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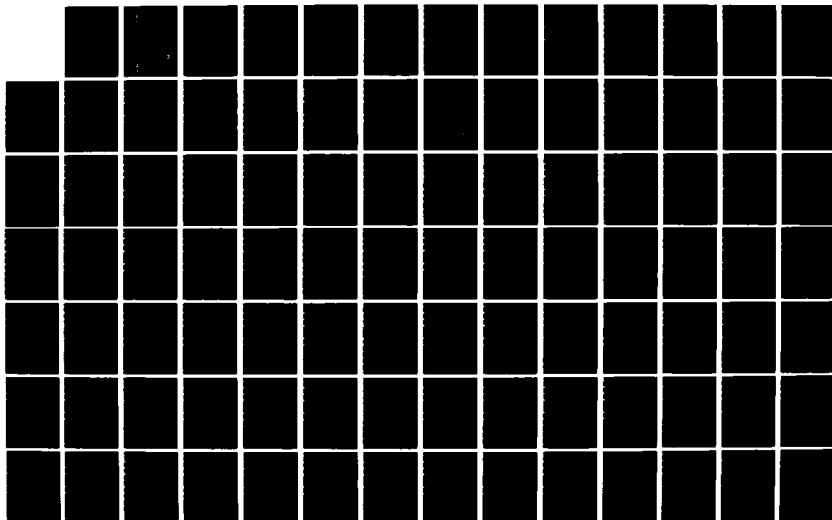
THE CONCEPTUAL DESIGN OF AN AUTOMATED  
MOBILIZATION/MANAGEMENT INFORMATION SYSTEM(U) DEFENSE  
LOGISTICS AGENCY ALEXANDRIA VA J H NEBLETT SEP 85

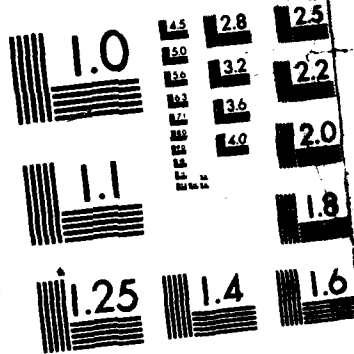
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DEFENSE LOGISTICS AGENCY

THE CONCEPTUAL DESIGN  
of an  
AUTOMATED MOBILIZATION / MANAGEMENT INFORMATION  
SYSTEM

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DLA LO Project #4017  
September 1985

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## PREFACE

**DLA's Contingency Planning, Command & Control functions can be changed from Korean War procedures to "Star War" systems for 1.9 million dollars.**

RE: Distribution Statement  
Approved for Public Release. Distribution  
Unlimited.  
Per Ms. Cleo Ridgeway, Defense Logistics  
Agency/LO

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### **ACKNOWLEDGEMENTS**

- 1. Researched and written by:  
J.H. Neblett  
Defense General Supply Center  
Richmond, Virginia.**
- 2. The estimated times for formulation of models W, Y and Z  
were supplied by DLA-LO/DORO (See pages; 69, 87 and 94).**

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**I**

**THE CONCEPTUAL DESIGN**

**of an**

**AUTOMATED MOBILIZATION**

**MANAGEMENT INFORMATION SYSTEM**

TEXT

By: J.H. Heblett  
August 2, 1985

3

I.  
**CONCEPTUAL DESIGN**  
of an  
**AUTOMATED MOBILIZATION, MANAGEMENT INFORMATION SYSTEM**

**A. INTRODUCTION**

At the request of the DLA Deputy Director, the Command Control and Contingency Plans Division (DLA-LC) established a Management by Objectives (MBO) goal: To develop the functional requirements for an Automated Mobilization Management Information System. DLA-LC requested that the Operations Research and Economic Analysis Office (DLA-LO) model the DLA logistical operations and design an information processing and analysis system for producing summary level management reports for use in both Contingency-Mobilization Planning and Command Post Exercises (CPXs),....

**B. PROJECT OBJECTIVE**

The objective of DLA-LO Project #4017 (See: Study Plan approved Dec. 10, '84) is:

- 1) Plan and define a logical and achievable set of models and automation system which will calculate the mission status and capacity of the DLA material acquisition, storage, and distribution processes under moderate to severe contingency and mobilization scenarios; *and*
- 2) Identify the specific actions and resources required to develop the set of models and system. ←

**C. SCIENTIFIC FOUNDATION**

The planning of any comprehensive system to underwrite a major organizational function must be based on a set of applicable scientific disciplines. The first applicable discipline for this project is Boolean Algebra. This mathematical logic is used to translate a language texts describing an operation or function, into an objective set of symbols and equations. Solving these equations produces a non-redundant, symbolic system which will perform the operations described by the source text.

Although the DLA-LC Mission & Functions statement, and procedural regulations are too extensive to explicitly apply Boolean Algebra, the concept of deriving the required automation system from procedural texts served as the guiding principle in conducting this analysis.

Secondly, it is quite apparent that Cybernetic principles will dominate in the design of the DLA-LC Command and Control system; therefore, the proposed system's architecture is taken directly from this concept<sup>1</sup>.

Integral to contingency planning and the operation of a command and control system would be a series of evaluative and predictive models<sup>2</sup>. These models are necessary to translate the multiple sets of discrete information into a set of executive or management level of information.

Finally, a ubiquitous and critical factor in the planning of the DLA-LC system is the current state of computer technology. Contrary to the general concept, computers are not a relatively uniform set of machines differing only in size, speed, and cost. Instead most computers will naturally fall into distinctively different categories characterized by a design philosophy corresponding to their intended use<sup>3</sup>.

---

#### Footnotes:

01. Two important reference books are:
  - ◊. DECISION & CONTROL, The Meaning of Operational Research and Management Cybernetics. Beer, Sir Stafford. John Wiley and sons NY / NY.
  - ◊. INDUSTRIAL DYNAMICS. Forrester, Jay W., MIT Press
02. The models DORO estimated were, W. Projected Demand, Y. Inventory Depletion, Z. Inventory Replenishment.
03. The current categories are:
  - ◊. The big "Main Frames".
  - ◊. The smaller cousins the "Mini's"
  - ◊. Office Automation Systems
  - ◊. Personal Computers

**D. PROCEDURE**

Following is a chronological list of the research undertaken:

**1. Source Material:**

The first step in the analysis was to identify and define the scope and content of the functional activities. This was done by studying the published documents governing the activities of DLA-LC, who supplied some twenty seven source documents (eg: Mission & Function Statements; Regulations / Manuals / DLA HQ. Staff Instructions; organization charts; and Position Descriptions, and the DLA Mobilization Plan) to initiate the research.

**2. Technological Potentials:**

The second step was to identify the automation characteristics and analytical models by reviewing the source materials. The Mission & Function Statements, regulations, manuals, HQ. standard instructions. These documents actually represent the composite historical experience of Contingency Planning in DLA. In addition, the comments on technology represented the accumulated experience of the Operations Research Analyst. Therefore, by breaking the source material into relatively small elements and estimating what technology could support each function or procedure, a comprehensive set of technical possibilities were created.

**3. Possibilities translated into Probabilities:**

Given a set of established procedures and a corresponding set of technological possibilities, the next critical question becomes: "Are both sets of information currently relevant--particularly if taken together?" The question was answered by preparing a survey report. The Survey Report listed the key functional elements, the corresponding technology comments, and a ranking scale for each element or factor. The Director of DLA-LC and his Action Officers then rated one hundred and fourteen separate pieces of information.

**6. Time and Cost Estimates:**

- a. Experienced Operations Research Analysts estimated the professional manpower required to develop models V-W-X-Y-Z.
- b. A compilation of industrial experience was used to estimate the effort required to develop the systems<sup>5</sup>.
- c. Information, developed in a recent analysis of office automation systems, was used to estimate the system's equipment costs<sup>6</sup>.
- d. Since development of the system and models could be accomplished primarily by contract, a uniform cost and overhead rate were applied to the manpower estimates<sup>7</sup>.

**D. THE SYSTEM**

The DLA Automated Mobilization Management Information System should consist of two major subsystems--A & B: A would be the Command & Control System operating in "realtime"; B would be the analysis and planning system. System A would be designed as an "alphameric" system with input/output links to line or operating elements. System B would be a set of analytic models with primary input from a DORO or DSAC data base. The models within System B would be accessed directly to support planning functions or used as, an analytic adjunct during exercises or actual operations.

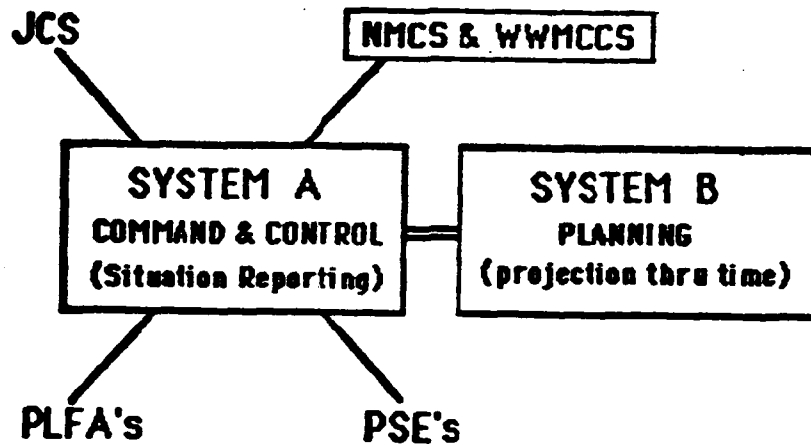
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**Footnotes:**

05. "A Productivity Measurement System" Neblett, J.H.; RMC Nov. 1981.

06. "Information Resource Management" Neblett, J.H. et. al. DGSC Dec. '83.

07. Professional labor rates ; Systems Analysts equivalent to GS 12/5 = 3000 \$/mo.; Operations Research analysts equivalent to GS 12/10 = 3400 \$/mo.D.

**SYSTEM DIAGRAM**

The Command and Control System (A) is essentially a random access data base / accounting / table driven system containing three major sets of information. They are:

- a. Current status ["Alphameric" format].
- b. Comparison to standards or norms.

The dominant processing logic would be:

- a. Catalog.
- c. Compare and contrast.
- b. Word/text processing.

In contrast, the Planning System (ie; system B), is a weakly connected series of complex logic modules. The characteristics of these modules or sub-systems are established in the model estimates V-W-X-Y-Z. The primary function of System B would be to project the outcomes over time of any current or hypothetical situation.

System B, used independently of system A, would support the planning process. Used in parallel with system A, System B, would compute the outcomes of any situation represented by the data in system A.

**E. COST ESTIMATES**

The functional requirements and general morphology of an Automated Mobilization Management Information System (AMMIS) are developed in the eight chapters of section II of this report. The system is designed to produce both technical and management level reports for use in both Contingency and Mobilization Planning, and Command Post Exercises (CPXs). The resources required to develop AMMIS have been extracted from the estimates in section II and summarized in the following table.

**TABLE I**  
**COST ESTIMATES**

| <u>SYSTEM OR MODEL</u>          | <u>Chapter symbol</u> | <u>EFFORT(mm.)</u>  |            | <u>ESTIMATES</u> |                 |                             |
|---------------------------------|-----------------------|---------------------|------------|------------------|-----------------|-----------------------------|
|                                 |                       | <u>Sys./</u>        | <u>OR.</u> | <u>Cost(\$)</u>  | <u>Staffing</u> | <u>Duration<sup>8</sup></u> |
| PROJECT MANAGEMENT              | Q                     | 36                  |            | 263,200          | 1               | 36                          |
| <i>systems &amp; procedures</i> |                       |                     |            |                  |                 |                             |
| SYSTEM A PROGRAMMING            | U                     | 84                  |            | 567,000          | 5               | 17                          |
| SYSTEM B PROGRAMMING            | U                     | 16                  |            | 108,000          | 2               | 8                           |
| SYSTEM ERC/AH PRG'MING          | T                     | 14                  |            | 97,200           | 1               | 14                          |
| COMPUTER SYSTEMS                | S                     | 8                   |            | 168,100          | n/a             | n/a                         |
| <i>models [systems B]</i>       |                       |                     |            |                  |                 |                             |
| THREAT ASSESSMENT               | V                     | 18                  | 7.0        | 172,300          | 2               | 12                          |
| PROJECTED DEMAND                | W                     |                     | 8.4        | 64,300           | 1               | 9                           |
| DAMAGE ASSESSMENT               | X                     |                     | 9.4        | 71,900           | 1               | 10                          |
| INVENTORY DEPLETION             | Y                     |                     | 8.3        | 63,500           | 1               | 8                           |
| INVENTORY REPLACEMENT           | Z                     |                     | 42.0       | 321,300          | 4               | 11                          |
| TOTALS                          |                       | ~ 251 <sub>mm</sub> |            | \$1,897,000      |                 |                             |

**FOOTNOTE 8:**

Total project duration is estimated thus:

DEVELOPMENT TIME =  $\Sigma$ (Systems A, Systems B, inventory replacement model) = 36 mo.

---

**F. SUMMARY**

1. The objectives of DLA-LO Project #4017 have been accomplished and documented in this report<sup>9</sup>. They are:

a. "To .... define a logical and achievable set of models and automation system which will calculate the mission status and capacity of the DLA material acquisition, storage, and distribution processes under moderate to severe contingency and mobilization scenarios".

b. To "Identify the .... resources required to develop the set of models and system".

2. Therefore the "bottom line" is:

a. Development cost estimate -1.897 million dollars.

b. Duration for development approximately: 36 months.

c. Requires a "self contained/office automation class" system.

d. Professional skills required: 70% systems design -- 30% OR. and scientific programming.

3. The next two steps leading to development of the system are:

a. Management approval -- signaled by funding of the project.

b. Identification of a project manager. -- The planned system is sophisticated, and the elements have subtle but complex relationships. Thus, if the direction and control of the project is not consistently well done, then marginal results are assured.

---

**FOOTNOTE #9:**

The objectives of DLA-LO Project #4017 are stated in the Study Plan approved Dec. 10, '84.

**II**  
**APPENDICES**

**SYSTEMS and MODELS ESTIMATES**

**APPENDIX S**

**COST ESTIMATE**  
**of the**  
**COMPUTER / AUTOMATION SYSTEM**

**THE AUTOMATION SYSTEM****MODEL ☐ SYSTEM ☒****APPENDIX # S****I. 1<sup>st</sup> TIER COMMENTS:**

☐ The planning and design of a command and control system must address each of ten exercise and/or emergency situations (Reference also: S IV.

Discussion):

- a. Contingency operations.
- b. Exercises.
- c. Foreign disaster relief efforts.
- d. Domestic disaster relief efforts.
- e. Pollution incidents.
- f. Civil disturbances.
- g. Nuclear accidents/incidents.
- h. Postal disruptions.
- i. Emergency supply operations.
- j. Situation Reports (SITREPs).

