STRUCTURED ANALYSIS/DESIGN

LSA TASK 402

EARLY FIELDING ANALYSIS

SUBTASK 402.2.3

IMPACT OF RESOURCE SHORTFALLS

APJ 966-260

APJ

MILITARY & SCIENTIFIC RESEARCH

AMERICAN POWER JET CO. RIDGEFIELD N.J.

CURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b. RESTRICTIVE MARKINGS
a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION / AVAILABILITY OF REPORT
b. DECLASSIFICATION / DOWNGRADING SCHEDULE	UNLIMITED
PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S)
a. NAME OF PERFORMING ORGANIZATION AMCCOM, Army	6b. OFFICE SYMBOL (If applicable) AMSMC-MAE-EA
7a. NAME OF MONITORING ORGANIZATION	
c. ADDRESS (City, State, and ZIP Code) Rock Island Arsenal Rock Island, IL 61299-6000	7b. ADDRESS (City, State, and ZIP Code)
a. NAME OF FUNDING / SPONSORING ORGANIZATION	8b. OFFICE SYMBOL (If applicable)
9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER	
c. ADDRESS (City, State, and ZIP Code)	10. SOURCE OF FUNDING NUMBERS

PROGRAM ELEMENT NO.	PROJECT NO.	TASK NO.	WORK UNIT ACCESSION NO.

1. TITLE (Include Security Classification) Structured Analysis and Structured Design for the Logistic Support Analysis (LSA) Tasks, LSA Subtask 402.2.3, "Impact of Resource Shortfalls", (APJ 966-260).

2. PERSONAL AUTHOR(S)
DUCLOS, RONALD SHEPHERD, NED kmk

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
FINAL	FROM _____ TO _____	Jan 1990	62

6. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB-GROUP	STRUCTURED ANALYSIS, STRUCTURED DESIGN, LOGISTIC SUPPORT ANALYSIS, LSA, DATA FLOW DIAGRAMS, DFDs, PROCESSES, DATA FLOWS, DATA STORES, EXTERNAL over

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

This report consolidates the Structured Analysis and Structured Design for the Logistic Support Analysis (LSA) Tasks. Included are the Data Flow Diagrams (DFDs) for the LSA Subtask 402.2.3, "Impact of Resource Shortfalls", with the corresponding descriptions of the processes, data flows, data stores, and external entities identified on each DFD. The DFDs are further developed into procedures which identifies how to use the data to carry out the processes and accomplish the LSA Subtask. Venture Evaluation Review Technique (VERT) Batch Input files are also provided to assist, as tools, giving both technical and managerial aspects of a task.

20. DISTRIBUTION / AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	UNCLASSIFIED

22a. NAME OF RESPONSIBLE INDIVIDUAL	22b TELEPHONE (Include Area Code)	22c. OFFICE SYMBOL
ED SHEPHERD	(309) 782-2479	AMSMC-MAE-EA

D Form 1473, JUN 86 *Previous editions are obsolete.* SECURITY CLASSIFICATION OF THIS PAGE

APJ 966-260

STRUCTURED ANALYSIS/DESIGN

LSA TASK 402

EARLY FIELDING ANALYSIS

SUBTASK 402.2.3

IMPACT OF RESOURCE SHORTFALLS

under

CONTRACT DAAA21-86-D-0025

for

HQ US AMCCOM

INTEGRATED LOGISTIC SUPPORT OFFICE
AMSMC-LSP
ROCK ISLAND, IL

by

AMERICAN POWER JET COMPANY

RIDGEFIELD, NJ — FALLS CHURCH, VA

FT. EUSTIS, VA — ST. LOUIS, MO

January 1990

FOREWORD

APJ, under contract to HQs, AMCCOM, has initiated the automation of the LSA Tasks (MIL-STD-1388-1) and the assessment of the ILS elements (AR 700-127). A major goal is to unify military and contractor approach to the performance of ILS and LSA.

Detailed to meet all requirements of ILS and LSA, the automated process will continue to provide the flexibility in selecting tasks and elements to be addressed at each life cycle stage. A major advantage of this approach is to insure that the application of each task element is consistent with prescribed Army policies and procedures.

This report consolidates the Structured Analysis and Structured Design under one cover for the respective LSA Task. Structured Analysis provides a logical model of the method to perform an LSA Task. This logical model facilitates the development of a Structured Design that provides the detailed procedures to perform the analysis. Both the logical model and detailed procedures are used to develop the application software programs which will be provided to Government and contractor personnel to assist in the performance of the LSA Task.

Included in this report are the Data Flow Diagrams (DFDs) for LSA Subtask 402.2.3, "Impact of Resource Shortfalls" and the corresponding descriptions of the processes, data flows, data stores, and external entities identified on each DFD (Annex B). In addition the DFDs are further developed into step by step procedures (Annex C) which identifies how to use the data to carry out the processes which ultimately leads to accomplishing the LSA Subtask.

To assist managers in planning and controlling this task, Venture Evaluation Review Technique (VERT) Batch Input files are provided (Annex D). These VERT tools provide government agencies with complete packages to give contractors that cover both technical and managerial aspects of a task. This approach establishes a standardized form of communication and management between contractors performing the task and government personnel reviewing the task.

To view this work in context, this report also presents a brief overview of Structured Analysis and its place in the overall systems development process. Additionally, Annex E provides a brief working description of Structured Systems Analysis fundamentals. The overview and certain portions of the introductory text are repeated verbatim in every report in this series so that each report is free standing.

TABLE OF CONTENTS

LIST OF FIGURES

INTRODUCTION

PURPOSE

The purpose of this report series is to present the results of the APJ Structured Analysis/Design under Contract DAAA21-86-D-0025 for coordination with the AMCCOM Program Manager prior to in-depth programming of ILS and LSA functions and processes. LSA Task 402 "Early Fielding Alternatives", ("LSA Subtask 402.2.3, "Impact of Resource Shortfalls") is addressed in this report.

BACKGROUND

The Department of the Army has a requirement for management control over contractor and Government agency response to the requirements of AR 700-127, "Integrated Logistic Support", and MIL-STD-1388-1, "Logistic Support Analysis". HQs AMCCOM has initiated action to structure each of the LSA tasks, the assessment of each ILS element, the form of the results, and the detailed processes to insure consistency with current Army policies, procedures, and techniques.

This approach (undertaken by AMCCOM and APJ) will insure uniformity in efforts and products, reproducibility of analyses, and a well-defined structure which can be coordinated among all participants in the logistic process to arrive at common understanding and procedures.

