82
Figure 5 is a page from the five-page listing from [7], "Common entries in studies and models files," which furnishes cross references for the present catalog and the custom bibliography. The two tapes were matched on the numeric portions of the LD numbers and then the LD numbers and initial segments of titles and names of performing organizations were listed in forms similar to those previously illustrated by Figures 1 and 3. With only minor exceptions—see the entries in Figure 5 for LD Numbers having numeric portions 49111—common entries identify "studies" whose "models" have also been entered by DLSIE.

4. The DATENT program

A data entry system was created as part of the present effort. The system is based upon a sequential access data file, a copy action update facility, and a STAIRS format conversion program. Operating instructions and source codes for the programs are listed in [5]. The program is "portable" in the sense that only two changes are required for installation, namely, a new (COBOL) Environment Section and a native "clear screen" routine.

The sequential access data file consists of fixed format 64-character records each containing the subject document number (5 digits), card type number (3 digits), card type sequence number (2 digits), a filler character, and the text data area (53 characters). The sequence of this file is strictly ascending on columns 1 thru 10 (document number, card type number, and card type sequence number). Also, each document is limited to a maximum of 100 records (a restriction imposed by the current update program).

The data entry update program, DATENT, is a control card driven document update facility implemented in American National Standard COBOL, X3.23-1974. This program will update documents by record insertion and or deletion, insert documents, and delete documents. This program is control card driven in that, for each allowed record type in a document, a control card defines both its record format and the operator prompt to be used for record display, insertion, and deletion. The program will also translate record type numbers, reordering records within a document to maintain the data file's sequence on columns 1 thru 10, and delete record types as requested by the control card stream.

The STAIRS format conversion program, STAIRS, converts the 64-character data entry system record format to the 80-character STAIRS record format. The STAIRS output file consists of 128-character records of which the first 80 characters of each record is a STAIRS record. The program converts card type numbers 001 and 005 to AFLMC STAIRS card codes *** and OAO, respectively. All other STAIRS card codes are copied directly from the data entry system format. This program is also implemented in American National Standard COBOL, X3.23-1974.
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<th>Organization</th>
<th>Location</th>
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Figure 5
Figure 6 is a page from a listing of data for inserting 111 documents into STAIRS at the AFLMC. The complete listing is contained in [8]. These data were generated by the present data entry system for documents which are candidates for inclusion in the AFLMC Bibliography [3]. The actual entries came from DD Forms 1473, or abstracts from DLSIE, or from the individual documents themselves.

5. A handbook of models and source data

The present section outlines a particular set of criteria for analyzing logistics models, namely, the following.

1. Problem background
2. Objectives (primary, secondary, ...)
3. Pertinent variables
4. Measurements and indexes
5. Modeling (deterministic, stochastic, relationships, ...)
6. Analytical techniques
7. Validation or measures of effectiveness
8. Inventory of data files
9. Inventory of computer programs
10. Numerical examples
11. Applicability and intended users
12. Critical comments
13. References

This set is an expansion of the entries in the data banks at DLSIE, Fort Lee, VA, which are used to prepare the model abstracts in Section 3 above and the regularly published "Catalog of Logistics Models."

Reference [10] illustrates the type of analyses that might be included in a "Handbook of Models and Source Data" for a few models of major importance to a command such as the AFLMC. (And there would be no better place to search for candidate models than the publications of DLSIE.) The sortie-generation model of the Logistics Management Institute, as presented in [1], is the example used to illustrate this approach to model analysis.

See (4) in the next section for the summary recommendation concerning implementation of such a handbook.
6. Recommendations

We make five general recommendations.

(1) The DLSIE studies and models tapes should be loaded into STAIRS and analyzed as two data bases of the LSMS.

(2) The DATENT program should be implemented at the AFLMC to assist manual input of data to the LSMS.

(3) The AFLMC should establish requirements for machine readable STAIRS inputs from its major sources of data.

(4) A "Handbook of Models and Source Data," as illustrated by [10], should not be implemented for any sizable number of logistics models; it would be too expensive and it could not be expected to improve on the practice of using the DLSIE data bases, and others, to identify sources which could then be pursued as appropriate to obtain detailed information.

(5) The AFLMC Bibliography [3] should continue to be maintained as a separate data base in the LSMS.
REFERENCES