Although it is not possible to give each situation the design attention it deserves within the present project, these subjects would undergo a thorough analysis during an application design. [III.5]

Data I/O: Problem potential:

X. Input Information 67 %

Y. output Information 33 %

☐ Automation is essential to support the briefing actions by minimizing the time factor in preparation and by improving the accuracy and quality of the information. [III.10]

☐ The command and control center should have an automated command and control system which will embody sophisticated mathematical logic for the synthesis of data and information. [II.2 & III.2]

**$\Sigma$  Importance Index = 3.7**

**2<sup>nd</sup> TIER COMMENTS:**

□ A command and control system should operate in real time. In these systems, sophisticated mathematical logic would be used as multi-dimensional data transforms in summary and predictive reporting. [II.1]

□ Automation with electronic displays and analytical models are essential to support the briefing actions by minimizing the time factor in preparation and by improving the accuracy and quality of briefing information for the DLA Director. An automated system will significantly alter and greatly improve both the efficiency and effectiveness of the PSE tasking portion of the control process. [III.8 & 9]

□ Word processing and Electronic file systems are required to automate the situation reporting activities, and to efficiently link current input to a standard or base line for comparison. [VII.6] Two implied system characteristics are:

1. Situation mapping should be augmented by high resolution bit mapped screens and corresponding printers. [III.6]
2. Action status information would require systems specifically designed with alphanumeric electronic files and multi-paging CRT screen displays for effective storage and recall. [III. 7]

□ The function of "document control" clearly implies a word processing class machine with good electronic file capability -- not data processing or PC class machines. Document Control is an administrative process designed for efficient division operations and logically must be related to the existing DLA systems. [II.3]

□ If DLA opts for a reasonable investment level in automating the Exercise function then important concepts in War Gaming should become an integral component in the design of the system. Without automation, play would continue using the present script. [VIII.4]

Data I/O: Problem potential:

|                       |      |
|-----------------------|------|
| X. input information  | 70 % |
| Y. output information | 30 % |

**Σ Importance Index = 3.1**

**II. PRIMARY PROCESS:**

- |                                              |                                     |
|----------------------------------------------|-------------------------------------|
| <b>A. THREAT — DECISION / RISK</b>           | <input type="checkbox"/>            |
| <b>B. DAMAGE ASSESSMENT</b>                  | <input type="checkbox"/>            |
| <b>C. THRU-PUT CAPACITY</b>                  | <input type="checkbox"/>            |
| <b>D. INVENTORY EMPLOYMENT</b>               | <input type="checkbox"/>            |
| <b>E. INVENTORY REPLENISHMENT</b>            | <input type="checkbox"/>            |
| <b>F. THE NAT'L INDUSTRIAL BASE</b>          | <input type="checkbox"/>            |
| <b>G. INFORMATION &amp; CONTROL SYSTEMS:</b> | <input checked="" type="checkbox"/> |

**III. APPLICABLE MODEL:**

|                                  |                                               |                                     |                                                                                                                                                                 |
|----------------------------------|-----------------------------------------------|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TECHNOLOGICAL METHODOLOGY</b> | <b>ACCOUNTING METHODS</b>                     |                                     | <b>DATA PROCESSING</b>                                                                                                                                          |
|                                  | MAX. DIMENSIONS 3 to 4<br>[limited options]   | <input type="checkbox"/>            |                                                                                                                                                                 |
|                                  | DETAILED ITEMS<br>[compare/contrast logic]    | <input checked="" type="checkbox"/> |                                                                                                                                                                 |
|                                  | Explicit "BOTTOM LINE"                        | <input type="checkbox"/>            |                                                                                                                                                                 |
|                                  | <b>OPERATIONS RESEARCH</b>                    |                                     |                                                                                                                                                                 |
|                                  | MULTI-DIMENSIONAL                             | <input checked="" type="checkbox"/> |                                                                                                                                                                 |
|                                  | OPTIMUM SOLUTIONS<br>[closed form]            | <input type="checkbox"/>            |                                                                                                                                                                 |
|                                  | LIKELY OUTCOMES<br>probabilistic<br>heuristic | <input type="checkbox"/>            |                                                                                                                                                                 |
|                                  |                                               |                                     | <b>DETAIL TRANSACTION PROCESSING</b> <input checked="" type="checkbox"/><br>[sort / summary]<br><b>SCIENTIFIC STATISTICAL ANALYSIS</b> <input type="checkbox"/> |

**Operations Research Methodologies:**

- |                                 |                          |                               |                                     |
|---------------------------------|--------------------------|-------------------------------|-------------------------------------|
| <b>Inventory Theory</b>         | <input type="checkbox"/> | <b>Decision/Risk analysis</b> | <input type="checkbox"/>            |
| <b>Allocation Theory (L.P.)</b> | <input type="checkbox"/> | <b>Game Theory</b>            | <input type="checkbox"/>            |
| <b>Distribution analysis</b>    | <input type="checkbox"/> | <b>Cybernetics</b>            | <input type="checkbox"/>            |
| <b>Scheduling Theory</b>        | <input type="checkbox"/> | <b>Probability/Statistics</b> | <input type="checkbox"/>            |
| <b>Queueing Theory</b>          | <input type="checkbox"/> | <b>Regression analyses</b>    | <input type="checkbox"/>            |
| <b>Forecasting models</b>       | <input type="checkbox"/> | <b>Simulations</b>            | <input type="checkbox"/>            |
| <b>Industrial Dynamics</b>      | <input type="checkbox"/> | <b>Computer Science</b>       | <input checked="" type="checkbox"/> |

### **III. DISCUSSION:**

□ Of the ten exercise and emergency situations cited in the first tier comments (See page 13), the planning and design of a command and control system must address four that are quite suitable for computer/systems automation. These are:

Contingency operations.

Exercises.

Emergency supply operations.

Situation Reports (SITREPs).

In contrast, automation probably is not essential for six of the situations, primarily because the effective management of them is not dependent on the DLA inventory position. These situations are:

Foreign disaster relief efforts.

Domestic disaster relief efforts.

Pollution incidents.

Civil disturbances.

Nuclear accidents/incidents.

Postal disruptions.

Development of plans to control these six situations should be based on procedural logic derived from a series of actual and hypothetical case studies.

□ Under normal conditions the DLA-LC computers would be used for on going analyses of mobilization and contingency planning with the input data being structured on the DORAN computer. Under emergency conditions or contingency exercises the DLA-LC machines would operate as a component within a much larger information processing network. For example, global and weapons employment information would be received from the WWMCCS network. The DLA-LC machines at HQ and AH/ERS, would process command and control information as well as the damage assessment data. In turn, DLA level, event or transactional data would be processed on the DLA PLFA's computers.

□ The overriding characteristic for the LC command & Control System is that it must be USER FRIENDLY. The system will be operated by non-data processing oriented personnel. The Action Officers who will use the system, have definite tours of duty so they should have to invest only a very limited time in becoming fairly proficient in extracting information from the system.

□ The computer system must have:

- ◆ Pixel screen display for graphics (not character readout projection).
- ◆ Multi-page display.
- ◆ Menu (pull down list).

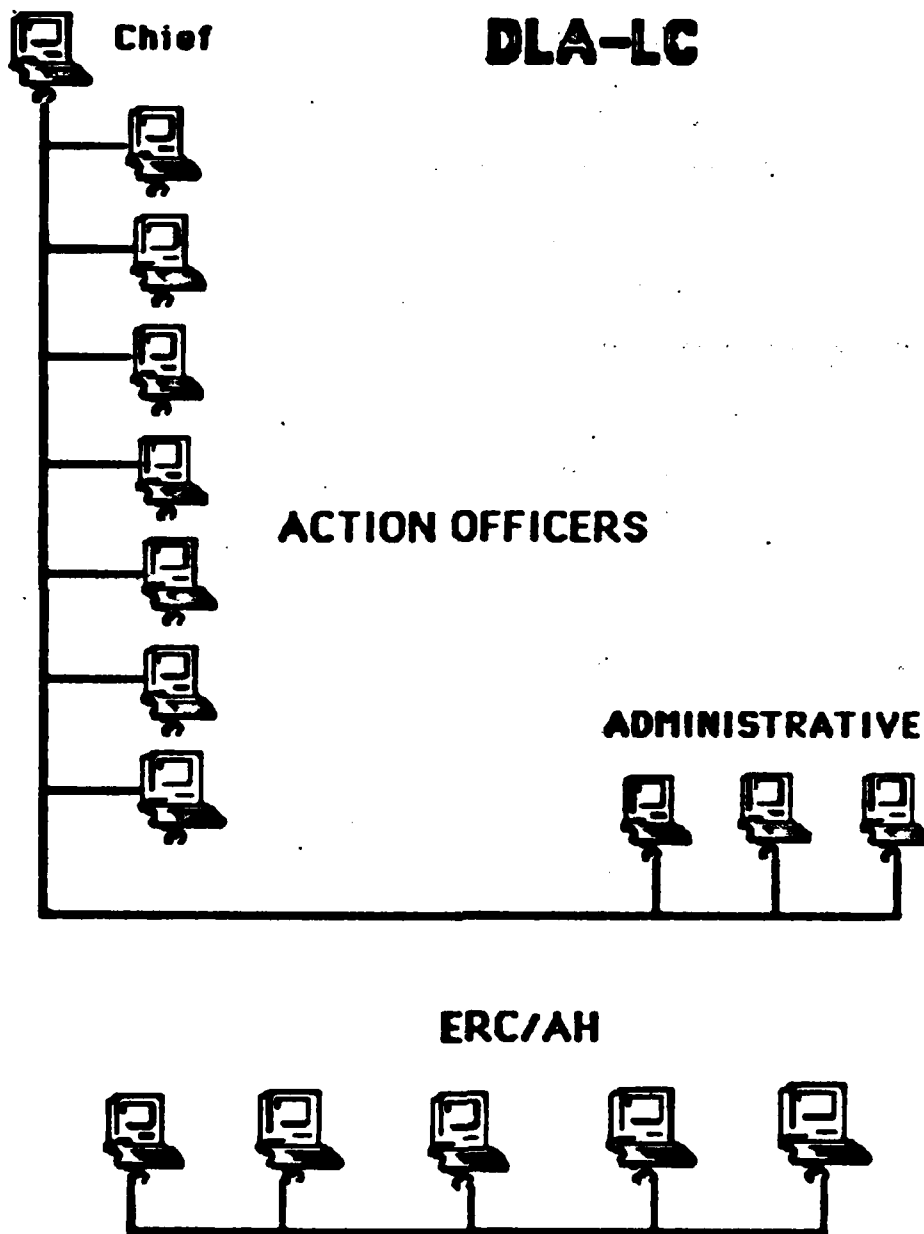
□ Required application software ( Ref. Macintosh GA Systems) is:

- ◆ Word Processing
- ◆ Data Base
- ◆ Electronic spread sheet (Lotus, Symphony or Jazz equivalent).
- ◆ Scientific language (eg. Fortran, APL, Pascal).
- ◆ Graphics.
- ◆ LAN Communications.

□ The machines that appear to embody the requisite functional features such as Icon displays, pointer access control, and other user enhanced features are:

- ◆ The XEROX Star.
- ◆ Apple's Macintosh Office System (a low cost alternative).
- ◆ The NBI top-of-the-line machine.
- ◆ Certain new AT&T PC machines.

Columns  
D. Rows **8** DATA SETS EQUIPMENT SCHEMATIC



**BI. TIME & COST ESTIMATES:****□ Computations****1. Manpower:**

- a. Evaluation of the computer equipment characteristics verses the machine requirements for the LC System. 2.0 mm.
- b. Technical selection. 1.5 mm.
- c. Purchase, installation, training on the system. 4.5 mm.

**2. Equipment Cost Estimate:**

A complete study for application of office automation systems for DGSC was completed in 1983. Since the general applications and procedures call for very similar systems the equipment cost estimates for the LC System will be taken from the DGSC study <sup>10</sup>.

- 1. Eleven work stations @ \$ 7000 ea. = \$77,000
- 2. ERC, 5 work stations @ \$ 7000 ea. = \$35,000

**□ Summary:**

**DIRECT LABOR [ 8 m.m.] H [ Rate 3000 \$/S.A. m.m.]**

**H [1+ (125% Overhead)] = \$ 54,000**

**PACKAGED PC SOFTWARE 6 @ \$350 ea. = 2,100**

**EQUIPMENT 16 wk. sta. @ \$7000 ea. = 112,000**

**TOTAL <sup>11</sup> = \$168,100**

---

Footnote 10: Report title: "Information Resource Management System"  
Neblett J.H. et. al. DGSC 1983.

Footnote 11: If the Macintosh Office System is acceptable, then the equipment cost would then be computed at approximately \$ 3600 per work station—\$ 43,200 @ Hq., \$ 14,400 @ the ERC/AH site. The labor component would remain the same. The total cost would be \$ 96,300.

Appendix • T

THE ALTERNATE HEADQUARTERS & EMERGENCY RELOCATION SITE

COMPUTER SYSTEM

**OH/ERC AUTOMATION/SYSTEM****MODEL ☐ SYSTEM ☒****ESTIMATE # T****I. COMMENTS:**

☐ There are two CCC sites, one at DLA HQ at Cameron Station, and the alternate headquarters and emergency relocation site (ERS/AH) at DGSC, Richmond, VA. A potential threat to Washington, D.C., would make the operational readiness the ERS/HQ of critical importance. Therefore such a situation would have direct implications for planning and design of any CCC system. [V.14]

☐ The key design recommendation to insure operational reliability of the Command & Control function is: whatever automation system is installed at Cameron Station, a corresponding system should be installed at the alternate headquarters and emergency relocation site in Richmond. [III.1]

☐ The Analysis/Exercise systems can and should be implemented on a self contained OFFICE AUTOMATION class computer system with sufficient logic and analytical capability. Under normal conditions these computers would be used for on going analyses of mobilization and contingency planning with the input data being structured on a central large scale computer. Under emergency conditions or contingency exercises the AH/ERC computer would operate as a component within a much larger information processing network. For example, global, and weapons employment information would be received from WWMCCS. The AH/ERS computer would process the command and control information and the damage assessment data specifically required for command management of DLA operations. In turn, the detail transactional data required by field operations would be processed on the PLFA computers. [V.1]

Data I/O: Problem potential:

X. input information      60 %

Y. output information    40 %

**$\Sigma$  Importance Index = 3.5**

**II. PRIMARY PROCESS:**

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| <b>A. THREAT -- DECISION / RISK</b> | <input type="checkbox"/>            |
| <b>B. DAMAGE ASSESSMENT</b>         | <input type="checkbox"/>            |
| <b>C. THRU-PUT CAPACITY</b>         | <input type="checkbox"/>            |
| <b>D. INVENTORY EMPLOYMENT</b>      | <input type="checkbox"/>            |
| <b>E. INVENTORY REPLENISHMENT</b>   | <input type="checkbox"/>            |
| <b>F. THE NAT'L INDUSTRIAL BASE</b> | <input type="checkbox"/>            |
| <b>G. COMMAND AND CONTROL:</b>      | <input checked="" type="checkbox"/> |

**III. APPLICABLE MODEL:**

|                                  |                                                         |                                     |  |
|----------------------------------|---------------------------------------------------------|-------------------------------------|--|
| <b>TECHNOLOGICAL METHODOLOGY</b> | <b>ACCOUNTING METHODS</b>                               |                                     |  |
|                                  | MAX. DIMENSIONS 3 to 4<br>[limited options]             | <input type="checkbox"/>            |  |
|                                  | DETAILED ITEMS<br>[compare/contrast logic]              | <input checked="" type="checkbox"/> |  |
|                                  | Explicit "BOTTOM LINE"                                  | <input type="checkbox"/>            |  |
|                                  | <b>OPERATIONS RESEARCH</b>                              |                                     |  |
|                                  | MULTI-DIMENSIONAL<br>OPTIMUM SOLUTIONS<br>[closed form] | <input checked="" type="checkbox"/> |  |
|                                  | LIKELY OUTCOMES<br>probabilistic<br>heuristic           | <input type="checkbox"/>            |  |
|                                  | <b>DATA PROCESSING</b>                                  |                                     |  |
|                                  | DETAIL TRANSACTION<br>PROCESSING<br>[sort / summary]    | <input checked="" type="checkbox"/> |  |
|                                  | SCIENTIFIC STATISTICAL<br>ANALYSIS                      | <input type="checkbox"/>            |  |

**Operations Research Methodology:**

- |                                 |                          |                               |                                     |
|---------------------------------|--------------------------|-------------------------------|-------------------------------------|
| <b>Inventory Theory</b>         | <input type="checkbox"/> | <b>Decision/Risk analysis</b> | <input type="checkbox"/>            |
| <b>Allocation Theory (L.P.)</b> | <input type="checkbox"/> | <b>Game Theory</b>            | <input type="checkbox"/>            |
| <b>Distribution analysis</b>    | <input type="checkbox"/> | <b>Cybernetics</b>            | <input type="checkbox"/>            |
| <b>Scheduling Theory</b>        | <input type="checkbox"/> | <b>Probability/Statistics</b> | <input type="checkbox"/>            |
| <b>Queueing Theory</b>          | <input type="checkbox"/> | <b>Regression analyses</b>    | <input type="checkbox"/>            |
| <b>Forecasting models</b>       | <input type="checkbox"/> | <b>Simulations</b>            | <input type="checkbox"/>            |
| <b>Industrial Dynamics</b>      | <input type="checkbox"/> | <b>Computer Science</b>       | <input checked="" type="checkbox"/> |

**DL. TIME & COST ESTIMATES:****A. Computations:**

**TABLE II**  
**ESTIMATING PROGRAM DEVELOPMENT <sup>12</sup>.**

| <u>SYSTEM CLASSIFICATION</u>                          | <u>MEDIUM SMALL</u>              |
|-------------------------------------------------------|----------------------------------|
| SIZE RANGE (lines of code)                            | 6 <sup>K</sup> to 8 <sup>K</sup> |
| PRODUCTION RATE<br>(man mo. per th'snd lines of code) | 2.4                              |
| DIVISION of EFFORT [%]:                               |                                  |
| <input type="checkbox"/> Logic Design & Review        | 28                               |
| <input type="checkbox"/> Programing                   | 35                               |
| <input type="checkbox"/> Testing & Installation       | 31                               |
| <input type="checkbox"/> Documentation                | <u>6</u>                         |
|                                                       | 100%                             |