SCOPE

This report summarizes the results of the Structured Analysis of the identification of LSA Task 402 "Early Fielding Alternatives", LSA Subtask 402.2.3, "Impact of Resource Shortfalls", and presents the associated Data Flow Diagrams (DFDs) developed from the Structured Analysis and the corresponding procedures developed in the Structured Design. The portions of the Data Dictionary relating to the DFDs for this LSA Subtask includes the labels, names, descriptions, processes, data flows, data stores, and external entities. (The Data Dictionary is a "living document" that evolves through the analysis and design process).

The Data Dictionaries developed for each of the individual LSA Subtasks are integrated together into a Master Data Dictionary. Integration of the individual Data Dictionary involves the combination of simular Data Flows, Data Stores, and External Entities. The resulting Master Data Dictionary may well contain some minor differences from the definitions that appear in this report. All processes, and of course, the content of the structured design will remain identical.

The Structured Design portion of this report develops the processes and data flows developed in the DFDs into procedures which are used to accomplish the LSA Tasks. The DFDs provide the method and the Design implements it, by formulating a guide for programmers to write software applications.

This report presents a brief overview of Structured Analysis and its place in the overall systems design process to assist the reader who may not be fully briefed on the symbols and conventions used. It is supported by Annex E, which defines each element in Structured Analysis.

LSA SUBTASK 402.2.3 - Description

The "Impact of Resource Shortfalls" involves the introduction of a new or the replacement/supplement of an existing systems/equipment. This subtask identifies the resources required to implement each, examines new requirements against existing requirements and determines any resource shortfalls that result. It also provides for the determination of the shortfall impacts on the 'readiness of the system/equipment under consideration.

This task provides the processes and methods required to develop and extract the data and information needed - including the testing requirements and source data used to develop documents for use in the field.

The LSA Task Description with associated task inputs and outputs is extracted from MIL-STD-1388-1A and is included as Annex A.

APPROACH

The APJ approach to Structured Analysis and Structure Design of an LSA Subtask is:

1. Scope the Subtask defined in MIL-STD-1388-1A with the overall task and determine its relationship with other LSA Tasks.

2. Review all pertinent documentation (e.g., AR's, MIL-STDs, etc.) applicable to the specific topic.

3. Prepare the Top Level DFDs in context of the Subtask, and develop lower level DFDs to further quantity any complex process identified in the top level DFD.

4. Complete the Data Dictionary portion of the Analysis by descripting all processes, data flows, data stores and external entities.

5. Apply staff experience in logistic support analysis to assure that the topic has been exhaustively addressed.

6. From the completed DFDs prepare the step by step procedures that form the structured design.

7. Review Data Item Description and other applicable material to develop output reports.

8. If required revise DFDs and Data Dictionary based on preparation of detailed procedures.

9. Validate results in discussions with Army activities and personnel directly involved in the applicable or related LSA tasks.

NOTE: Structured Analysis and preparation of Data Flow Diagrams (DFDs) was further assisted by the application of Structured Analysis software. Licensed by Index Technology Corporation, Excelerator provides for automated tracking of names, labels, descriptions, multiple levels of detail in the data flow diagrams, and industry standards in symbols and diagramming practices.

LSA SUBTASK 402.2.3 - Impact of Resource Shortfalls

The Data Flow Diagram is a tool that shows the flow of data, (i.e., data flows from sources) and is processed by activities to produce intermediate or final products.

The DFD provides a useful and meaningful partitioning of a system from the viewpoint of identification and separation of all functions, actions, or processes so that each can be introduced, changed, added, or deleted with minimal disruption of the overall program, i.e., it emphasizes the underlying concept of modularity and identifiable transformations of data into actionable products.

A series of three (3) DFDs have been developed to structure the LSA subtask relative to operations and other support functions:

1. 402.2.3 Impact of Resource Shortfalls
2. 402.2.3.2A Logistics Resources Required to Field System
3. 402.2.3.3A Logistics Resources Available from Fielded System

Each DFD is keyed to the specific task through the identification number assigned in the lower right hand box. The Alpha codes indicate the level of indenture or explosion below the top level, i.e.,:

Top Level.....LSA DFD 402.2.3.2
First Indenture.....LSA DFD 402.2.3.2A

Each DFD makes reference to the basic LSA task it addresses, as well as the level of indenture (explosion) of the DFD. For example, the first or top level DFD, "402.2.3", refers to the section in MIL-STD-1388-1A which describes the review items. One of the processes (bubbles) on the top level diagram (402.2.3.2) is expanded and identified as "402.2.3.2A", a second level of "402.2.3.2" (Alpha "A" indicates the second level).

Four standard symbols are used in the drawing of a DFD (see Annex E - Figure 1).

A copy of each DFD is presented in Annex B, accompanied by the Data Dictionary process elements. Each entry made in the DFDs has a corresponding entry in the Data Dictionary.

This presents only those Data Dictionary entries necessary for the coordination of the overall concept and details of the processes. To facilitate review of the diagrams, data flow identifications, process, an data store descriptions are provided.

As noted above, they will continue to evolve and be expanded in the System Design phase.

VERT DIAGRAMS

The Venture Evaluation Review Technique (VERT) was developed as a network analysis technique to facilitate management decision making. It allows systematic planning and control of programs and enables managers to find solutions to real life managerial problems. The VERT Diagrams and Input Files for this task can be found in Annex D. In order to understand how these Input Files were developed, a brief discussion of the methodology used is provided. The same explanation is repeated verbatim in every report.

ANNEX A

—

LSA TASK 402
EARLY FIELDING ANALYSIS

ANNEX A
LSA TASK 402
EARLY FIELDING ALTERNATIVES 1/

402.1 PURPOSE. To assess the impact of introduction of the new system/equipment on existing systems, identify sources of manpower and personnel to meet the requirements of the new system/equipment, determine the impact of failure to obtain the necessary logistic support resources for the new system/equipment, and determine essential logistic support resource requirements for a combat environment.

402.2 TASK DESCRIPTION

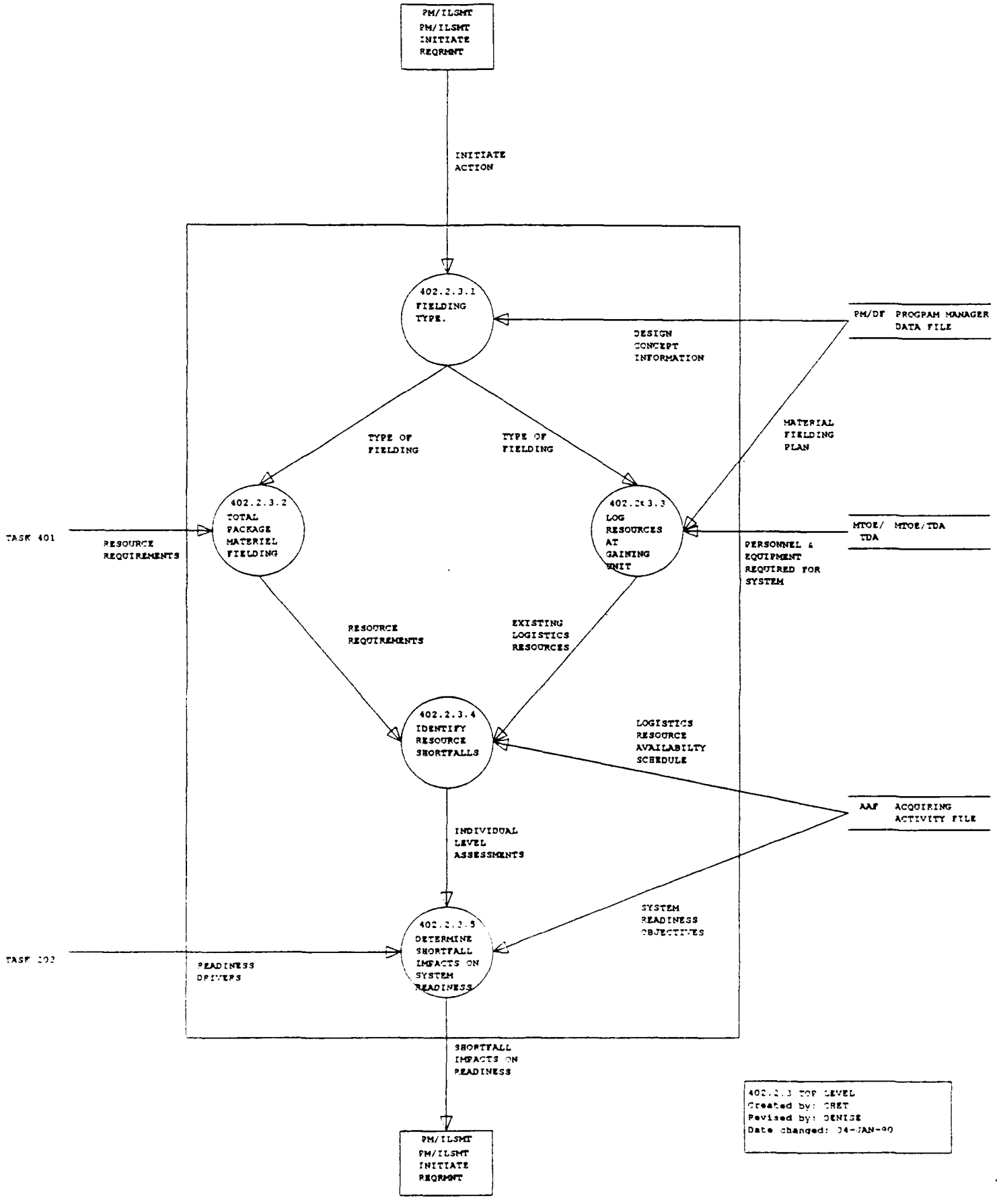
402.2.3 Assess the impact on system/equipment readiness resulting from failure to obtain the required logistic support resources in the quantities required. Do not duplicate analyses performed under Task 303.

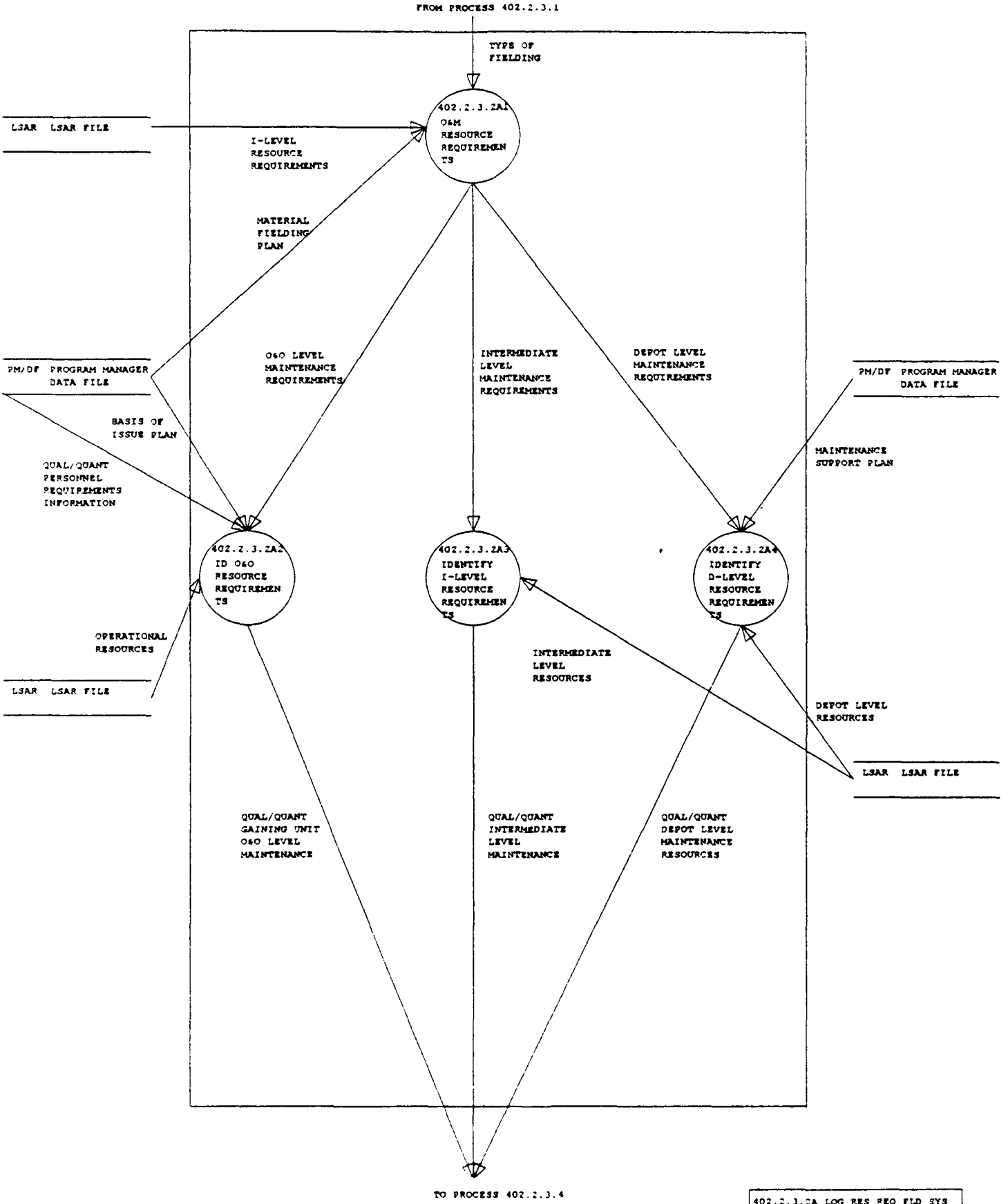
1/ Abstracted verbatim from MIL-STD-1388-1A, April 11, 1983, Page 45.