**B. ESTIMATE:**

Given the models, the machine system, and the development of the DLA Hq. system, the creation of an ERC/AH program system would be equivalent to developing a 6000 line industrial system. Thus:

$$(A\ 6000\ line\ program) \times 2.4\ mm/Kloc = 14.4\ S.A.\ mm.$$

**C. SUMMARY:**

$$[DIRECT\ LABOR\ 14.4\ m.m.] \times [Rate\ \underline{3000}\ \underline{\$/S.A.\ m.m.}]$$

$$\times [1 + (125\%\ Overhead)] = \$\ 97,200.$$

**FOOTNOTE 12:**

Reference "A Productivity Measurement System for an MIS Organization"  
Neblett, J.H., RMC 1982

**APPENDIX**

**U**

**"SOFTWARE SYSTEMS" and PROCEDURES**

**SOFTWARE SYSTEMS & PROCEDURES**

MODEL ☐ SYSTEM ☒  
ESTIMATE # 8

**I. 1<sup>st</sup> TIER COMMENTS:**

☐ It is imperative that DLA have an automated planning, command and control system simply to be able to interact or participate on some basis of equivalence in joint DOD contingency planning and operations. [II.10]

☐ A Situation Reporting system should probably process three classes of information. Listed in order of development, they are (1) alphanumeric information, (2) numeric data, and (3) data synthesis via sophisticated mathematical logic and modern information processing techniques. [II.4]

☐ Planning and analyses models of DLA should exist in DLA-LC to evaluate and compare the quantitative factors in the field reports. The existence of these systems would then place DLA-LC in the capability assessment business rather than primarily serving as a pass through coordinator. [VI.2]

Data I/O: Problem potential:

X. input information 73 %

Y. output information 27 %

☐ An exercise is essentially an operational "war game". Today, any serious "war game" uses computers and automation extensively in two different ways, (1) as an integral part of procedural play and (2) to evaluate or score the outcomes. Note: the existing LC procedures simply define the play script. War game concepts are also the same as those for a Business Game. [VIII.1 & 2]

Data I/O: Problem potential:

X. input information 38 %

Y. output information 62 %

---

**$\Sigma$  Importance Index  $\geq 3.6$**

---

**2<sup>nd</sup> TIER COMMENTS:**

□ To effectively analyze information from other DoD components, DLA-LC must have an automation/analysis capability they do not now possess. This includes planning systems and a corresponding organizational structure to use them effectively. [II.15]

□ It is evident that an automated contingency planning system, capable of rapidly processing alternative options, and "what if" questions could be used very effectively to evaluate issues in question without having to reactivate the PSE evaluation and review procedures. Automation is an effective solution to the traditional problem of deliberate manpower commitments when staff actions cross organizational boundaries. [VI.5]

Data I/O: Problem potential:

X. Input information 75 %

Y. output information 25 %

□ The development of sophisticated mathematical equations is required to compute the various alternative outcomes necessary to developing future emergency plans. In addition, for both efficiency and effectiveness, these equations should be automated on a system under LC control. The concept of resident computational logic in LC clearly implies a major shift within DLA's organizational responsibilities. Instead of functioning as a "pass-thru" coordinator with the PSEs doing the studies, LC would conduct the studies from an overall DLA contingency view point and present the results for the Director of DLA and his PSEs to review. The initial function of the PSEs would be to furnish data and policy information to LC. This procedural change should result in a far superior planning product. [II.8]

Data I/O: Problem potential:

X. Input information 78 %

Y. output information 22 %

□ DLA needs an analysis and planning system with loaded data files to create the information needed for rapid and accurate management decisions. The analyses and responses should then be only a matter of a few days (hours in war time), otherwise there may not be sufficient time for a thorough analysis, review, and staffing of some of the actions contemplated which could significantly affect the DLA mission.

For example, there could be lost opportunities to present effectively the DLA position. Clearly, a central automated planning system needed to replace the present clerical type procedures, which because of time requirements distributes and dilutes responsibility. [IX.2 & 3]

□ The implied automation should not be time constrained; therefore, it will require pre-positioning data (i.e. prior extractions from primary data bases), sophisticated mathematical logic, and dedicated office automation systems & equipment. [VII.2]

Data I/O: Problem potential:

X. input information 70 %

Y. output information 30 %

□ Development of the DLA-BEP, which outlines policies and procedures for addressing specific contingencies, should be founded on a set of sophisticated mathematical equations which would compute a range of probable futures. [II.5]

□ Capability reporting appears to be primarily narrative--a dialogue between field commanders and the Director. Although in form, the contents are quantitative (i.e: inventory, dollars, manpower, facilities, ADP equipment, % of capacity, tons per day of commodities). [VI.1]

□ SITREPs appear to be reported in standard text format with judgemental logic. An accumulation of PLFA SITREPs could be the input to trigger an Evaluation/Predictive system which would then compute the probable performance of DLA under the ongoing "war game" scenario. [VII.5]

Data I/O: Problem potential:

X. input information 67 %

Y. output information 33 %

$\Sigma$  Importance Index = 3.0

**II. PRIMARY PROCESS:**

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| <b>A. THREAT -- DECISION / RISK</b> | <input type="checkbox"/>            |
| <b>B. DAMAGE ASSESSMENT</b>         | <input type="checkbox"/>            |
| <b>C. THRU-PUT CAPACITY</b>         | <input checked="" type="checkbox"/> |
| <b>D. INVENTORY EMPLOYMENT</b>      | <input type="checkbox"/>            |
| <b>E. INVENTORY REPLENISHMENT</b>   | <input type="checkbox"/>            |
| <b>F. THE NAT'L INDUSTRIAL BASE</b> | <input type="checkbox"/>            |
| <b>G. COMMAND &amp; CONTROL:</b>    | <input type="checkbox"/>            |

**III. APPLICABLE MODEL:**

|                                  |                                               |                                     |                                                                                                                                                   |
|----------------------------------|-----------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>TECHNOLOGICAL METHODOLOGY</b> | <b>ACCOUNTING METHODS</b>                     |                                     | <b>DATA PROCESSING</b>                                                                                                                            |
|                                  | MAX. DIMENSIONS 3 to 4<br>[limited options]   | <input type="checkbox"/>            |                                                                                                                                                   |
|                                  | DETAILED ITEMS<br>[compare/contrast logic]    | <input checked="" type="checkbox"/> |                                                                                                                                                   |
|                                  | Explicit "BOTTOM LINE"                        | <input checked="" type="checkbox"/> |                                                                                                                                                   |
|                                  | <b>OPERATIONS RESEARCH</b>                    |                                     |                                                                                                                                                   |
|                                  | MULTI-DIMENSIONAL                             | <input type="checkbox"/>            |                                                                                                                                                   |
|                                  | OPTIMUM SOLUTIONS<br>[closed form]            | <input type="checkbox"/>            |                                                                                                                                                   |
|                                  | LIKELY OUTCOMES<br>probabilistic<br>heuristic | <input type="checkbox"/>            |                                                                                                                                                   |
|                                  |                                               |                                     | DETAIL TRANSACTION PROCESSING <input checked="" type="checkbox"/><br>[sort / summary]<br>SCIENTIFIC STATISTICAL ANALYSIS <input type="checkbox"/> |

**Operations Research Methodology:**

- |                                 |                          |                               |                                     |
|---------------------------------|--------------------------|-------------------------------|-------------------------------------|
| <b>Inventory Theory</b>         | <input type="checkbox"/> | <b>Decision/Risk analysis</b> | <input type="checkbox"/>            |
| <b>Allocation Theory (L.P.)</b> | <input type="checkbox"/> | <b>Game Theory</b>            | <input type="checkbox"/>            |
| <b>Distribution analysis</b>    | <input type="checkbox"/> | <b>Cybernetics</b>            | <input type="checkbox"/>            |
| <b>Scheduling Theory</b>        | <input type="checkbox"/> | <b>Probability/Statistics</b> | <input type="checkbox"/>            |
| <b>Queueing Theory</b>          | <input type="checkbox"/> | <b>Regression analyses</b>    | <input type="checkbox"/>            |
| <b>Forecasting models</b>       | <input type="checkbox"/> | <b>Simulations</b>            | <input type="checkbox"/>            |
| <b>Industrial Dynamics</b>      | <input type="checkbox"/> | <b>Systems and Procedures</b> | <input checked="" type="checkbox"/> |

**III. SYSTEMS ANALYSIS:****B. Key Phrase Analysis--To determine the system's dynamics:**

Certain key phrases that imply specific systems design dynamics have been extracted from the 1<sup>st</sup> and 2<sup>nd</sup> Tier Comments. For the sake of clarity and grammar, the phrases have been changed into sentences. Thus:

- ◆ The reporting system should process three classes of information:
  - (1) Alphanumeric information.
  - (2) Numeric data.
  - (3) Synthesized data.
- ◆ The system should be designed to establish a basis of equivalence for DLA's participation in joint DoD contingency operations.
- ◆ The system must be designed to perform capability assessments by evaluating and comparing quantitative factors.
- ◆ "Hard-copy" plans should be accomplished on a word processing system with sufficient electronic file capability and resident computational logic.
- ◆ An exercise is essentially an operational war game. The contingency planning system must be designed to function as an integral part of procedural play and to evaluate or score the outcomes.
- ◆ The system must be capable of rapidly processing alternative options, and "what if" questions so that it could effectively evaluate unresolved issues without having to reactivate the PSE evaluation and review procedures. In other words, the automation system should not be time constrained. It will require pre-positioned data (i.e. prior extractions from primary data bases), sophisticated mathematical logic, and dedicated office automation systems and equipment. Then the analyses and responses would be only a matter of a few hours (i.e. similar to wartime conditions).
- ◆ the system must have the capability to process SITREPs that are reported in standard text format with judgment logic.
- ◆ In summary the system must be both evaluative and predictive, capable of computing a range of probable futures.

**B. Procedural Analysis—To determine the structure of the system:**

The Importance Index was used to identify the most significant procedural statements relating to the design of systems. Reference the following source documents:

|             |             |
|-------------|-------------|
| DLAM 5800.1 |             |
| HSI 3125.1  | 23 Mar. '83 |
| DLAR 3135.2 | 4 Oct. '81  |
| HIS 3135.2  | 20 Nov. '78 |
| DLAR 3135.3 | 20 Dec. '79 |
| DLAR 3135.4 | 4 May '76   |

Pages thirty one to fifty six are included as a design reference so that professional systems analysts can relate the procedural statements to the observations and to the estimate of the system's program size.

1. The statements extracted from the DLA regulations and instructions are recorded in normal type.
2. The analyst's working notes or observations are off-set to the right and are in italics.
3. An estimate of the program size appear in the last section of this appendix.

Thus: (begin next page).

**DLAM 5800.1 MISSION & FUNCTION STATEMENTS**

[NOTE: Only those statements and phrases that imply automation and systems, are extracted from the original documents.]

**Observations****MISSION of DLA-LC**

**Directs development and implementation of plans, operations and exercises to test and assure DLA's capability to support the Military Services and designated Federal agencies during emergency and/or wartime conditions.**

Operates the DLA Command and Control Center, provides Directorate classified document control, principal, and alternate Top Secret Control Officers, and Joint Action Control Officer functions.

**FUNCTIONS**

**Establishes and operates a situation report system designed to collect information affecting the mission of DLA PLFA's**

**a). Develops and administers DLA's BASIC EMERGENCY PLAN.**

**b). Provides staff supervision over the development of HQ DLA War & Emergency plans.**

*Requires access to planning models:*

*Threat/Risk assessment =V*

*Demand estimating =W*

*Damage Assessment =X*

*Inventory Depletion =Y*

*Inventory Replacement =Z*

*These models should be contained in a loosely linked system.*

**Exercises staff supervision over the development of implementing war/emergency plans by DLA PLFAs.**

- ☐ Conducts and exercises staff supervision over special studies and research on DLA plans, concepts, and logistics objectives for use in development of future emergency plans and continuity of operations of DLA systems.
- ☐ Directs, controls, and develops DLA policy for the Residual Capability Assessment Program which involves damage assessment and resource evaluations. Exercises staff supervision over execution of the program by PSEs and DLA field activities.
- ☐ Develops DLA position and participates with the Joint Staff and Military Services on actions related to the Joint Strategic Capabilities Plan, Joint Strategic Planning Document, Joint Operation Planning System, unified and specified command plans, and JCS sponsored Exercise Plans.

*Requires a procedural system incorporating models v, w, x, y, and z.*

- ☐ Acquires and analyzes information from other DoD components to determine the impact on the DLA mission and to ensure responsiveness to the requirements therein.

*Requires a situation assessment and reporting system.*

- ☐ *Appreciable emphasis should be placed on Procedural development.*
- ☐ *Time and Cost estimates to develop the analytical components will be shown in appendices V, W, X, Y and Z.*
- ☐ *Computer hardware system costs to implement this system in the LC function will be developed in appendix S.*
- ☐ *A comprehensive Situation Reporting System is required which will underwrite the requirements of the current Situation Reporting, Capability reporting, JCS Action Matters, and Exercise functions.*

## **U. HIS 3135.2 COMMAND AND CONTROL CENTER**

### **Observations**

**The Command and Control Center [CCC] is the primary command and control facility for HQ DLA..... During exercises or periods of national or international crises, it will operate as required, to serve as the Agency's central emergency action facility and operations information center.**

**The CCC is the HQ DLA point of contact for the exchange of operational information with the National Military Command System and other Worldwide Military Command and Control System operation centers for matters relating to the crisis.**

**The CCC provides the primary interface between the HQ DLA staff and exercise or crisis participants. The intent of this interface is to assure central visibility within the agency of significant ongoing actions during an exercise or crisis.**

*This is a comprehensive situation reporting system.*  
**U. Design Criteria: No on line or direct linking of the DLA CC System with existing computer files or systems because this would only add complexity without bringing any operational benefit. In fact, attempting to establish computer to computer transfer of data will result in a significant loss of management control at the interface. Technically, only a small volume of quantitative data would need to be transferred at any time, therefore the design task is to establish the required hardcopy format for handling the data.**

**A. The Chief, Command and Control Division, Office of the Assistant Director, Plans, Programs and Systems (DLA-LC) will:**

**1. Provide overall management of the Command and Control Center.**

**2. Ensure that the Command and Control Center is prepared for execution of this Hq. Standard Instructions.**

**3. Recommend to DLA-L augmentation changes needed within the Command and Control Center to satisfy specific operational requirement.**

**4. Ensure that the Command and Control Center coordinates exercises and emergency actions pertaining to the following situations:**

- a. Contingency operations.**
- b. Exercises.**
- c. Foreign disaster relief efforts.**
- d. Domestic disaster relief efforts.**
- e. Pollution incidents.**
- f. Civil disturbances.**
- g. Nuclear accidents/incidents.**
- h. Postal disruptions.**
- i. Emergency supply operations.**
- j. Situation Reports (SITREPs).**

*□ Probably only conditions a,b,i and j should be addressed by an automated command and control system.*

*□ Conditions c through h would be too unique, of little predictability, and with limited impact on DLA resources. Therefore, these conditions would probably be managed on an exception basis, using traditional command and control procedures.*

**6. Display significant actions on status boards.**

7. Maintain operations and intelligence situation maps, status of resources and logistics, and pertinent information on the status of actions supporting exercises or crises resolution.

8. Ensure that briefings are prepared and conducted for the Director and his staff on all significant ongoing actions.

*In time, graphics and display screens will be a must for the CCC system. This capability would not occur in the initial development, but would be a logical extension of the system. Initially, systems design would concentrate on the "data Processing" aspects. Graphic displays would be added after the system is effectively processing the required information.*

9. Task PSEs and subordinate activities to provide status of actions.

10. Develop responses to queries from the Director about exercise or crisis situations.

11. Monitor implementation and operation of the DLA SITREP reports.

12. PUBLISH DEFCON change notifications and monitor DLA implementation of the DEFCON.

13. Establish such records as necessary to provide a complete account of the exercise or crisis operation.

**DLAR 3135.4 CAPABILITY REPORTING****Observations**

The capability reporting system is designed to assess the Defense Logistics Agency's (DLA) ability to sustain military forces in combat. It is intended to provide a dialogue between the field Commanders and the Director, DLA.