ANNEX B

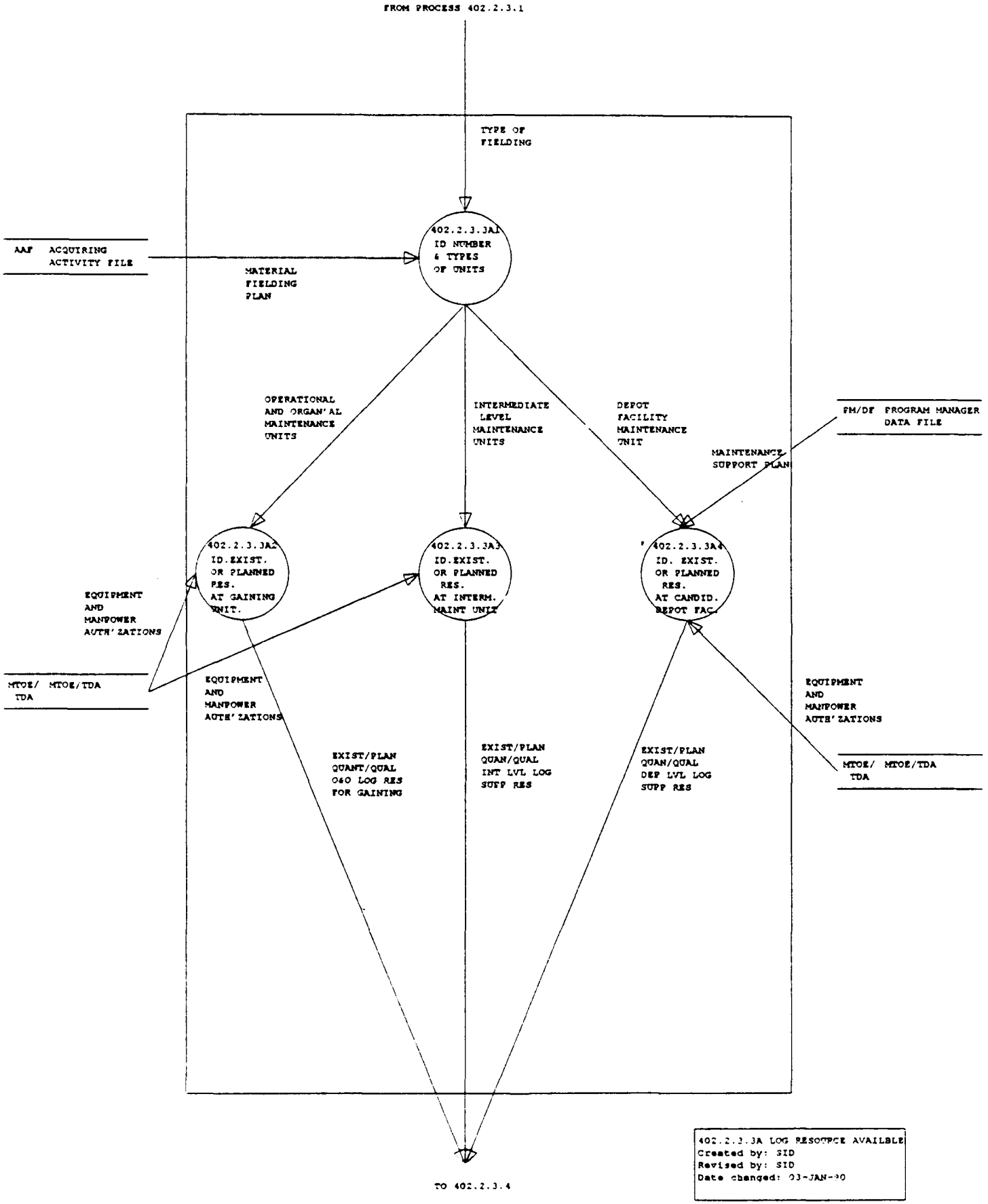
—

SUBTASK 402.2.3
IMPACT OF RESOURCE SHORTFALLS, DATA FLOW DIAGRAMS AND PROCESS DATA DICTIONARY


PM/ILSMT
PM/ILSMT
INITIATE
REQRMNT
INITIATE
ACTION
402.2.3.1
FIELDING
TYPE.
PM/DF PROGRAM MANAGER
DATA FILE
DESIGN
CONCEPT
INFORMATION
MATERIAL
FIELDING
PLAN
TYPE OF
FIELDING
TYPE OF
FIELDING
TASK 401
RESOURCE
REQUIREMENTS
402.2.3.2
TOTAL
PACKAGE
MATERIEL
FIELDING
402.2.3.3
LOG
RESOURCES
AT
GAINING
UNIT
MTOE/
TDA
MTOE/TDA
PERSONNEL &
EQUIPMENT
REQUIRED FOR
SYSTEM
RESOURCE
REQUIREMENTS
EXISTING
LOGISTICS
RESOURCES
402.2.3.4
IDENTIFY
RESOURCE
SHORTFALLS
LOGISTICS
RESOURCE
AVAILABILITY
SCHEDULE
AAF ACQUIRING
ACTIVITY FILE
INDIVIDUAL
LEVEL
ASSESSMENTS
SYSTEM
READINESS
OBJECTIVES
TASK 202
READINESS
DRIVERS
402.2.3.5
DETERMINE
SHORTFALL
IMPACTS ON
SYSTEM
READINESS
SHORTFALL
IMPACTS ON
READINESS
PM/ILSMT
PM/ILSMT
INITIATE
REQRMNT
402.2.3 TOP LEVEL
Created by: CRET
Revised by: DENISE
Date changed: 04-JAN-90



402.2.3.2A LOG RES REQ FLD SYS
Created by: CHET
Revised by: GID
Date changed: 03-JAN-90