*Objective: Sustaining an assessment is equivalent to the projection of capability over time, such as accomplished with models V,W,X,Y, and Z.*

*Design Task: To determine whether capability reporting programs should process projections via:*

- a) tables of output from V,W,X,Y, and Z*
- b) formulas of V,W,X,Y, and Z*

The system/procedures will inform the DLA Director, of the field Commanders' evaluations of their organizations' abilities to provide mission support under contingency situations. This Defense Logistics Agency Regulations (DLAR) is applicable to HQ DLA and the DLA Primary Level Field Activities (PLFAs) (exception DLA administrative Support Center (DDASC) and Defense Technical Information Center (DTIC).

*Design Task: Determine the procedures and report formats for PLFAs to report their capabilities and for the system to compare them with engineered or historical/statistical standards.*

## **I. Responsibilities**

### **A. HQ DLA The Assistant director, Policies and Plans will:**

a. Coordinate the preparation and submission of the annual DLA Capability Statement to the Director of the Joint Staff.

b. Provide capability reporting policy and guidance to PLFA's and the HQ DLA Principal Staff Elements (PSEs).

### **B. PSE Capability Input**

PSEs will review the input of their respective PLFAs and provide input to the DLA Capability Statement.

### **C. Capability Review Meeting**

The Director and the Heads of the DLA Principal Staff Elements will meet during the first week in April to review internal DLA Capability Problems and the DLA Capability Statement which was prepared for submission to the JCS.

***Design Task:** Define procedures and report formats for interactive mode between the PSEs and the planning system.*

### **D. DLA Capability Statement**

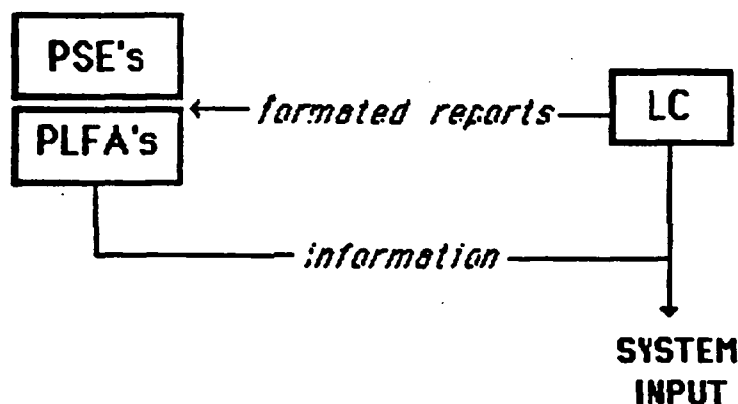
The DLA Capability Statement will be submitted to the JCS in accordance with the "blue bullet" tasking.

## II. Forms & Reports

PLFA Commanders will report in a narrative letter format not to exceed two pages. PSEs will report in a IOM format not to exceed two pages.

*Design Task: Review transfer of information, contact, and extraction for the system's input.*

A. The Heads of all HQ DLA PSEs will, within their functional areas, review and provide comments pertaining to deficiencies reported by the Heads of PLFAs.



B. Field Activities The Heads of PLFAs are the key to the success of the capability reporting system. Their evaluation of their commands' capabilities to support forces in combat will consider the applicable items on enclosure 1, Capability Reporting Checklist. The report will be a concise narrative summary of the PLFA Commander's most pressing problems in sustaining forces in combat.

*Design Task: Include processing of narrative or qualitative information (ie. W.P. files).*

**III. Procedures:****A. PLFA Capability Reports.**

1. Capability Reports will be submitted by the Heads of PLFAs to the Director, DLA, ATTN: DLA-LC, and will evaluate all conditions which impact, or may impact, on the PLFA's ability to sustain military forces in combat. The PLFA Commanders Capability Report should be submitted annually.

**CAPABILITY REPORTING CHECKLIST**

1. Supply:
  - a. Stock Availability and Materiel Obligation Trend.
  - b. DLA War Reserve Program
  - c. Bulk Fuels
  - d. Subsistence
  - e. Weapon System Support Program
  - f. Medical
  - g. Clothing & Textiles
2. Personnel:
  - a. Military
  - b. Civilian
  - c. Individual Mobilization Augmentees
  - d. Training
3. Equipment:
  - a. Materiel Handling Equipment
  - b. Storage Aids
4. Facilities
5. Transportation
6. Computer Reliability
7. Industrial Preparedness Planning.

**Footnote-Definitions:****1. Stock Availability and Material Obligation Trend.**

This is a key measurement of DSA's readiness to effectively support the Military Services. For example, a decreasing trend in the percent of stock availability or a rising trend in the number of material obligations indicate reduced materiel readiness for the Military Services.

**b. DSA War Reserve Program (DSAH-0 only).**

In order to evaluate the war reserve readiness position, the war reserve funding deficiency will be subtracted from the aggregate value of Military Service submitted war materiel requirements. The result is divided by the aggregate Military Service war reserve materiel to determine the percent of readiness for each DSA Commodity and on a total program basis.

**c. Bulk Petroleum Status (Defense Fuel Supply Center only).**

The readiness reporting format for bulk fuels is divided into five separate sections by major location (Continental United States; Commander-in-Chief, Pacific; Commander-in-Chief, Europe; Commander-in-Chief, Atlantic and Commander-in-Chief, South). Within each section and for each product listed under "DEFICIENCY," compare the inventory on hand to the maximum fill level, useable storage available and minimum inviolable level 9PWRMRP plus useable plus cross country pipeline).

**d. Worldwide Integrated Management of Wholesale Subsistence (DSAH-0 only).** Consider each Military Service subsistence wholesale storage location and determine the subsistence management capability to identify areas which are or which could impact the ability of DSA to provide acceptable support.

**2. Military and Civilian Personnel Strength.**

This indicator is intended to compare authorized vs. assigned strength. It considers shortages in overall personnel strength, shortages within specific skill groupings or those involving key management or supervisory positions.

**3. Equipment et al.**

Identify readiness implications connected with shortages, authorized quantities, condition or age of materials handling equipment, storage aids, vehicles or other automated conveyances necessary to the operation of the PLFA.

**4. Facilities.**

Determine the adequacy of storage facilities as relates to readiness. Consider space requirements and maintenance condition of general purpose, humidity controlled, and temperature controlled warehousing.

**5. Transportation.**

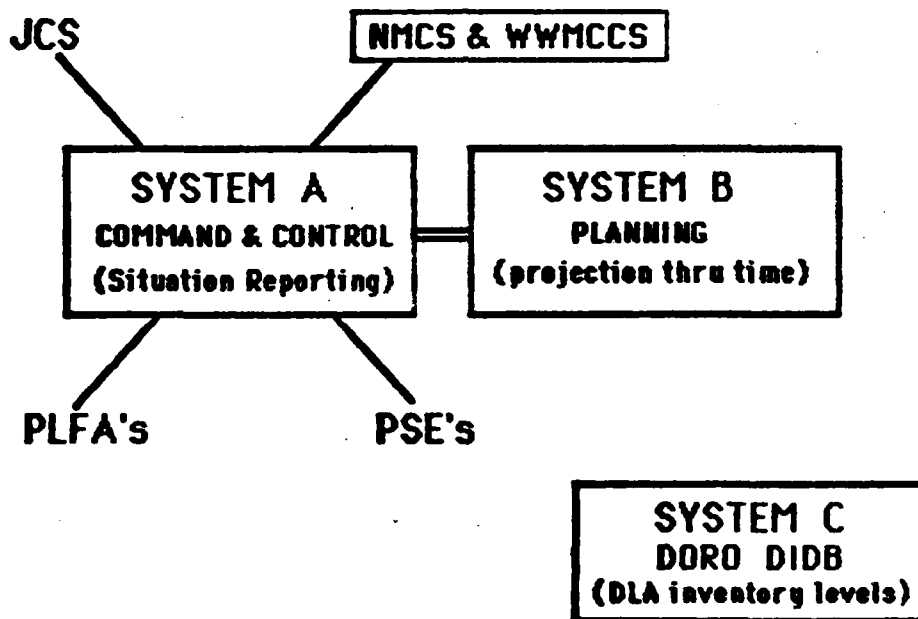
This section discusses requirements for the submission of data on the capabilities of DSA installations to outload and receive materiel by rail and motor under both peacetime and mobilization expansion conditions. The reported data will be used to analyze the capability in terms of the number of each transportation equipment type that can be processed during a sustained period of activity.

**6. Computer Reliability.**

Measure the reliability of the prime computer at Supply Centers, Service Centers, Depots and DCASR Regions.

**7. Industrial Preparedness Planning et.al.**

Comment: A Lieontief Input/Output matrix. [Included in the Model Z estimate.]



*A. The Command and Control System is essentially a; random access data base, accounting table driven system; containing three major sets of information. They are:*

- 1. Current status [Alpha-meric format].*
- 2. Comparison standard.*
- 3. Qualitative or text information*

*The dominant processing logic is:*

- 1. Catalogue, compare and contrast.*
- 2. Word or text processing.*

**B. In contrast, the Planning System is a weakly connected series of complex logic modules. The characteristics of these modules or sub-systems are being determined in model estimates V-W-X-Y-Z. The primary function of System B is to project the outcomes over time of a current or hypothetical situation.**

**C. The third system in the contingency planning structure is the DORO data base (DIDB). It is currently under development and when activated will contain detail NSN level records on the DLA hardware centers' managed items (Not currently included are fuels, subsistence and some other items.). DIDB is specifically designed for research and analyses studies, so therefore it will be quite valuable in supporting both contingency planning studies and as source records for the LC System.**

**D. System-B, used indendently of system-A, supports the planning process; used in conjunction with system-A will project over time, the outcomes of the current state of the situation represented by the data in system-A.**

**E. Major design tasks (relating primarily to System A):**

**1. Design the information exchange link between System A and System B.**

**2. Determine the procedures to link the input of PSE information into the system. This includes; the triggering format, the PSE reporting format, the receiving tables within the system, and the primary linking within the system.**

**4. Determine the procedures for transferring the summary inventory information from the DORO data base to the LC Planning system.**

**5. Determine how to pick up inventory information not presently included in the DORO data base (eg. fuels, subsistence, etc.).**

- 6. Determine the procedures to link the input of PLFA information into the system. This includes; the triggering format, the PSE reporting format, the receiving tables within the system, and the primary linking within the system.**
- 7. Determine the procedures etc. to capture the required input information from THE National Military Command and World Wide Military Command and Control Systems.**
- 8. Determine and design the input and response procedures for linking and processing Joint Chiefs of Staff matters (See: JCS Matters).**
- 9. Design Output report formats for the LC Action Officers, The Chief of LC, The Director of DLA and staff.**
- 10. Design the systems internal data base, and logic structure.**

## **I. DLAR 3135.2 SITUATION REPORTING PROCEDURES**

### **Observations**

The DLA Situation Reporting System is the medium through which the Director, DLA and the Heads of HQ DLA principal staff elements (PSEs) are notified of exceptional situations within the Agency which may detract from mission accomplishment. It also provides the Director, DLA with a means of informing higher authority of the Agency's status.

The Situation Reporting System does not supersede other reporting requirements. It supplements them by providing early information to the decision making level.

Reporting is linked to JCS (see App. U.7, pg.52); it should be similar to reporting to DLA-D.

## **II. DEFINITIONS**

A. HQ DLA Situation Report (SITREP). When requested by JCS, or at the direction of the Director, DLA, a HQ DLA report, submitted by message, normally used during crisis and exercise operations. Information copies of the report are furnished PLFAs.

*SITREPS are primarily in text format, containing highly synthesized quantitative information on current status and projected capability.*

B. A special OSD SITREP of such significance as to warrant forwarding to OSD.

C. PLFA SITREP. A daily PLFA report by message to AIG 4527; provides the status of PLFA resources and facilities and any factors impacting on mission accomplishment. This report is used during crisis and exercise operations.

*The task for Systems/Procedures is to define reporting formats and management by exception procedures. In turn, this specifies the top level output structure for system A.*

D. Special SITREP. A nonscheduled PLFA SITREP to HQ DLA concerning a significant event which has an impact on the Agency's mission or image. This report can be used during crisis and exercise operations.

### III. RESPONSIBILITIES

#### A HQ DLA

1. The Assistant Director, Office of Plans, Policies and Programs, DLA (DLA-L) will:

a. Establish appropriate files and procedures to ensure that SITREPs are properly recorded and passed to appropriate HQ DLA PSEs and the Command Group.

b. Forward OSD Special SITREPS to OSD upon approval by the Director, DLA.

Heads of DLA Principal Staff Elements will: Review SITREPs pertaining to their functional area, initiate support action as required, and recommend designation as an OSD Special SITREP.

B. Heads of DLA Primary Level Field Activities will:

1. Establish local procedures to identify, record, and report situations addressed.

2. Submit PLFA SITREPs at DEFCON 3 or when requested by HQ DLA.

Design Tasks are to determine:

1) *The procedure and format for a triggering SITREP.*

*2) System A's data, W.P., text, and graphics files.*

*3) Procedure and format for Management by exception with the PSEs, PLFAs, and Command groups.*

#### **IV. PROCEDURES**

##### **A. NORMAL OPERATIONS**

1. During normal operations, a Special SITREP is the only reporting requirement under this DLAR. Special SITREPs will be forwarded to HQ DLA immediately. Special SITREPs will be transmitted by the fastest means available.

##### **2. Subject areas for Special SITREPs:**

a. Unscheduled computer and software downtime of more than 12 hours and computer downtime of less than 12 hours when customer support is affected or HQ assistance is required. Each SITREP should reference the following areas:

- (1) Component failure.
- (2) System software errors.
- (3) Application programs errors.
- (4) Operator errors.
- (5) Power outages
- (6) ADP related communications outages.
- (7) Computer cycles:

b. Defense Depots. Mechanization of Warehousing and Shipment Processing (MOWASP) cycles which are missed, bypassed, or not scheduled for any reason.

c. Defense Supply Centers. Missed or delayed evening multiday cycles which cause the center to miss the 2000 hours Material Release Order (MRO) daily transmission cutoff (2200) hours for DESC).

d. Non-ADP related communications outages which are not covered by backup systems.

e. Bomb threats, criminal activities, and civil disorders.

f. Temporary closings or interruptions of DLA facilities involving over 25 percent of total duty personnel strength. Each SITREP on this subject area will include:

- (1) Cause of closure.
- (2) Percent of employees released.
- (3) Nondeferrable operations affected.
- (4) Mission impact.
- (5) Estimated date and time for resuming normal operations.

g. Other command interest items such as:

- (1) Death or serious injury to the Head or Deputy of a PLFA.
- (2) Natural disaster
- (3) Repeated equipment failure.
- (4) Adverse publicity in the press.
- (5) Disputes with local authorities.
- (6) Radioactive or hazardous material emergencies.
- (7) Any incident which results in death of a DLA employee, hospitalization of five or more DLA employees, or damage to DLA property in excess of \$200,000.

**Design Task:** Define the role for system A for a special SITREP under normal conditions.

There are two logical options: 1) May involve only the WF portion of system A. (2) May be totally external to system A.

**B. DEFCON 3 or Higher:**

Commence submitting PLFA SITREPs to HA DLA.

**C. DEFCON 3, or Higher, or as Directed by HQ DLA:** Add the alternate headquarters and Defense Contract Administration Services Region (DCASR) Atlanta to PLFA SITREP addresses.

**TABLE III**  
**FORMAT FOR THE PLFA SITREP**

**PART I. RESOURCES**

1. Personnel
2. Funds
3. Utilities
4. Buildings
5. Communications
6. ADPE
7. Major Equipment
8. Other

**□. Situation Reporting Procedures should be solved as a part of the Capability Reporting Procedures.**

**□. System A is equivalent to a Command and Control system.**

**□. Reporting includes:**

- 1)  $Capability = f(\text{stock, throughput rates, time})$
- 2)  $Status = f(\text{current capability})$
- 3)  $Situation = \text{status of exception}$

**Design Tasks are:**

- 1. Determine the procedures and format for SitRep. to the JCS and OSD. The JCS Sitreps are probaably text dominated, containing highly synthesized data and information, delineating the present situation (status), and projecting significant changes in DLA's capability.**
- 2. Define the reporting formats and management exception procedures for obtaining status informatior from the PLFA's.**
- 3. Define the reporting formats and management exception procedures for transferring information with the PSE's.**
- 4. Define contents, formats, procedures for special Sitreps under normal conditions. Two options to consider.**
  - a. May be totally external to System A.**
  - b. May involve only the W.P. portion of System A.**

**DLAR 3135.3 EXERCISES****Observations****POLICY**

A. DLA will determine its level of participation in a particular exercise contingent upon the objectives of the exercise.