FROM PROCESS 402.2.3.1
TYPE OF FIELDING
402.2.3.3A1 ID NUMBER & TYPES OF UNITS
AAF ACQUIRING ACTIVITY FILE
MATERIAL FIELDING PLAN
OPERATIONAL AND ORGAN'AL MAINTENANCE UNITS
INTERMEDIATE LEVEL MAINTENANCE UNITS
DEPOT FACILITY MAINTENANCE UNIT
FM/DF PROGRAM MANAGER DATA FILE
MAINTENANCE SUPPORT PLAN
402.2.3.3A2 ID.EXIST. OR PLANNED RES. AT GAINING UNIT.
402.2.3.3A3 ID.EXIST. OR PLANNED RES. AT INTERM. MAINT UNIT
402.2.3.3A4 ID. EXIST. OR PLANNED RES. AT CANDID. DEPOT FAC.
EQUIPMENT AND MANPOWER AUTH'ZATIONS
MTOE/ TDA
MTOE/TDA
EQUIPMENT AND MANPOWER AUTH'ZATIONS
EQUIPMENT AND MANPOWER AUTH'ZATIONS
MTOE/ TDA
MTOE/TDA
EXIST/PLAN QUANT/QUAL O&O LOG RES FOR GAINING
EXIST/PLAN QUAN/QUAL INT LVL LOG SUPP RES
EXIST/PLAN QUAN/QUAL DEP LVL LOG SUPP RES
TO 402.2.3.4
402.2.3.3A LOG RESOURCE AVAILBLE
Created by: SID
Revised by: SID
Date changed: 03-JAN-90

	Name	Label	Description
	402.2.3.1	FIELDING TYPE.	THIS PROCESS DETERMINES THE PURPOSE OF INTRODUCING THE NEW SYSTEM (IE. WHETHER OR NOT IT IS A REPLACEMENT OF THE EXISTING ONE OR IS A NEW CAPABILITY).
	402.2.3.2	TOTAL PACKAGE MATERIEL FIELDING	THIS PROCESS DETERMINES THE SYSTEM/EQUIPMENT OPERATIONAL AND MAINTENANCE RESOURCES REQUIRED AT THE ORGANIZATIONAL, INTERMEDIATE, AND DEPOT LEVEL FOR THE NEW SYSTEM/EQUIPMENT.
	402.2.3.2A1	O&M RESOURCE REQUIREMEN TS	THIS PROCESS GATHERS LSAR AND MATERIEL FIELDING PLAN LOGISTIC SUPPORT AND OPERATIONAL DATA FOR O, I & D LEVELS RELATING TO THE NEW SYSTEM/EQUIPMENT.
	402.2.3.2A2	ID O&O RESOURCE REQUIREMEN TS	THIS PROCESS IDENTIFIES QUALITATIVE/QUANTITATIVE ORGANIZATIONAL & OPERATIONAL LOGISTIC SUPPORT REQUIREMENTS FOR EACH AFFECTED ILS ELEMENT IN THE NEW SYSTEM/EQUIPMENT.
	402.2.3.2A3	IDENTIFY I-LEVEL RESOURCE REQUIREMEN TS	THIS PROCESS IDENTIFIES QUALITITATIVE/QUANTITATIVE INTERMEDIATE LOGISTIC SUPPORT REQUIREMENTS FOR EACH AFFECTED ILS ELEMENT IN THE NEW SYSTEM/EQUIPMENT.
	402.2.3.2A4	IDENTIFY D-LEVEL RESOURCE REQUIREMEN TS	THIS PROCESS IDENTIFIES QUALITITATIVE/QUANTITATIVE DEPOT LOGISTIC SUPPORT REQUIREMENTS FOR EACH AFFECTED ILS ELEMENT IN THE NEW SYSTEM/EQUIPMENT.
	402.2.3.3	LOG RESOURCES AT GAINING UNIT	THIS PROCESS ESTABLISHES THE NUMBER AND TYPES OF LOGISTICS RESOURCES AT THE GAINING UNIT TO SUPPORT ITS OPERATIONAL AND MAINTENANCE REQUIREMENTS.
	402.2.3.3A1	ID NUMBER & TYPES OF UNITS	THIS PROCESS GATHERS QUALITATIVE/QUANTITATIVE O, I & D LEVEL LOGISTIC SUPPORT AND ORGANIZATIONAL RESOURCE REQUIREMENTS DATA FROM THE MATERIEL FIELDING PLAN IN THE EXISTING/PLANNED SYSTEM/EQUIPMENT.
	402.2.3.3A2	ID.EXIST. OR PLANNED RES. AT GAINING UNIT.	THIS PROCESS IDENTIFIES AVAILABLE QUALITATIVE/QUANTITATIVE OPERATIONAL AND ORGANIZATIONAL LOGISTIC SUPPORT REQUIREMENTS FOR EACH AFFECTED ILS ELEMENT IN THE EXISTING/PLANNED SYSTEM/EQUIPMENT.
	402.2.3.3A3	ID.EXIST. OR PLANNED RES. AT INTERM. MAINT UNIT	THIS PROCESS IDENTIFIES AVAILABLE QUALITATIVE/QUANTITATIVE INTERMEDIATE LOGISTIC SUPPORT REQUIREMENTS FOR EACH AFFECTED ILS ELEMENT IN THE EXISTING/PLANNED SYSTEM/EQUIPMENT.

Name	Label	Description
402.2.3.3A4	ID. EXIST. OR PLANNED RES. AT CANDID. DEPOT FAC.	THIS PROCESS IDENTIFIES AVAILABLE QUALITATIVE/QUANTITATIVE DEPOT LOGISTIC SUPPORT REQUIREMENTS FOR EACH AFFECTED ILS ELEMENT IN THE EXISTING PLANNED SYSTEM/EQUIPMENT.
402.2.3.4	IDENTIFY RESOURCE SHORTFALLS	THIS PROCESS IDENTIES LOGISTIC SUPPORT RESOURCE SHORTFALLS AT THE O, I AND D LEVELS BY COMPARING NEW TO EXISTING DATA FOR EACH RESOURCE TYPE/ILS ELEMENT AND ENTERING THE DIFFERENCES ON THE "DETERMINATION OF R.ESOURCE SHORTFALLS" FORM.
402.2.3.5	DETERMINE SHORTFALL IMPACTS ON SYSTEM READINESS	THIS PROCESS DETERMINES SYSTEM READINESS AT THE O. I AND D LEVELS BY BY ASSESSING THE IMPACTS OF THE SHORTFALLS THEREON. IT THEN PROVIDES FOR AN OVERALL SYSTEM READINESS ASSESSMENT. THE "EFFECT OF RESOURCE SHORTFALLS ON SYSTEMS READINESS OBJECTIVES" FORM IS TO BE USED HEREWITH.