B. Participation in exercises will include the HQ DLA principal staff elements (PSEs) and DLA PLFAs, as appropriate.

C. Exercise actions will be accomplished by the same organizational element or individual that would perform a comparable action under actual conditions.

**RESPONSIBILITIES:****A. HQ DLA**

1. The heads of PSEs will designate representatives to serve as HQ DLA Exercise Controllers and exercise participants.

2. The Assistant Director, Plans, Programs (DLA-L) will:

a. Provide executive oversight in the conduct of the exercise.

b. Activate the HQ DLA CCC for 24-hour operation.

c. Appoint an individual from his/her staff element as DLA Exercise Project Officer.

**B. The Heads of DLA PLFAs will:**

1. Designate exercise controllers and participants.

2. Develop supplemental plans as necessary and implement exercise operation plans for their respective field activities.

3. Activate and augment command centers or emergency operating centers for 24-hour operations.

C. The Commander, Defense Logistics Agency Administrative Support Center (DASC) will:

1. Provide 24-hour communication and mail control/distribution support of HQ DLA exercise elements relocating to the HQ DLA ERS and/or the ANMCC.

2. Provide administrative augmentation, as prescribed by the WESP, for support of HQ DLA exercise elements relocating to the HQ DLA ERS and/or the ANMCC.

3. Arrange for operation of the HQ DLA Command and Control Voice Communication System (CCVCS) switchboard.

4. In accordance with the WESP, assume operational control of the CCC at Cameron Station, upon relocation of emergency staff designees.

D. The DLA Exercise Project Officer will:

1. Supervise the development and execution of exercise operation plans throughout DLA.

2. Provide necessary liaison with the office of the JCS, the Military Services, and other major exercise participants.

**E. PSE and PLFA Controllers, in conjunction with their HQ DLA PSEs will:**

**1. Establish liaison with other exercise controllers to provide responsive exercise control channels within DLA.**

**2. Develop a HQ DLA and DLA PLFA exercise schedule of events and MSEL.**

**3. Prepare scripted inputs before active play begins in proper format for injection into the exercise at the appropriate time.**

**4. Maintain sufficient records to show the time and date of introduction of scripted inputs and the reaction of exercise participants to incidents resulting from the scripted inputs.**

**5. Regulate the tempo of the exercise through speedup or slowdown of scripted inputs into the exercise.**

**6. Use exercise control channels to stimulate an action or decision when an activity or exercise element is unnecessarily delaying the development and play of a particular exercise incident.**

**7. Avoid interfering with any "free-play" aspects of an exercise.**

**8. Develop simulated responses when exercise play involves an activity not participating in the particular exercise.**

**9. Assist in the preparation of post-exercise reports specified by the applicable exercise operation plan.**

**FOOTNOTE -- DEFINITIONS:**

1. Exercise Controller. An individual, group, or organizational element designated to monitor and control an exercise by the insertion of events which trigger exercise incidents.
2. Exercise Incident. A situation occurring during an exercise resulting from scripted inputs or free-play.
3. Exercise Participants. Individuals designated by Heads of PSEs and PLFAs to conduct the exercise.
4. Exercise Project Officer. An individual designated to direct the exercise development, execution, reporting.
5. Free-Play. The creation of an unplanned exercise incident by exercise participants and their subsequent reaction to the incident.
6. Joint Exercise Manual (JEM). A planning information document for the use of project officers as a guide in the planning, coordination, and execution of Joint Chiefs of Staff (JCS) sponsored exercises.
7. Master Scenario Events List (MSEL). An outline of exercise incidents, in chronological sequence, which will be inserted during the course of a particular exercise. An MSEL may be included in the exercise plan or published separately.
8. Scripted Input. An event from the MSEL in the form of a letter, message, or telephone call which is inserted into an exercise at a predetermined time, date, and place to trigger a specific incident.
9. WESPEX. A program established to test and improve the WESP and Field Activities War and Emergency Support Plans (FAWESPs) and to train personnel in their emergency duties.

**Observation**

**Design Task--Determine how System A should be integrated into the play of an exercise. This is a fairly extensive study of operating procedures and conditions. It should be undertaken after the principle characteristics of System A have been defined.**

## **U. HIS 3125.1 JOINT CHIEFS of STAFF ACTION MATTERS**

[NOTE: Only those statements and phrases that imply automation and systems were extracted from the original Joint Chiefs of Staff Action/Matters document.]

### **Purpose and Scope**

To establish policy and procedures and assign responsibilities for preparing, coordinating, and submitting to the Joint Chiefs of Staff, the DLA position on matters being considered by the Joint Chiefs of Staff. Note: suspension of the "rules" will occur in Crisis Action Situations (CAS).

HQ DLA is furnished Joint Chiefs of Staff papers and invited to coordinate or participate in those Joint Chiefs of Staff decisions or actions which are of DLA interest or impact. The Joint Chiefs of Staff MOP 132 process, which encompasses issuance of blue, flimsy, buff, green and red stripe papers, is the most common process by which DLA participates in these Joint Chiefs of Staff actions.

*Design Task: Assume Director DLA would require as a minimum the same reporting structure; therefore, these procedures assume a special importance in the planning and design of a contingency planning, command and control system.*

### **RESPONSIBILITIES**

**1. The Assistant Director, Policy & Plans DLA-L will, ensure that DLA responses to the Joint Staff are timely and reflect a coordinated DLA position.**

**2. The DLA Planner (Deputy Assistant Director, Policy & Plans), DLA (DLA-LD) will establish and approve a formal DLA position or concurrence to a Joint Chiefs of Staff buff paper or memorandum based upon the problem summary and proposed response prepared by the action officer.**

3. The Joint Action Control Officer will administer the DLA program for preparing, coordinating, and admitting the DLA position on matters being considered by the JCS. ....

## **V. PROCEDURES**

1. Joint Chiefs of Staff actions may originate from internal taskings or from external sources to include OSD, the Military Services, the Commanders in Chief, and Defense Agencies. Joint Chiefs of Staff invites DLA to participate in developing many papers; however, Joint Chiefs of Staff regards the views of any DoD Agency as advisory.

2. Development of a Joint Chiefs of Staff paper occurs at three levels in three separate stages.

a. Flimsy Level. The Joint Chiefs of Staff action officer prepares an initial draft (flimsy) for review by the AOs from the Joint Staff, Military Services and DoD Agencies.

b. Buff Level. The Joint Chiefs of Staff AO's directorate edits and approves the draft report, formally publishes it on buff-colored paper, and distributes it first to the Joint Staff Agencies to establish a unified Joint Staff position and then to the Services and other Agencies for coordination with their planners. DLA may receive buff reports for coordination or merely for information.

c. Green Level. After the buff has been coordinated with the planners, the Joint Chiefs of Staff corrects the report to correspond with the language agreed upon. DLA does not participate in the processing and approval of a green but receives copies of it for information.

*Note: Judging by the preceeding definition of responsibilities there could be lost opportunities for DLA to present a well analyzed and properly staffed response. But, with a planning system DLA would, in most cases, be prepared to give quick, accurate, and comprehensive replies.*

## B. TIME & COST ESTIMATES:

**TABLE IV**

### ESTIMATING PROGRAM DEVELOPMENT

[Data extracted from: "A Productivity Measurement System for an MIS Organization"]

#### SYSTEM CLASSIFICATION

|                                                       | <u>B</u><br><u>MEDIUM / SMALL</u><br>6 <sup>K</sup> to 8 <sup>K</sup> | <u>A</u><br><u>MEDIUM / LARGE</u><br>16 <sup>K</sup> to 64 <sup>K</sup> |
|-------------------------------------------------------|-----------------------------------------------------------------------|-------------------------------------------------------------------------|
| SIZE RANGE (lines of code)                            |                                                                       |                                                                         |
| PRODUCTION RATE (mm/Kloc)                             | 2.4                                                                   | 5.2                                                                     |
| DIVISION of EFFORT [%]:                               |                                                                       |                                                                         |
| <input type="checkbox"/> Project Control              | n/a                                                                   | 9%                                                                      |
| <input type="checkbox"/> Planning & Functional Design | n/a                                                                   | 12                                                                      |
| <input type="checkbox"/> Logic Design & Review        | 28%                                                                   | 10                                                                      |
| <input type="checkbox"/> Programming                  | 35                                                                    | 19                                                                      |
| <input type="checkbox"/> Testing & Installation       | 31                                                                    | 44                                                                      |
| <input type="checkbox"/> Documentation                | <u>6</u>                                                              | <u>6</u>                                                                |
|                                                       | 100%                                                                  | 100%                                                                    |

**SYSTEM B:** Equivalent to a medium/small system.

7 k ± 1K X 2.5 mm/Kloc = 15 to 20 mm.

**SYSTEM A:** Equivalent to a medium/large system.

Independent variable = Equivalent cobol structured program size.

Min. program size (16.1K) X 5.2 mm/Kloc = 84 mm.

#### Summary:

[DIRECT LABOR \_ 100 \_ m.m.] X [Rate \_ 3000 \_ \$/S.A. m.m.]

X [1+ (125% Overhead)] = \$ 675,000.

**Appendix V**  
**RISK/THREAT ASSESSMENT**

**THREAT ASSESSMENT**  
**MODEL ☒ SYSTEM ☐**  
**ESTIMATE # B.**

**I. COMMENTS:**

**☐ Projected Force Deployment:**

A valid mobilization plan must account for multiple, probabilistic futures not a single deterministic situation. A Decision/Risk type analysis, should be used to develop the strategic and tactical doctrines for DLA's logistical operations. [IV.7 & V.2]

**☐ Deployment scenarios for the armed forces are continually being written and updated to meet the shifting geo-political conditions in the world. In addition, specific concepts and operational plans are prepared by military strategists and planners. One of the fundamental objectives of DLA should be to compute its capacity and capability under a combination of deployment plans. DLA should be capable of quantifying its logistical support requirements under any of the OPLANS. The logistical requirements as derived from these plans would constitute the logical input demand for DLA mobilization planning. [IV.1]**

**$\Sigma$  Importance Index = 3.3**

**II. PRIMARY PROCESS:**

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| <b>A. THREAT -- DECISION / RISK</b> | <input checked="" type="checkbox"/> |
| <b>B. DAMAGE ASSESSMENT</b>         | <input type="checkbox"/>            |
| <b>C. THRU-PUT CAPACITY</b>         | <input type="checkbox"/>            |
| <b>D. INVENTORY EMPLOYMENT</b>      | <input type="checkbox"/>            |
| <b>E. INVENTORY REPLENISHMENT</b>   | <input type="checkbox"/>            |
| <b>F. THE NAT'L INDUSTRIAL BASE</b> | <input type="checkbox"/>            |
| <b>G. OTHER:</b>                    | <input type="checkbox"/>            |

**III. DOMINANT ♦ PROBLEM CHARACTERISTICS:****ACCOUNTING METHODS**

|                                  |                                                      |                                     |
|----------------------------------|------------------------------------------------------|-------------------------------------|
| <b>TECHNOLOGICAL METHODOLOGY</b> | <b>MAX. DIMENSIONS 3 to 4</b><br>[limited options]   | <input type="checkbox"/>            |
|                                  | <b>DETAILED ITEMS</b><br>[compare/contrast logic]    | <input type="checkbox"/>            |
|                                  | <b>Explicit "BOTTOM LINE"</b>                        | <input type="checkbox"/>            |
|                                  | <b>OPERATIONS RESEARCH</b>                           |                                     |
|                                  | <b>MULTI-DIMENSIONAL</b>                             | <input type="checkbox"/>            |
|                                  | <b>OPTIMUM SOLUTIONS</b><br>[closed form]            | <input type="checkbox"/>            |
|                                  | <b>LIKELY OUTCOMES</b><br>probabilistic<br>heuristic | <input checked="" type="checkbox"/> |

**DATA PROCESSING**

|                                                          |                          |
|----------------------------------------------------------|--------------------------|
| <b>DETAIL TRANSACTION PROCESSING</b><br>[sort / summary] | <input type="checkbox"/> |
| <b>SCIENTIFIC STATISTICAL ANALYSIS</b>                   | <input type="checkbox"/> |

**Operations Research Methodology:**

- |                                 |                          |                               |                                     |
|---------------------------------|--------------------------|-------------------------------|-------------------------------------|
| <b>Inventory Theory</b>         | <input type="checkbox"/> | <b>Decision/Risk analysis</b> | <input checked="" type="checkbox"/> |
| <b>Allocation Theory (L.P.)</b> | <input type="checkbox"/> | <b>Game Theory</b>            | <input type="checkbox"/>            |
| <b>Distribution analysis</b>    | <input type="checkbox"/> | <b>Cybernetics</b>            | <input type="checkbox"/>            |
| <b>Scheduling Theory</b>        | <input type="checkbox"/> | <b>Probability/Statistics</b> | <input type="checkbox"/>            |
| <b>Queueing Theory</b>          | <input type="checkbox"/> | <b>Regression analyses</b>    | <input type="checkbox"/>            |
| <b>Forecasting models</b>       | <input type="checkbox"/> | <b>Simulations</b>            | <input type="checkbox"/>            |
| <b>Industrial Dynamics</b>      | <input type="checkbox"/> | <b>Other</b>                  | <input type="checkbox"/>            |

**III. DISCUSSION:**

DLA should take the initiative in determining for themselves what the JCS considers as possible scenarios that would require the active employment of the armed forces. Particular attention would be directed to those scenarios that would place unusual demands on DLA in accomplishment of its mission and functions. DLA should then have a system to translate the information on risk assessment into estimates of potential demands.

**DEVELOPMENT ACTIONS:****A. Identify source, procedure, and format for obtaining Threat Scenarios.****1. Probable sources:**

- a. JCS for mobilizations - partial - full - total.
- b. JDA for deployments (20+).

**2. Format:**

- a. Qualitative/descriptive scenarios.
- b. Major military units involved.
- c. Change the use rates of DLA managed commodities.

**B. Design and establish computer data base (See: V. Data Sets.).****C. Determine the procedures & methodology required to assign a probability of occurrence to each of the scenarios identified. (This task will require interaction with the JCS or their staff).****D. Obtain primary scenario information, load and test the data base. (Obtaining the information will probably require appreciable coordination effort with the armed services, OSD, JCS, et. al.)****E. Write a program to compute a Demand distribution for the DLA managed commodities (a set of approx. 40) as a function of the potential threat scenarios, their probability of occurrence, and the expected change in the use rates over time.****F. Test by obtaining and processing a complete set of data.****G. Link this system to models W and Y to provide the Threat/Risk input for calculating possible demands on the DLA system.**

## Columns

# Now

**Y**

### DATA SETS :

FORCES (units)

| ARMY | NAVY | AIR FORCE | OTHER |
|------|------|-----------|-------|
|      |      |           |       |

PRODUCTS (8)  
COMMODITIES (40)

DEMAND RATES = const.

## PRODUCTS (8) · COMMODITIES (40)

**DEMAND RATES = const.**

**-Scenario n<sup>th</sup>.**

### Scenario 3

## Scenario 2

**DEPLOYMENTS: Scenario 1**

**MOBILIZATION: Partial / Full / Total**

**FORCES (units)**

**ARMY**

**NAVY**

**AIR FORCE**

OTHER

## PRODUCTS (8) COMMODITIES (40)

**DEMAND RATES =  $f(\text{time})$**

Columns

Rows **Y**

DATA SETS ( Continued ):

PROBABILITY of OCCURANCE

FORCES (units)

MOBILIZATION: Partial / Full / Total

DEPLOYMENTS: Scenario 1,2,3,.....n.

PRODUCTS (8)  
COMMODITIES (40)

DEMAND RATES = f (time)

EXPECTED DEMAND, MAD

**BI. TIME & COST ESTIMATES:****Computations:**

| <u>Major Tasks</u>                                                        | <u>Estimated Effort (m.m.)</u> |                 |
|---------------------------------------------------------------------------|--------------------------------|-----------------|
|                                                                           | <u>( min. )</u>                | <u>( max. )</u> |
| X. Initial administrative effort.                                         | 1.2                            | 2.5             |
| A. Establish source, procedure, format.                                   | 3.1                            | 4.8             |
| B. Design the Data Base.                                                  | 2.1                            | 3.2             |
| C. Obtain scenarios, load data base.                                      | 1.8                            | 3.6             |
| D. Establish procedures for obtaining<br>the probabilities of occurrence. | 2.0                            | 4.2             |
| E. Write a program to compute<br>the demand distributions.                | 2.5                            | 5.3             |
| F. Test the Threat Assessment system.                                     | 2.0                            | 4.5             |
| G. Link to subsequent systems.                                            | 2.8                            | 3.8             |
|                                                                           | $\Sigma$ 17.5 m.m.             | 31.9 m.m.       |

**Summary:**

**[DIRECT LABOR: 24.7 m.m.] H [ Rate: 3100 \$/m.m.<sup>13</sup>]**

**H [1+ (125% Overhead)] = \$ 172,300**

**Footnote # 13: 72 % of the labor rate is @ the Systems Analyst level, and 28 % is @ the Operations Research level.**

**BI. TIME & COST ESTIMATES:****Computations:**

| <u>Major Tasks</u>                                                        | <u>Estimated Effort (m.m.)</u> |                  |
|---------------------------------------------------------------------------|--------------------------------|------------------|
|                                                                           | <u>( min. )</u>                | <u>( max. )</u>  |
| X. Initial administrative effort.                                         | 1.2                            | 2.5              |
| A. Establish source, procedure, format.                                   | 3.1                            | 4.8              |
| B. Design the Data Base.                                                  | 2.1                            | 3.2              |
| C. Obtain scenarios, load data base.                                      | 1.8                            | 3.6              |
| D. Establish procedures for obtaining<br>the probabilities of occurrence. | 2.0                            | 4.2              |
| E. Write a program to compute<br>the demand distributions.                | 2.5                            | 5.3              |
| F. Test the Threat Assessment system.                                     | 2.0                            | 4.5              |
| G. Link to subsequent systems.                                            | 2.8                            | 3.8              |
|                                                                           | <b>Σ 17.5 m.m.</b>             | <b>31.9 m.m.</b> |

**Summary:**

**[DIRECT LABOR: 24.7 m.m.] H [Rate: 3100 \$/m.m.<sup>13</sup>]**

**H [1+ (125% Overhead)] = \$ 172,300**

**Footnote # 13:** 72 % of the labor rate is @ the Systems Analyst level, and 28 % is @ the Operations Research level.

**Appendix W**  
**PROJECTED DEMAND**

**PROJECTED DEMAND****MODEL ☐ DATA PROCESSING ☒  
ESTIMATE ☒****I. COMMENTS:****☐ Deployment Scenarios to Demand Projections:**

A deterministic/analytical program is required which will take the force elements identified in a mobilization or contingency scenario, and compute the expected supply demands on DLA at the NSN item level. *(Note, there are two alternatives: one, DLA could develop a system to compute the time phased requirements at the NSN level given a force deployment scenario: or two, the Joint Deployment Agency (JDA) or other DOD agencies create one). If DLA does not have the responsibility to create this analytical system then DLA should provide a detailed set of specifications on the output product required (ie, data sets and control parameters). [IV.8]*

☐ [Note: Duplicate comments in Model Y]: The DLA contingency planning system should be designed with two levels or sets of information:

- ♦ Set one would contain transactional data summarized into product and commodity groups on which a set of management or executive reports would be based.
- ♦ Set two would be carried at the NSN level. From this set, exception type reports, identifying the most critical line items by NSN, would be developed.

The commodity / product level of *data would be transferred into the DLA-LC computer system*. The second set of reports would be for tactical planning which, by necessity, would remain in the data base of a large scale processor. [IV.3]

---

 **$\Sigma$  Importance Index = 3.3**

---

**II. PRIMARY PROCESS:**

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| <b>A. THREAT — DECISION / RISK</b>  | <input type="checkbox"/>            |
| <b>B. DAMAGE ASSESSMENT</b>         | <input type="checkbox"/>            |
| <b>C. THRU-PUT CAPACITY</b>         | <input type="checkbox"/>            |
| <b>D. INVENTORY EMPLOYMENT</b>      | <input checked="" type="checkbox"/> |
| <b>E. INVENTORY REPLENISHMENT</b>   | <input type="checkbox"/>            |
| <b>F. THE NAT'L INDUSTRIAL BASE</b> | <input type="checkbox"/>            |
| <b>G. OTHER:</b>                    | <input type="checkbox"/>            |

**III. DOMINANT ♦ PROBLEM CHARACTERISTICS:****ACCOUNTING METHODS**

|                                  |                                                    |                                     |
|----------------------------------|----------------------------------------------------|-------------------------------------|
| <b>TECHNOLOGICAL METHODOLOGY</b> | <b>MAX. DIMENSIONS 3 to 4</b><br>[limited options] | <input type="checkbox"/>            |
|                                  | <b>DETAILED ITEMS</b><br>[compare/contrast logic]  | <input checked="" type="checkbox"/> |
|                                  | <b>Explicit "BOTTOM LINE"</b>                      | <input type="checkbox"/>            |
|                                  | <b>OPERATIONS RESEARCH</b>                         |                                     |
|                                  | <b>MULTI-DIMENSIONAL</b>                           | <input checked="" type="checkbox"/> |
|                                  | <b>OPTIMUM SOLUTIONS</b><br>[closed form]          | <input type="checkbox"/>            |
|                                  | <b>LIKELY OUTCOMES</b><br>probabilistic            | <input type="checkbox"/>            |
|                                  | <b>heuristic</b>                                   | <input type="checkbox"/>            |

**DATA PROCESSING**

- |                                                          |                                     |
|----------------------------------------------------------|-------------------------------------|
| <b>DETAIL TRANSACTION PROCESSING</b><br>[sort / summary] | <input checked="" type="checkbox"/> |
| <b>SCIENTIFIC STATISTICAL ANALYSIS</b>                   | <input type="checkbox"/>            |

**Operations Research Methodology:**

- |                                 |                          |                               |                                     |
|---------------------------------|--------------------------|-------------------------------|-------------------------------------|
| <b>Inventory Theory</b>         | <input type="checkbox"/> | <b>Decision/Risk analysis</b> | <input type="checkbox"/>            |
| <b>Allocation Theory (L.P.)</b> | <input type="checkbox"/> | <b>Game Theory</b>            | <input type="checkbox"/>            |
| <b>Distribution analysis</b>    | <input type="checkbox"/> | <b>Cybernetics</b>            | <input type="checkbox"/>            |
| <b>Scheduling Theory</b>        | <input type="checkbox"/> | <b>Probability/Statistics</b> | <input type="checkbox"/>            |
| <b>Queueing Theory</b>          | <input type="checkbox"/> | <b>Regression analyses</b>    | <input type="checkbox"/>            |
| <b>Forecasting models</b>       | <input type="checkbox"/> | <b>Simulations</b>            | <input type="checkbox"/>            |
| <b>Industrial Dynamics</b>      | <input type="checkbox"/> | <b>Data Base Management</b>   | <input checked="" type="checkbox"/> |

**III. DISCUSSION:**

Estimating demand from projected deployments (see: Model V -- Threat Assessment).

Out put of model W. NSN Demand <sup>14</sup>:

- ◊. NSN demand rate over time, week, and/or month.
- ◊. Sumarize (total) demand over time by FSG/commodity/product groupings.
- ◊. Compute percent increase in demand over normal or peacetime rates, by FSG/commodity/product groupings.
- ◊. Compute normal (baseline) absolute demand rates by NSN from DADB .....also aggregate by FSG/commodity/product groupings.
- ◊. Multiply peacetime rates by percent increase in demand to get mobilization or deployment demand rates, over time, and by FSG or commodity/product groupings.
- ◊. Similar calculations for each NSN.
- ◊. Assumes that within a FSG, commodity or product grouping the percent contribution of each NSN to the FSG, commodity or product grouping is the same for a deployment, mobilization as for normal conditions.

---

**Footnote 14:**

It is only in this W Model that NSN data is processed. An analysis of NSN information is essentially to identify critical items. It is a planning/research activity. The NSN demand output tapes would then be the input to existing DORO models.

During an active Command & Control operation the management and control of specific items will be in the normal PLFA organizations. The identification of critical items will originate in the PLFA's and be reported through the Contingency Command and Control system as specific SITREP reports.

U.

Columns

Rows **W**

DATA SETS:

others

OGDEN

TRACEY

RICHMOND

SMCC'S (frequency(5), value (6) = 30

PRODUCTS ( 1 = 40 )

GENERAL ELECTRONICS CONSTRUCTION INDUSTRIAL MEDICAL PETROL CLOTHING FOOD

*Note: the hardcopy equivalent  
is about thirty pages of data,  
or about 900 eighty column cds.*

$\Sigma$  data pts. = [6 depots]  
[40 products][30 SMCC'S]  
= 7200

**VI. TIME & COST ESTIMATES:****Computations:**

| <u>Identifiable Milestones:</u>                                                                                                          | <u>Estimated man - weeks</u> |                  |
|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------|
|                                                                                                                                          | <u>[minimum]</u>             | <u>[maximum]</u> |
| 1. Initializing administrative actions.                                                                                                  | 1                            | 3                |
| 2. Conduct data research and formulate<br>input procedures for items not in DADB<br>ie. fuels, subsistence, C&T <small>DORO est.</small> | 7                            | 15               |
| 3. Formulate logic--model <small>DORO est.</small>                                                                                       | 6                            | 11               |
| 4. Formulate output procedures/formats.                                                                                                  | 2                            | 5                |
| 5. Formulation reviewed and approved.                                                                                                    | 1                            | 3                |
| 6. Coding completed.                                                                                                                     | 3                            | 5                |
| 7. Testing completed.                                                                                                                    | <u>2</u>                     | <u>5</u>         |
| Est. man-weeks:                                                                                                                          | 22                           | 47               |

**Summary:**

**[DIRECT LABOR 8.4 m.m.] X [Rate \$ 3400 /O.R. m.m.]**

**X [1 + (125% Overhead)] = \$ 64,300**

**Appendix X**  
**DAMAGE ASSESSMENT**

**DAMAGE ASSESSMENT MODEL****MODEL  $\checkmark$  SYSTEM  $\square$** **ESTIMATE  $\# \Sigma$** **I. COMMENTS:**

$\square$ . To analyze the residual capacity of DLA, given a nuclear attack scenario, a damage assessment model/program must include radiation as well as blast effects to be at all predictive. Logically there should be duplicate systems/models implemented on office automation class computers, one at DLA-HQ and one at the emergency relocation site. [IV.13 & II.9]

Data I/O: Problem related potential:

X. Input information 80 %

Y. output information 20 %

**$\Sigma$  Importance Index - 3.1**

**II. PRIMARY PROCESS:**

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| <b>A. THREAT -- DECISION / RISK</b> | <input type="checkbox"/>            |
| <b>B. DAMAGE ASSESSMENT</b>         | <input checked="" type="checkbox"/> |
| <b>C. THRU-PUT CAPACITY</b>         | <input type="checkbox"/>            |
| <b>D. INVENTORY EMPLOYMENT</b>      | <input type="checkbox"/>            |
| <b>E. INVENTORY REPLENISHMENT</b>   | <input type="checkbox"/>            |
| <b>F. THE NAT'L INDUSTRIAL BASE</b> | <input type="checkbox"/>            |
| <b>G. OTHER:</b>                    | <input type="checkbox"/>            |

**III. APPLICABLE MODELS & METHODOLOGIES:****ACCOUNTING METHODS**

|                                  |                                                      |                                     |
|----------------------------------|------------------------------------------------------|-------------------------------------|
| <b>TECHNOLOGICAL METHODOLOGY</b> | <b>MAX. DIMENSIONS 3 to 4</b><br>[limited options]   | <input type="checkbox"/>            |
|                                  | <b>DETAILED ITEMS</b><br>[compare/contrast logic]    | <input type="checkbox"/>            |
|                                  | <b>Explicit "BOTTOM LINE"</b>                        | <input type="checkbox"/>            |
|                                  | <b>OPERATIONS RESEARCH</b>                           |                                     |
|                                  | <b>MULTI-DIMENSIONAL</b>                             | <input type="checkbox"/>            |
|                                  | <b>OPTIMUM SOLUTIONS</b><br>[closed form]            | <input type="checkbox"/>            |
|                                  | <b>LIKELY OUTCOMES</b><br>probabilistic<br>heuristic | <input checked="" type="checkbox"/> |

**DATA PROCESSING**

|                                                          |                          |
|----------------------------------------------------------|--------------------------|
| <b>DETAIL TRANSACTION PROCESSING</b><br>[sort / summary] | <input type="checkbox"/> |
| <b>SCIENTIFIC STATISTICAL ANALYSIS</b>                   | <input type="checkbox"/> |

**Operations Research Methodology:**

- |                                 |                          |                                 |                                     |
|---------------------------------|--------------------------|---------------------------------|-------------------------------------|
| <b>Inventory Theory</b>         | <input type="checkbox"/> | <b>Decision/Risk analysis</b>   | <input type="checkbox"/>            |
| <b>Allocation Theory (L.P.)</b> | <input type="checkbox"/> | <b>Game Theory</b>              | <input type="checkbox"/>            |
| <b>Distribution analysis</b>    | <input type="checkbox"/> | <b>Cybernetics</b>              | <input type="checkbox"/>            |
| <b>Scheduling Theory</b>        | <input type="checkbox"/> | <b>Probability/Statistics</b>   | <input type="checkbox"/>            |
| <b>Queueing Theory</b>          | <input type="checkbox"/> | <b>Regression analyses</b>      | <input type="checkbox"/>            |
| <b>Forecasting models</b>       | <input type="checkbox"/> | <b>Simulations</b>              | <input type="checkbox"/>            |
| <b>Industrial Dynamics</b>      | <input type="checkbox"/> | <b>Nuclear Weapons Analysis</b> | <input checked="" type="checkbox"/> |

**IV. DISCUSSION:** The two physical phenomena to be modeled are:

**□ Blast Effects:**

Blast effect physics are computed as a percent survival multiplier for a set of items. The Item Set could be facilities of any type, inventories of various commodities, or humans.

$$\% \text{ Surviving Set}_i = f_1 [\text{Original Set}_i, \text{Structural Factors}_i, \text{PSI Overpressure}_i]$$

$$\text{PSI Overpressure} = f_2 [\text{Yield}^{\text{air/ground}}, \text{Coordinates}]$$

**□ Radiation Effects:**

Thermal, alpha, and beta radiation are usually considered second order effects when compared with the effects of blast and gamma radiation. Gamma radiation is not considered initially important, but its effect can become important within hours and persist for a long time, essentially denying access to facilities and commodities for weeks or even months. Therefore its time dependent effects must be incorporated in all assessments of nuclear attack scenarios.

$$\bullet \text{ Staff Survival } (t) = f_3 [\text{Original Staff}, \text{Prob. illness}(t), \text{Prob. fatality}]$$

$$\bullet \text{ Prob. fatality} = f_4 [\text{Physiological Response}, \text{illness } (t), \text{shelter attenuation, REM}^*(t)]$$

$$\bullet \text{ REM}^*(t) = f_5 [\text{Physical adsorption rates } (t), \text{YIELD}, \text{ground, coordinates, wind vectors}]$$

**Where:**

**i** = The sets of physical objects (facilities, commodities, ..., personnel)

**j** = The geographical locations (Rich., Dayton, Phila., ...)

**function  $f_1$ :** The % survival of given a physical set is a function of the given PSI overpressure.

**function  $f_2$ :** The PSI is computed using the physics of spherical attenuation of energy, given the released energy or yield and the spherical radius.

**function  $f_3$ :** The physical condition of a staff over time, can be calculated from their biological response to their radiation field.

**function  $f_4$ :** The observable biological response of a human is directly proportional to the cumulative whole body dose received.

**function  $f_5$ :** \* REM = Computation of the effective radiological dose in man.

QED.

COLUMNS

B.