	Name	Label	Description
	O-L/RES	O-LEVEL RESOURCES	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE THEORETICAL RESOURCES REQUIRED TO OPERATE ONE SYSTEM. IT IS EXTRACTED FROM THE LSAR MASTER RECORD AND CONTAINS DATA RELATED TO EACH ILS ELEMENT.
	BOIP	BASIS OF ISSUE PLAN	ACRONYMS: PURPOSE: THIS DATA FLOW PREDICTS THE QUANTITATIVE REQUIREMENTS FOR A NEW ITEM OF EQUIPMENT TO BE INCLUDED IN TABLES OF ORGANIZATION AND EQUIPMENT (TOE), TABLES OF DISTRIBUTION AND ALLOWANCES (TDA), COMMON TABLES OF ALLOWANCES (CTA), JOINT TABLES OF ALLOWANCES (JTA), AND ADDITIVE OPERATIONAL PROJECTS (AOP).
	DEP/FAC/MAINT/UNIT	DEPOT FACILITY MAINTENANCE UNIT AVAILABLE	ACRONYM: PURPOSE: THIS DATA CONTAINS THE CANDIDATE DEPOTS AVAILABLE WHICH WILL PROVIDE COMPLEX REPAIRS, SYSTEM REWORK, AND OVERHAUL SERVICES FOR THE NEW SYSTEM.
	DEP/LEV/RES	DEPOT LEVEL RESOURCES	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE THEORETICAL RESOURCES (MANPOWER, MATERIALS AND SUPPORT EQUIPMENT) REQUIRED TO REPAIR AND /OR OVERHAUL THE SYSTEM AT DEPOT LEVEL.
	DEP/MAI/REQ	DEPOT LEVEL MAINTENANCE REQUIREMENTS	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE MAINTENANCE RESOURCE REQUIREMENTS OF THE SYSTEM/EQUIPMENT AT THE DEPOT LEVEL. IT COVERS THE AREAS OF PERSONNEL, SUPPORT, TRAINING, AND SUPPLIES.
	DES/CON/INF	DESIGN CONCEPT INFORMATION	ACRONYMS: PURPOSE: THIS DATA FLOW DESCRIBES THE CONCEPT AND DESIGN FORMULATION OF THE SYSTEM/EQUIPMENT. THE INFORMATION INCLUDES ITEM/EQUIPMENT SPECIFICATIONS, MISSIONS AND FUNCTIONS.
	DMSP	MAINTENANCE SUPPORT PLAN	ACRONYMS: TMDE - TEST MEASUREMENT AND DIAGNOSTICS EQUIPMENT. PURPOSE: THIS DATA FLOW CONTAINS THE PLANS AND SCHEDULES TO COORDINATE PERSONNEL, TMDE, FACILITIES, AND EQUIPMENT REQUIREMENTS FOR EXISTING DEPOT LEVEL MAINTENANCE AND SUPPORT SERVICES.
	EQU/MAN/AUTH	EQUIPMENT AND MANPOWER AUTH'ZATIONS	THIS DATA FLOW CONTAINS THE AUTHORIZED QUANTITY OF EQUIPMENT AND MANPOWER AVAILABLE TO OPERATE AND MAINTAIN THE EXISTING SYSTEM/EQUIPMENT.

Name	Label	Description
EX/LOG/RES	EXISTING LOGISTICS RESOURCES	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE AVAILABLE OPERATIONAL AND MANITENANCE LOGISTICS RESOURCES AT THE GAINING UNIT. IT INCLUDES THE MAJOR LOGISTICS RESOURCE AREAS (IE PERSONNEL, SUPPORT, TRAINING AND SUPPLIES).
EXI/LOG/RES	EXISTING LOGISTICS RESOURCES	ACRONYMS: O&O - OPERATIONAL AND ORGANIZATIONAL PURPOSE: THIS DATA CONTAINS THE AVAILABLE OPERATIONAL AND MAINTENANCE LOGISTICS RESOURCES AT THE GAINING UNIT. IT INCLUDED THE MAJOR LOGISTICS RESOURCE AREAS SUCH AS PERSONNEL, SUPPORT, TRAINING, AND SUPPLIES.
EXIST/PLAN/Q-Q/LOG/R	EXIST/PLAN QUANT/QUAL O&O LOG RES FOR GAINING	ACRONYMS: PURPOSE: THIS DATA FLOW IDENTIFIES THE O&O LOGISTIC RESOURCES PLANNED AND AVAILABLE AT THE GAINING UNIT FOR EXISTING OPERATIONAL SUPPORT AND/OR MAINTENANCE.
I-L/MAI/REQ	INTERMEDIATE LEVEL MAINTENANCE REQUIREMENTS	ACRONYMS; PURPOSE: THIS DATA FLOW CONTAINS THE MAINTENANCE RESOURCE REQUIREMENTS OF THE NEW SYSTEM/EQUIPMENT AT THE INTERMEDIATE LEVEL. IT COVERS THE AREAS OF PERSONNEL, SUPPORT, TRAINING, AND SUPPLIES.
I-L/MAI/UNI	INTERMEDIATE LEVEL MAINTENANCE UNITS AVAILABLE	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE NUMBER AND TYPES OF MAINTENANCE UNITS LOCATED AT THE INTERMEDIATE LEVEL, DESIGNATED TO SUPPORT THE NEW SYSTEM THAT ARE AVAILABLE.
I-L/RES	INTERMEDIATE LEVEL RESOURCES	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE THEORETICAL LOGISTICS RESOURCES REQUIRED TO PERFORM GS AND DS MAINTENANCE FOR ITEMS DESIGNATED TO BE REPAIRED AT THE INTERMEDIATE LEVEL. IT ALSO IDENTIFIES THE MANPOWER, SUPPORT EQUIPMENT AND SPARE PARTS.
IMP/READ	SHORTFALL IMPACTS ON READINESS	ACRONYMS: PURPOSE: THIS DATA FLOW CARRIES THE THE ASSESSMENT OF THE SHORTFALL IMPACTS ON SYSTEM/EQUIPMENT READINESS.
IND/LVL/ASSMNTS	INDIVIDUAL LEVEL ASSESSMENTS	ACRONYM: O&O - OPERATIONAL AND ORGANIZATIONAL PURPOSE: THIS DATA FLOW IDENTIFIES THE LOGISTIC RESOURCE SHORTFALLS AT EACH MAINTENANCE LEVEL (O&O, INTERMEDIATE AND DEPOT) TO PROVIDE A BASIS FOR A SYSTEM READINESS ASSESSMENT BASED UPON THE IMPACT OF SUCH SHORTFALLS.