ROWS

DATA SETS:

**A. INPUT DATA:**

**1. ATTACK PATTERN:**

$\square [YIELD, \text{air/ground}]_{j,k}$

affected facilities,  $j = 1, 2, 3, \dots, 26$

weapon index,  $k = 1, 2, 3, \dots, n$

$\square$  Geographical coordinates [ lat., long. ]<sub>k</sub>

WEAPONS

|   |       |            |      |       |
|---|-------|------------|------|-------|
| 1 | YIELD | air/ground | LAT. | LONG. |
| 2 |       |            |      |       |
| 3 |       |            |      |       |
| 4 |       |            |      |       |

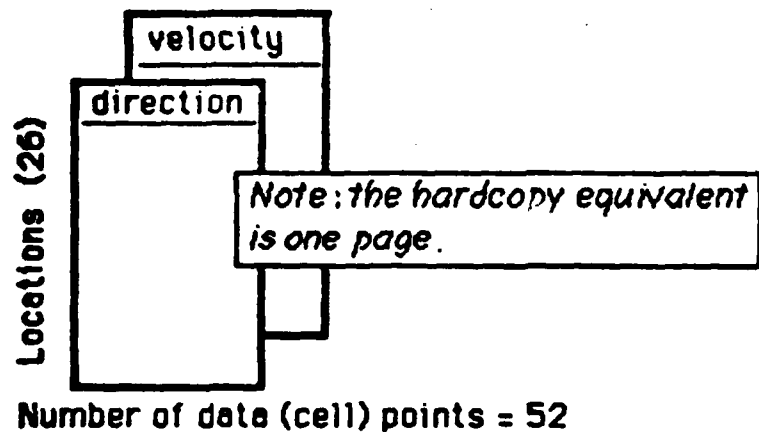
LOCATIONS (26)

*Note: the hardcopy equivalent is about two pages*

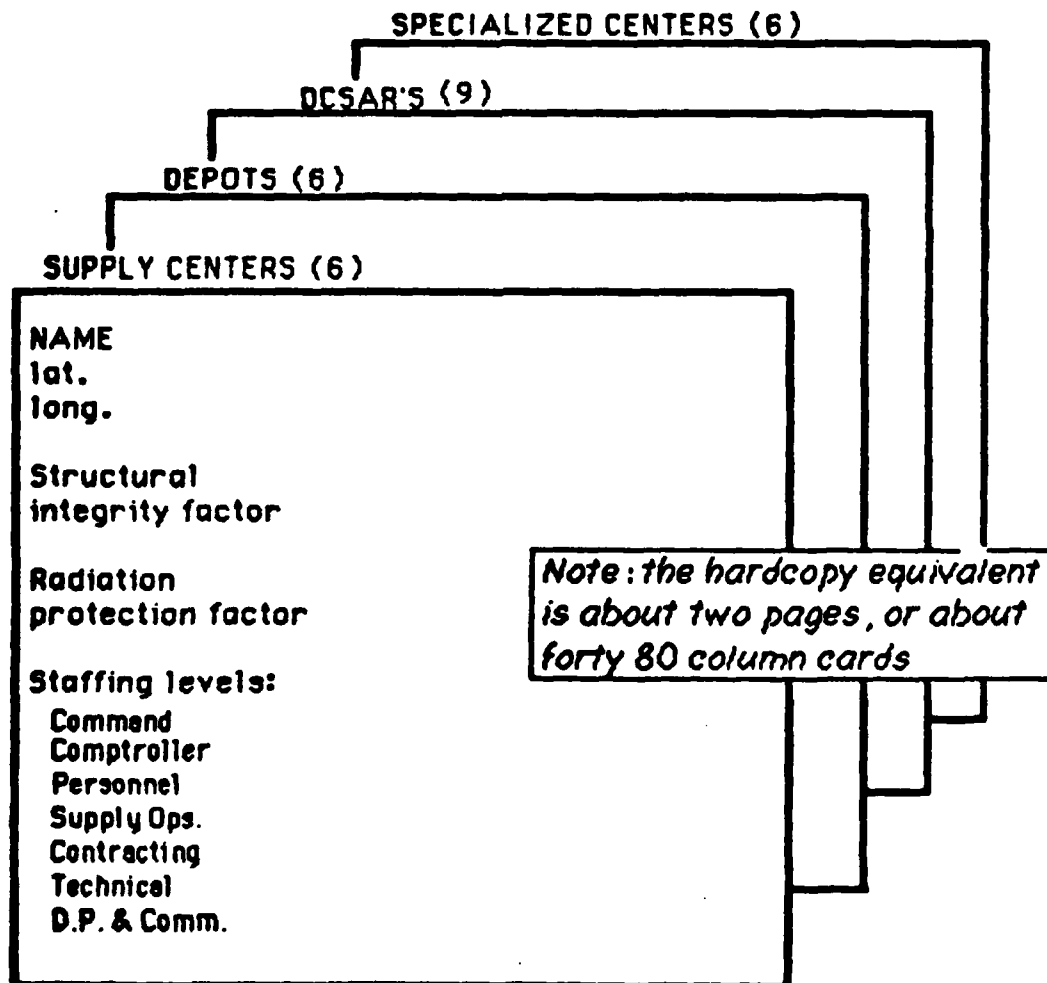
$\Sigma$  input data points (cells) =

$$[yield + \text{air/ground} + \text{lat.} + \text{long.}] \times j \times k = 4 \times 26 \times \text{avg.} < 4 = 416$$

## 2. WIND VECTORS = $f$ (compass direction, velocity)



## B. STORED DATA ARRAYS



Facility data points (cells) = 27 X ( rows = 12) = 324

# DEPOT INVENTORIES

PRODUCTS ( 1 = 40 )

GENERAL    ELECTRONICS    CONSTRUCTION    INDUSTRIAL    MEDICAL    PETROL    CLOTHING    FOOD

RICHMOND

TRACEY

OGDEN

others

SMCC'S (frequency(5), value (6) = 30

*Note: the hardcopy equivalent  
is about thirty pages of data,  
or about 900 eighty column cds.*

$\Sigma$  data pts. = [6 depots]  
[40 products][30 SMCC'S]  
= 7200

## C. OUTPUT INFORMATION

### 1. FACILITIES

SPECIALIZED CENTERS (6)

DCSAR'S (9)

DEPOTS (6)

SUPPLY CENTERS (6)

NAME

lat.

long.

TIME: day 1--wk 1, 2, 3, 4, mo. 1, 2, 3,

Structural  
integrity %

Radiation fields

outside r/hr

inside r/hr

Acumulative REM

Staffing levels:

Num.

Command

Comptroller

Personnel

Supply Ops.

Contracting

Technical

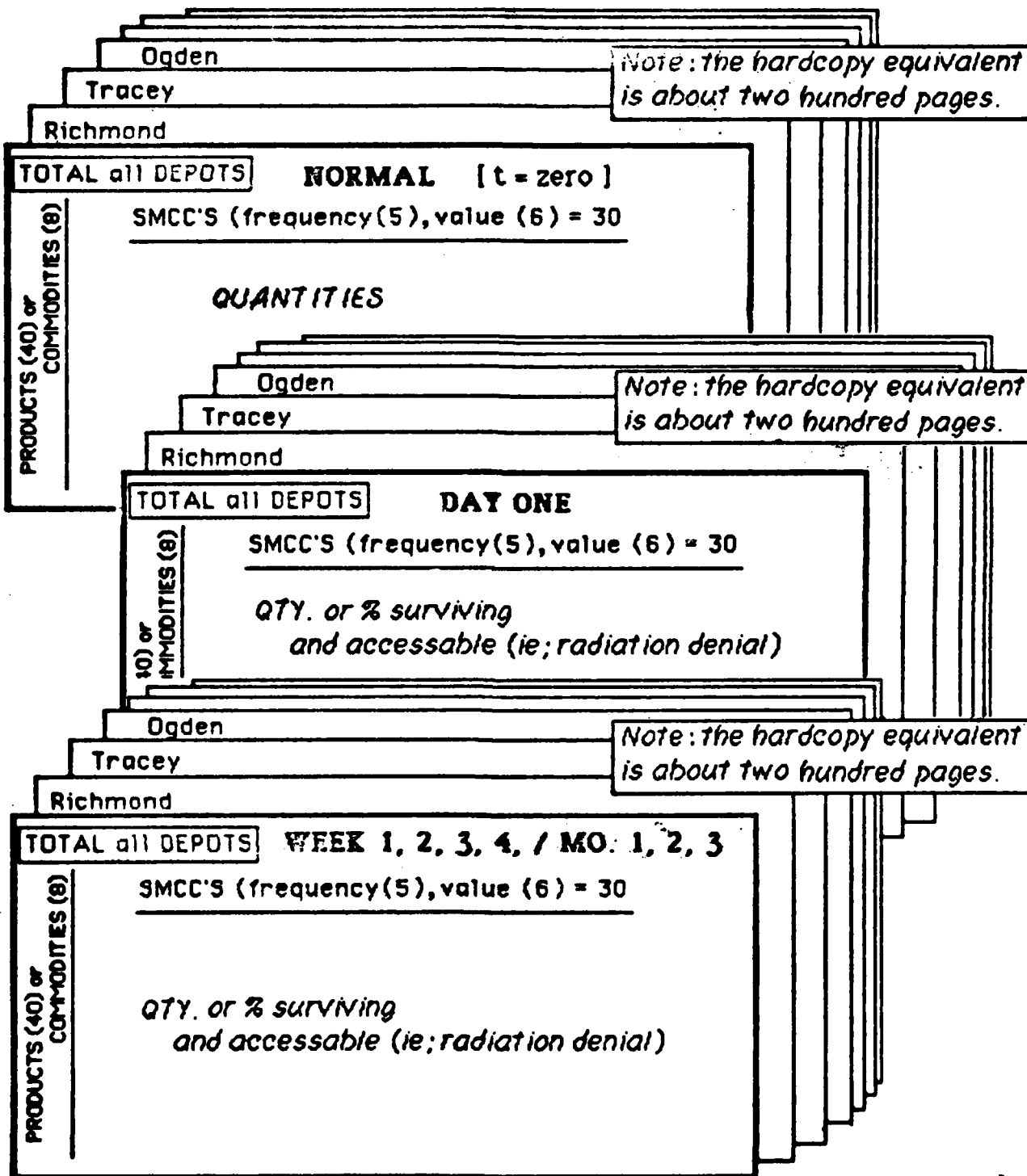
D.P. & Comm.

% Available  
for duty

*Note: the hardcopy equivalent  
is about twenty six pages.*

Facility data points (cells) = (27 facilities)(14 rows)(8 times) = 3024 pts.

## 2. INVENTORIES



Max. output data points = (7200)(9 time frames) = 64,800 pts.

**DI. TIME and COST ESTIMATES:****Computations:**

☐ The initial input of stored data arrays is equivalent to about 35 pages of data. A small volume.

☐ Initiating an attack pattern would be via a display screen format with minimal keyboard entry.

☐ The logical math transformations is by five functions. It could be formulated by matrix algebra or a "canned spreadsheet" program which will save appreciable coding and debugging time.

☐ Output would initially be by display screen--then selection for page printing. Quantities are easily handled by the office automation class equipment, but is beyond the capability of most P.C. class machines.

| <u>Identifiable Milestones:</u>                                            | <u>Estimated man - weeks</u> |                  |
|----------------------------------------------------------------------------|------------------------------|------------------|
|                                                                            | <u>[minimum]</u>             | <u>[maximum]</u> |
| 1. Initializing administrative actions.                                    | — 2 —                        | — 3 —            |
| 2. Formulate input procedures.                                             | — 3 —                        | — 5 —            |
| 3. Formulate logic--model.                                                 | — 5 —                        | — 9 —            |
| 4. Formulate output procedures.                                            | — 3 —                        | — 5 —            |
| 5. Formulation reviewed and approved.                                      | — 2 —                        | — 3 —            |
| 6. Computer and software available.<br>(Includes a machine learning curve) | — 2 —                        | — 4 —            |
| 7. Coding completed.                                                       | — 5 —                        | — 11 —           |
| 8. Testing completed.                                                      | — 3 —                        | — 9 —            |
| 9. Project completed.                                                      | — 1 —                        | — 3 —            |
| Est. man-weeks:                                                            | 26                           | 51               |

**Summary:**

**[DIRECT LABOR 9.4 m.m.] X [Rate \$ 3400 /O.R. m.m.]**

**X [1+ (125% Overhead)] = \$ 71,900**

**Appendix Y**

**August 2, 1985**

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**Appendix Y**

**INVENTORY DEPLETION**

**INVENTORY DEPLETION****MODEL**  **SYSTEM** **ESTIMATE**  **I. COMMENTS:** **Time Phased Force Deployment:**

An analytical system modeling the initial phases of a mobilization scenario, is required to account for the inventory depletion at the NSN item level. [IV.9]

**$\Sigma$  Importance Index = 3.5**

 **For inventory analysis the DLA system should produce two types of management or executive reports:**

♦ Set one would summarize the transactional data into product and commodity groups.

♦ Set two would be exception type reports identifying by NSN the most critical line items.

The first set of reports would be for strategic planning such as setting the dollar investment level for the war reserve stocks. *The data in these reports would be transferred into the DLA-LC system* The second set of reports would be for tactical planning such as ensuring the correct mix of items in inventory to support a mobilization effort. [IV.3]

**$\Sigma$  Importance Index = 3.4**

 **The policies that govern the war reserve investment level should be based directly on the deployment and mobilization contingency plans. Although at present, the services identify their War Reserve requirements, DLA should take an active role and compute what they consider to be the War Reserves for the items under their management. Considering the overall functioning of the Department of Defense, the logical and most efficient role for the services would be one of reviewing and approving DLA's inventory stocking plans. [IV.5]**

**$\Sigma$  Importance Index = 2.9**

**II. PRIMARY PROCESS:**

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| <b>A. THREAT -- DECISION / RISK</b> | <input type="checkbox"/>            |
| <b>B. DAMAGE ASSESSMENT</b>         | <input type="checkbox"/>            |
| <b>C. THRU-PUT CAPACITY</b>         | <input type="checkbox"/>            |
| <b>D. INVENTORY EMPLOYMENT</b>      | <input checked="" type="checkbox"/> |
| <b>E. INVENTORY REPLENISHMENT</b>   | <input type="checkbox"/>            |
| <b>F. THE NAT'L INDUSTRIAL BASE</b> | <input type="checkbox"/>            |
| <b>G. OTHER:</b>                    | <input type="checkbox"/>            |

**III. DOMINANT ♦ PROBLEM CHARACTERISTICS:**

|                                  |                                               |                                     |                                                      |                                     |
|----------------------------------|-----------------------------------------------|-------------------------------------|------------------------------------------------------|-------------------------------------|
| <b>TECHNOLOGICAL METHODOLOGY</b> | <b>ACCOUNTING METHODS</b>                     |                                     | <b>DATA PROCESSING</b>                               |                                     |
|                                  | MAX. DIMENSIONS 3 to 4<br>[limited options]   | <input checked="" type="checkbox"/> |                                                      |                                     |
|                                  | DETAILED ITEMS<br>[compare/contrast logic]    | <input type="checkbox"/>            |                                                      |                                     |
|                                  | Explicit "BOTTOM LINE"                        | <input type="checkbox"/>            |                                                      |                                     |
|                                  | <b>OPERATIONS RESEARCH</b>                    |                                     |                                                      |                                     |
|                                  | MULTI-DIMENSIONAL                             | <input type="checkbox"/>            | DETAIL TRANSACTION<br>PROCESSING<br>[sort / summary] | <input type="checkbox"/>            |
|                                  | OPTIMUM SOLUTIONS<br>[closed form]            | <input type="checkbox"/>            | SCIENTIFIC STATISTICAL<br>ANALYSIS                   | <input checked="" type="checkbox"/> |
|                                  | LIKELY OUTCOMES<br>probabilistic<br>heuristic | <input type="checkbox"/>            |                                                      |                                     |

**Operations Research Methodology:**

- |                                 |                                     |                               |                          |
|---------------------------------|-------------------------------------|-------------------------------|--------------------------|
| <b>Inventory Theory</b>         | <input checked="" type="checkbox"/> | <b>Decision/Risk analysis</b> | <input type="checkbox"/> |
| <b>Allocation Theory (L.P.)</b> | <input type="checkbox"/>            | <b>Game Theory</b>            | <input type="checkbox"/> |
| <b>Distribution analysis</b>    | <input type="checkbox"/>            | <b>Cybernetics</b>            | <input type="checkbox"/> |
| <b>Scheduling Theory</b>        | <input type="checkbox"/>            | <b>Probability/Statistics</b> | <input type="checkbox"/> |
| <b>Queueing Theory</b>          | <input type="checkbox"/>            | <b>Regression analyses</b>    | <input type="checkbox"/> |
| <b>Forecasting models</b>       | <input type="checkbox"/>            | <b>Simulations</b>            | <input type="checkbox"/> |
| <b>Industrial Dynamics</b>      | <input type="checkbox"/>            | <b>Other</b>                  | <input type="checkbox"/> |

## **III. DISCUSSION:**

### **Y - Inventory Depletion or draw-down model:**

- ◊. Model is similar to existing DORO's TFFDD model (ie, the Mobilization/OPLAN Requirements model).
- ◊. Need to add to TFFDD model data base fuel, subsistence, clothing and textiles. Also some recoding of the TFFDD model will be required due to differences in the data input formats.
- ◊. Output will be Supply Availability Projections. The reports will be by FSG, commodity, or product groupings, and by weeks over a period of three or four months
- ◊. Note: The current TFFDD model will be used to produce a list of specific NSNs with critical short falls.
- ◊. The Contingency System B model will be designed as an expected value model of inventory depletion. The input Mobilization or deployment demand rates will be obtained from model W. The model Y data base will be initialized by a "snapshot" of current inventory levels from DIDB.