Name	Label	Description
INIT/ACT	INITIATE ACTION	ACRONYMS: PURPOSE: THIS DATA FLOW DIAGRAM CARRIES THE STATEMENT OF WORK RELEVENT TO THE CONTRACT FOR THIS SYSTEM/EQUIPMENT.
LOG/RES/AVA	LOGISTICS RESOURCE AVAILABILTY SCHEDULE	ACROMYMS: PURPOSE: THIS DATA FLOW CONTAINS INFORMATION ON THE SCHEDULE TO PROVIDE LOGISTIC RESOURCES NEEDED BY THE GAINING UNIT TO SUPPORT THE NEW SYSTEM/EQUIPTMENT.
MAT/FIE/PLA	MATERIAL FIELDING PLAN	ACRONYMS: MACOM - MAJOR SUBORDINATE COMMAND PURPOSE: THIS DATA FLOW IS A STAND-ALONE DOCUMENT WHICH CONTAINS PLANS, SCHEDULES, PROCEDURES, AND MATERIEL FIELDING AND GAINING MACOM ACTIONS NECESSARY TO SUCCESSFULLY SHIP, PROCESS, DEPLOY, AND SUSTAIN MATERIEL FIELDED FOR THE EXISTING SYSTEM/EQUIPMENT AT A GAINING MACOM.
O&O/LVL/MAINT/REQ	O&O LEVEL MAINTENANCE REQUIREMENTS	ACRONYM: PURPOSE: THIS DATA FLOW CONTAINS THE MAINTENANCE RESOURCE REQUIREMENTS OF THE SYSTEM/EQUIPMENT AT THE OPERATIONAL & ORGANIZATIONAL LEVEL. IT ALSO COVERS PERSONNEL, SUPPORT, TRAINING AND SUPPLIES.
OPE/I-L/REQ	I-LEVEL RESOURCE REQUIREMENTS	ACRONYMS: PURPOSE: THIS DATA FLOW CARRIES THE INTERMEDIATE LEVEL RESOURCE REQUIREMENTS TO SUPPORT THE SYSTEM/EQUIPMENT AT THAT LEVEL.
OPE/RES	OPERATIONAL RESOURCES	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE ANALYTICAL RESULTS FROM LSA TASK REPORTS AND THE LSAR MASTER RECORD WHICH CAN BE USED TO DETERMINE THE LOGISTICS RESOURCES REQUIRED TO OPERATE THE NEW SYSTEM UPON RECEIPT BY THE GAINING MACOM.
OPR/ORG/MU	OPERATIONAL AND ORGAN'AL MAINTENANCE UNITS AVAILABLE	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE NUMBER AND TYPES OF OPERATIONAL MAINTENANCE UNITS THAT ARE AVAILABLE FOR RECEIVING AND/OR REPAIRING THE NEW SYSTEM.
PERS/EQPT/REQ/SYT	PERSONNEL & EQUIPMENT REQUIRED FOR SYSTEM	ACRONYM: PURPOSE: THIS DATA FLOW CONTAINS THE MINIMUM ESSENTIAL PERSONNEL & EQUIPMENT REQUIRED TO PERFORM A SUCCESSFUL MISSION USING THE SYSTEM/EQUIPMENT.
Q&Q/ INT/LVL/MAINT/R	EXIST/PLAN QUAN/QUAL INT LVL LOG SUPP RES	ACRONYM: PURPOSE: THIS DATA FLOW IDENTIFIES THE RESOURCES PLANNED AND AVAILABLE TO SUPPORT THE EXISTING SYSTEM/EQUIPMENT AT THE INTERMEDIATE LEVEL.

Name	Label	Description
Q&Q/DEP/LVL/LOG/MAIN	EXIST/PLAN QUAN/QUAL DEP LVL LOG SUPP RES	ACRONYM: PURPOSE: THIS DATA FLOW IDENTIFIES THE RESOURCES PLANNED AND AVAILABLE TO SUPPORT THE EXISTING SYSTEM/EQUIPMENT AT THE DEPOT LEVEL.
Q&Q/INT/LVL/MAINT/R	QUAL/QUANT INTERMEDIATE LEVEL MAINTENANCE	ACRONYMS: PURPOSE: THIS DATA FLOW CARRIES THE PLANNED AND AVAILABLE RESOURCES TO SUPPORT THE SYSTEM/EQUIPMENT AT THE INTERMEDIATE LEVEL.
QQ/DMR	QUAL/QUANT DEPOT LEVEL MAINTENANCE RESOURCES	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE QUALITATIVE AND QUANTITATIVE DEPOT LEVEL MAINTENANCE RESOURCES REQUIRED TO SUPPORT THE SYSTEM/EQUIPMENT. IT COVERS THE AREAS OF PERSONNEL, TRAINING, SUPPORT, AND SUPPLIES.
QQ/G-UNIT/O&O/LVL/MA	QUAL/QUANT GAINING UNIT O&O LEVEL MAINTENANCE RESOURCES	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE QUALITATIVE AND QUANTITATIVE O&O LEVEL MAINTENANCE RESOURCES REQUIRED TO OPERATE AND SUPPORT THE SYSTEM/EQUIPMENT. IT COVERS THE AREAS OF PERSONNEL, TRAINING, SUPPORT AND SUPPLIES.
QQPRI	QUAL/QUANT PERSONNEL REQUIREMENTS INFORMATION	ACRONYMS: QQPRI PURPOSE: THIS DATA FLOW PROVIDES THE QUANTITATIVE AND QUALITATIVE PERSONNEL REQUIREMENTS FOR THE NEW SYSTEM.
REA/DRI	READINESS DRIVERS	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE READINESS DRIVERS FOR THE NEW SYSTEM/EQUIPMENT. AMONG THE READINESS DRIVERS ARE MAINTAINABILITY, RELIABILITY, OPERATIONAL AVAILABILITY, ETC.
RES/REQ	RESOURCE REQUIREMENTS	ACRONYMS: PURPOSE: THIS DATA FLOW PROVIDES DETAILS OF THE REQUIRED OPERATIONS AND MAINTENANCE TASKS FOR THE NEW SYSTEM/EQUIPMENT AND IDENTIFIES THE LOGISTICS SUPPORT RESOURCE REQUIREMENTS FOR EACH TASK.
SYS/REA/OBJ	SYSTEM READINESS OBJECTIVES	ACRONYMS: PURPOSE: THIS DATA FLOW CONTAINS THE SYSTEM READINESS OBJECTIVES THAT WERE PREPARED AS PART OF THE ACQUISITION, INITIATION, JUSTIFICATION, AND PLANNING PROCESSES.
TYP/FIE	TYPE OF FIELDING	ACRONYMS: PURPOSE: THIS DATA FLOW IS THE TYPE OF FIELDING INTENDED FOR THE NEW SYSTEM/EQUIPMENT (I.E. IS IT A REPLACEMENT OF THE EXISTING SYSTEM/EQUIPMENT OR IS IT A NEW CAPABILITY?). THIS PATH FOLLOWS THE EXISTING SYSTEM PATH.