Columns

Rows Y

DATA SETS:

REPORT SET # 1  
[stored arrays]

others

OGDEN

TRACEY

RICHMOND

SMCC'S (frequency(5), value (6) = 30

FOOD  
CLOTHING  
PETROL  
MEDICAL  
INDUSTRIAL  
CONSTRUCTION  
ELECTRONICS  
GENERAL

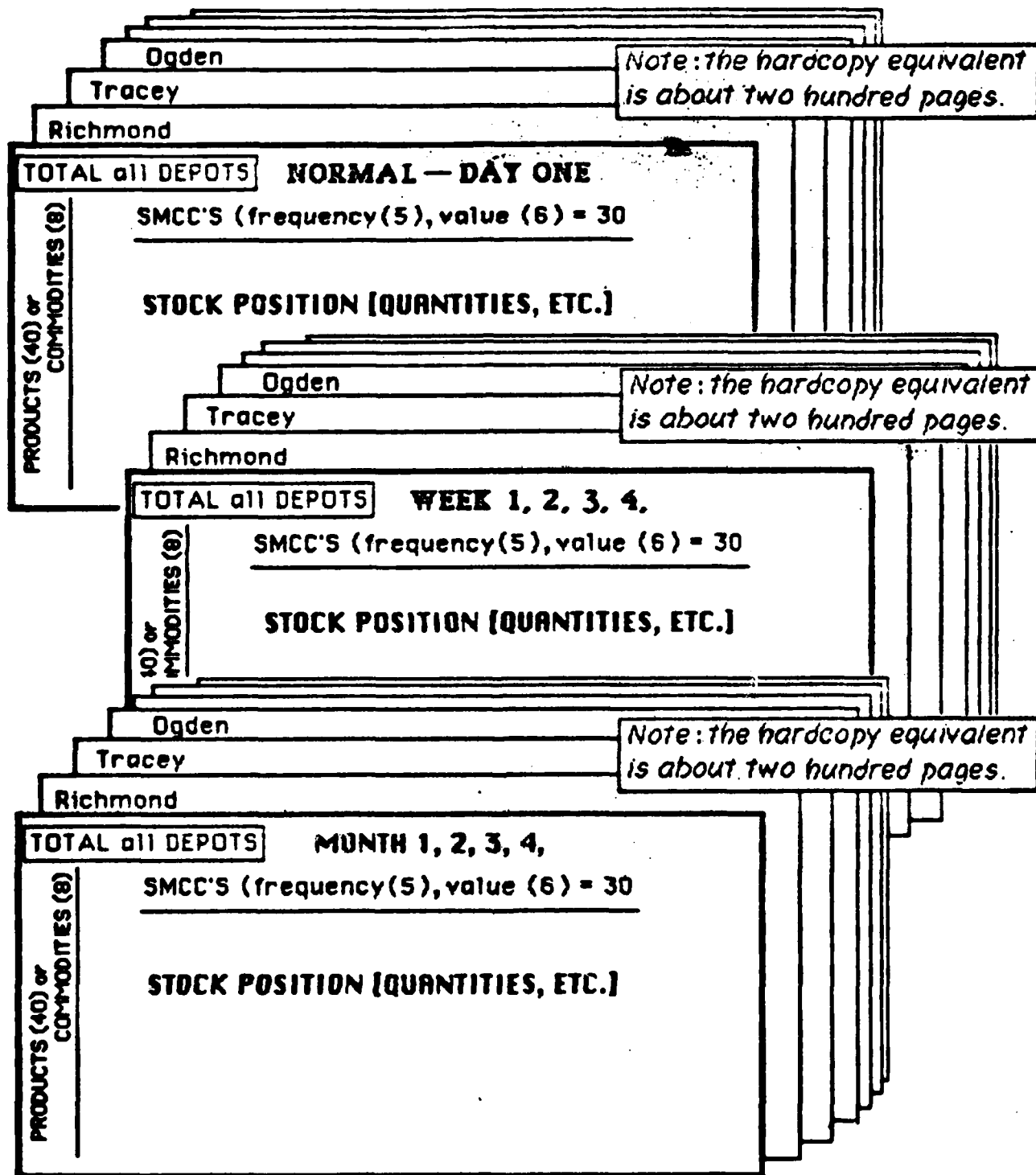
PRODUCTS (1 = 40)

*Note: the hardcopy equivalent  
is about thirty pages of data,  
or about 900 eighty column cds.*

$\Sigma$  data pts. = [6 depots]  
[40 products][30 SMCC'S]  
= 7200

**DATA SETS (continued):**

**OUTPUT REPORTS DATA SET # 1.**



Max. output data points = (7200)(9 time frames) = 64,800 pts.

**VI. TIME & COST ESTIMATES:****Computations:**

| <u>Identifiable Milestones:</u>                                                                                                          | <u>Estimated man - weeks</u> |                  |
|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------|
|                                                                                                                                          | <u>[minimum]</u>             | <u>[maximum]</u> |
| 1. Initializing administrative actions.                                                                                                  | — 1 —                        | — 3 —            |
| 2. Conduct data research and formulate.<br>input procedures for items not in<br>DIDB (ie. fuels, subsistence, C&T ) <sub>DORO est.</sub> | — 3 —                        | — 5 —            |
| 3. Formulate logic--model <sub>DORO est.</sub>                                                                                           | — 5 —                        | — 9 —            |
| 4. Formulate output procedures.                                                                                                          | — 2 —                        | — 3 —            |
| 5. Formulation reviewed and approved.                                                                                                    | — 1 —                        | — 3 —            |
| 6. Computer and software available.<br>(Includes a machine learning curve)                                                               | — 1 —                        | — 5 —            |
| 7. Coding completed.                                                                                                                     | — 4 —                        | — 7 —            |
| 8. Testing completed.                                                                                                                    | — 3 —                        | — 9 —            |
| 9. Project completed.                                                                                                                    | — 1 —                        | — 3 —            |
| Est. man-weeks:                                                                                                                          | 21                           | 47               |

**Summary:**

**[DIRECT LABOR 8.3 m.m.] N [ Rate: 3400 \$/O.R. m.m.]**

**N [1+ (125% Overhead)] = \$ 63,500**

**Appendix Z**

**INVENTORY REPLENISHMENT**

**INVENTORY REPLENISHMENT****MODEL ☒ SYSTEM ☐****ESTIMATE # 2****I. COMMENTS:**

**☐ DLA is a classic industrial logistics operation except for the critical War Reserve and mobilization requirements.**

The essential nature of large scale industrial logistics systems is that they operate most efficiently by basing operating decisions on internally generated data. In both theory and practice, the major operational decisions in industrial logistics are based on mathematically optimizing equations using internally generated data sets. DLA is no exception, it is organized and operates on this concept. SAMMS, the Standard Automated Material Management System, using exponential smoothing equations, "scientifically" calculates the Reorder Point (ROP) and Economic Order Quantities (EOQ) for any item in inventory. SAMMS accounts for and tracks the current inventory balances, signals when a replenishment action is required, and computes the correct quantity based on past performance. In theory, Item Managers in Supply Operations exist to provide for a line item override capability. Purchasing agents in procurement, specialists in Technical Operations, and the DCASR Organization, provide the systems interface with the national industrial base. This Z Estimate is to define a model concept of these essential components in the replenishment process.

**☐ "Dynamic programming" of the inventory replenishment process may be important in analyzing the later phases of a mobilization scenario. Specifically, a system is required to analyze the transition from the inventory depletion phase to a later, more stable phase where an expected value system could be used to analyze the probable level of future/normal operations. [IV.10]**

**☐ Because of the uncertainty of conditions in the latter stages of a mobilization, the primary data sets should only be at the commodity or product level of detail. Attempting to analyze the situation at a greater level of detail would only confuse precision with accuracy.**

---

 **$\Sigma$  Importance Index = 3.2**

---

**II. PRIMARY PROCESS:**

- |                                     |                                     |
|-------------------------------------|-------------------------------------|
| <b>A. THREAT -- DECISION / RISK</b> | <input type="checkbox"/>            |
| <b>B. DAMAGE ASSESSMENT</b>         | <input type="checkbox"/>            |
| <b>C. THRU-PUT CAPACITY</b>         | <input type="checkbox"/>            |
| <b>D. INVENTORY EMPLOYMENT</b>      | <input type="checkbox"/>            |
| <b>E. INVENTORY REPLENISHMENT</b>   | <input checked="" type="checkbox"/> |
| <b>F. THE NAT'L INDUSTRIAL BASE</b> | <input checked="" type="checkbox"/> |
| <b>G. OTHER:</b>                    | <input type="checkbox"/>            |

**III. DOMINANT PROBLEM CHARACTERISTICS:**

|                                  |                                                                                                            |  |
|----------------------------------|------------------------------------------------------------------------------------------------------------|--|
| <b>ACCOUNTING METHODS</b>        |                                                                                                            |  |
| <b>TECHNOLOGICAL METHODOLOGY</b> | MAX. DIMENSIONS 3 to 4<br>[limited options] <input type="checkbox"/>                                       |  |
|                                  | DETAILED ITEMS<br>[compare/contrast logic] <input type="checkbox"/>                                        |  |
|                                  | Explicit "BOTTOM LINE" <input type="checkbox"/>                                                            |  |
|                                  | <b>OPERATIONS RESEARCH</b>                                                                                 |  |
|                                  | MULTI-DIMENSIONAL <input checked="" type="checkbox"/>                                                      |  |
|                                  | OPTIMUM SOLUTIONS<br>[closed form] <input type="checkbox"/>                                                |  |
|                                  | LIKELY OUTCOMES<br>probabilistic <input checked="" type="checkbox"/><br>heuristic <input type="checkbox"/> |  |
| <b>DATA PROCESSING</b>           |                                                                                                            |  |
|                                  | DETAIL TRANSACTION<br>PROCESSING <input type="checkbox"/><br>[sort / summary]                              |  |
|                                  | SCIENTIFIC STATISTICAL<br>ANALYSIS <input type="checkbox"/>                                                |  |

**OPERATIONS RESEARCH METHODOLOGY:**

- |                                 |                                     |                               |                          |
|---------------------------------|-------------------------------------|-------------------------------|--------------------------|
| <b>Inventory Theory</b>         | <input type="checkbox"/>            | <b>Decision/Risk analysis</b> | <input type="checkbox"/> |
| <b>Allocation Theory (L.P.)</b> | <input type="checkbox"/>            | <b>Game Theory</b>            | <input type="checkbox"/> |
| <b>Distribution analysis</b>    | <input type="checkbox"/>            | <b>Cybernetics</b>            | <input type="checkbox"/> |
| <b>Scheduling Theory</b>        | <input type="checkbox"/>            | <b>Probability/Statistics</b> | <input type="checkbox"/> |
| <b>Queueing Theory</b>          | <input type="checkbox"/>            | <b>Regression analyses</b>    | <input type="checkbox"/> |
| <b>Forecasting models</b>       | <input type="checkbox"/>            | <b>Simulations</b>            | <input type="checkbox"/> |
| <b>Industrial Dynamics</b>      | <input checked="" type="checkbox"/> | <b>Other</b>                  | <input type="checkbox"/> |

**D. DISCUSSION<sup>15</sup>:**

1. Output of the models should be supply availability by Federal Stock Group, commodity, or similar summary level data, in monthly increments for 12 to 18 periods.

2. This Z model is for long term projections of inventory replenishment. To achieve this it must also include:

- a. PLFA mobilization work load projections.
- b. PLFA capacity factors as a function of time.

3. The initializing FSG demand estimates will come from Model W.

4. Model Z will need to:

- a. Convert the demand to workload factors for the PLFA's.
- b. Measure depot capacity in MRO's or thruput tons.
- b. Measure DSCARs by contracts processed.

5. Model hardware supply centers by a modified USIMS. To complete the modeling of DLA's supply operations sumodels will also have to be written for fuels, subsistence, and clothing and textiles.

6. A Depot model will have to be written.

7. A DSCAR model will have to be written.

8. A model of the national industrial base will have to be constructed. This model will probably be a data matrix of information obtained from the Dept of Commerce's Lieontief Input/output matrix.

---

**FOOTNOTE 15:** The inventory replenishment model Z is by far the most logically complex of the models because it is essentially an analytical representation of the primary mission of DLA. Technologically it can only be accomplished by excluding all noncontributory modeling techniques. Specifically:

a. The model will compute only expected values. The probabilistic future will be obtained by using the model for parametric analyses to compute a range of possible outcomes.

b. The data tables representing THE DLA inventories will be measured or classified by commodities or products never by NSNs.

c. Monte Carlo procedures would will not be used.

Rows Columns  
 2

DATA SETS:

others

OGDEN

TRACEY

RICHMOND

SMCC'S (frequency(5), value (6) = 30

PRODUCTS (1 = 40)

GENERAL ELECTRONICS CONSTRUCTION INDUSTRIAL MEDICAL PETROL CLOTHING FOOD

Note: the hardcopy equivalent is about thirty pages of data, or about 900 eighty column cds.

$\Sigma$  data pts. = [6 depots]  
 [40 products][30 SMCC'S]  
 = 7200

Columns  
Rows **2**

**DATA SETS (Continued):**

**OUTPUT**

**INFORMATION:**

SPECIALIZED CENTERS (6)

DCSAR'S (9)

DEPOTS (6)

SUPPLY CENTERS (6)

NAME

lat.

long.

**Capacity Indices**

Month: 1, 2, 3, .....18.

**FACTORS:**

Facility data points (cells) =

(27 facilities)(14 rows)(8 times) = 3024 data points

*Note: the hardcopy equivalent  
is about twenty six pages.*

Ogden

Tracey

Richmond

*Note: the hard copy equivalent  
is about twenty pages.*

**TOTAL all DEPOTS**

MONTH: 1, 2, 3, .....18.

PRODUCTS (40) or  
COMMODITIES (8)

**INVENTORY POSITION**

SMCC'S (frequency(5), value (6) = 30

AD-A166 482

THE CONCEPTUAL DESIGN OF AN AUTOMATED  
MOBILIZATION/MANAGEMENT INFORMATION SYSTEM(U) DEFENSE  
LOGISTICS AGENCY ALEXANDRIA VA J H NEBLETT SEP 85

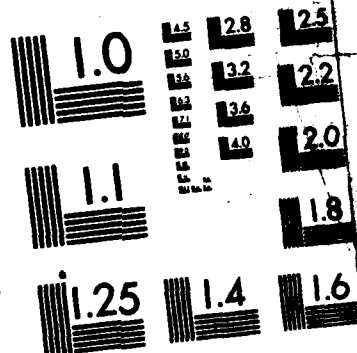
2/2

UNCLASSIFIED

F/G 15/5

NL





MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS-1963-A

**DI. TIME & COST ESTIMATES:****Computations:**

| <u>Identifiable Milestones</u> <sup>16</sup> .            | <u>Est. man-wks</u>           |
|-----------------------------------------------------------|-------------------------------|
| 1. Initializing administrative actions.                   | 3.0                           |
| 2. Formulate input procedures.                            | 7.0                           |
| 3. Formulate logic--models <small>DORO estimates.</small> |                               |
| Modify USIMS for hardware ct'rs.                          | 8.2                           |
| Write fuels model.                                        | 12.3                          |
| Write subsistence model.                                  | 12.3                          |
| Write clothing & m textiles model.                        | 12.3                          |
| Write depot model.                                        | 16.4                          |
| Write DCASR model.                                        | 24.6                          |
| Write Industrial base model <small>JN estimate.</small>   | 28.9                          |
| 4. Formulate output procedures.                           | 6.0                           |
| 5. Formulation reviewed and approved.                     | 4.0                           |
| 6. Computer and software available.                       | 7.0                           |
| (Includes a machine learning curve)                       |                               |
| 7. Coding completed.                                      | 18.0                          |
| 8. Testing completed.                                     | 9.0                           |
| 9. Project completed.                                     | 3.0                           |
|                                                           | <u>total man-weeks: 172.0</u> |

**Summary:**

**DIRECT LABOR 42.0 m.m.] H [ Rate: 3400 \$/O.R. m.m.]**

**H [1+ (125% Overhead)] = \$ 321,300**

**FOOTNOTE # 16:** This Z set would be the last models for the system; therefore, the development time estimates could be appreciably greater than the values listed.

END

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