	Name	Label	Description
	AAF	ACQUIRING ACTIVITY FILE	CONTAINS THOSE RECORDS, DOCUMENTS, DECISION PAPERS, SCHEDULES THAT WERE PREPARED AS PART OF THE ACQUISITION INITIATION, JUSTIFICATION, AND PLANNING PRIOR TO THE ASSIGNMENT OF A PROGRAM MANAGER. THE ITEMS IN THIS DATA STORE INCLUDE: A. THREAT ANALYSIS DATA B. O&O PLAN C. READINESS OBJECTIVES DATA D. FUNTIONAL REQUIREMENTS DATA E. PROJECTED SCHEDULE DATA F. LOGISTICS RESOURCES DATA G. DESIRED R & M PARAMETERS H. TOA I. TOD J. COST & OPERATIONAL EFFECTIVENESS ANALYSIS (COEA) DATA K. PROJECTED COST DATA L. JUSTIFICATION OF MAJOR SYSTEM NEW START (JMSNS) DATA M. REQUIRED OPERATIONAL CAPABILITY (IF PREPARED PRIOR TO ASSIGNMENT OF PROGRAM MANAGER - ELSE FOUND IN PM FILES)
	LSAR	LSAR FILE	LOGISTICS SUPPORT ANALYSIS RECORD FILE. PURPOSE OF DATA STORE: THIS FILE OR RECORDS HOLDING AREA CONTAINS LSA TASK REPORTS OR THEIR EQUIVALENT; LSAR MASTER RECORD SHEET INFORMATION; LSAR REPORTS WHEN SYSTEM IS AUTOMATED. IT CONTAINS LOGISTICS DATA WHICH CAN BE USED TO ASSESS VARIOUS ILS ELEMENTS. MIL-STD 1388-1A AND 1388-2A SHOULD BE LOOKED AT FOR COMPLETE OUTPUTS AVAILABLE.
	MTOE/TDA	MTOE/TDA	THIS DATA STORE CONTAINS THE MODIFIED TABLE OF EQUIPTMENT (MTOE) AND THE TABLE OF DISTRIBUTION AND ALLOWANCES (TDA). THEY DEFINE THE MINIMUM ESSENTIAL REQUIREMENTS OF PERSONNEL AND EQUIPTMENT NEEDED FOR A UNIT TO SUCCESSFULLY PERFORM ITS MISSION, AND THE ALLOWANCE AND DISTRIBUTION PLANS FOR THESE ITEMS.
	PM/DF	PROGRAM MANAGER DATA FILE	CONTAINS THOSE FILES AND DATA WHICH ARE NORMALLY DEVELOPED BY AND/OR RETAINED BY THE PROGRAM MANAGER FOR PROPER MANAGEMENT OF THE DEVELOPMENT PROGRAM. THESE FILES INCLUDE: 1. ENGINEERING DRAWINGS 2. ENGINEERING CHARACTERISTICS 3. DT/OT RESULTS 4. CONCEPT FORMULATION PACKAGE (CFP) 5. DESIGN CONCEPT PAPER (DCP) 6. TYPE TECHNICAL REVIEWS REQUIRED 7. MILESTONE SCHEDULES 8. FUNDING PROFILES 9. REQUIRED OPERATIONAL CAPABILITIES (ROC) 10. ITEM/EQUIPMENT SPECIFICATIONS 11. ITEM/EQUIPMENT MISSIONS & FUNCTIONS 12. EQUIPMENT, MANPOWER, AND TECHNICAL RISK ASSESSMENTS (FROM LSA TASK 301.2.3 13. TRADE OFF DETERMINATION ANALYSIS (TOD) 14. TRADE OFF ANALYSIS (TOA) 15. BEST TECHNICAL APPROACH ANALYSIS (BTA) 16. COST AND OPERATIONAL-EFFECTIVENESS ANALYSIS (COEA)

	Name	Label	Description
	PM/ILSMT	PM/ILSMT INITIATE REQRMNT	THE PROGRAM MANAGER OR THOSE ACTIVITIES, AGENCIES, OR AUTHORITIES THAT ARE RESPONSIBLE FOR THE INITITATION OF THE REQUIREMENT FOR AN ILS ELEMENT ASSESSMENT DURING A DEVELOPMENT PROGRAM FOR A SYSTEM AND/OR EQUIPMENT IN ACCORDANCE WITH AR 700-127. THE KEY ACTION (OUTPUT) REQUIRED OF THIS EXTERNAL ENTITY IS THE DIRECTIVE, AUTHORITY, OR OTHER DOCUMENTATION THE INITIATES THE REQUIREMENT FOR THE APPLICATION OF THIS ILS ASSESSMENT TO A SPECIFIC SYSTEM/EQUIPMENT DEVELOPMENT PROGRAM AT A SPECIFIED POINT IN ITS LIFE CYCLE.

ANNEX C

—

LSA TASK 402
EARLY FIELDING ANALYSIS

ANNEX C
LSA TASK 402
EARLY FIELDING ANALYSIS

PROCESS - 402.2.3.1 - Fielding Type

Objective:

Determine whether the introduction of the new system/equipment is for the replacement of an existing item or is a new capability.

Procedure:

1. Examine all documentation associated with the new system/equipment and extract information dealing with its purpose, (i.e., is it an replacement or is it a new capability). Obtain from the Program Manager the Concept Formulation Package (CFP) and the mission area analysis.

Result:

Identification of the type of fielding for the new system/equipment (i.e., whether it is a replacement of the existing system or is a new capability).

PROCESS - 402.2.3.2 - Total Package Materiel Fielding

Objective: To examine operational and maintenance requirements in order to determine the necessary logistics resources required to field the new system.

PROCESS - 402.2.3.2A1 - O&M Resource Requirements

Objective: Review Operational and Maintenance Resource Requirements.

Procedure:

1. Obtain the "Type of fielding" data from Process 402.2.3.1. In this case for new systems/equipment.

2. Obtain from the Logistic Support Analysis Record the results of task 401; which includes the complete LSAR database on system/equipment hardware and software, its operational and maintenance resource requirements, and new or critical logistic support resources required to operate and maintain the new system/equipment

3. From the Project Manager Data file obtain the Materiel Fielding Plan for the New System/Equipment.

Result:

System/Equipment Operational resource requirements and Maintenance resource requirements at the O, I and D level

PROCESS - 402.2.3.2A2 - Identify Operational and Organizational Resource Requirements

Objective: To identify the qualitative/quantitative O&O Logistics Support resource required by the gaining unit to meet intended mission of the system equipment.

Procedure:

1. Obtain the "O&O Level Maintenance requirements" data from process 402.2.3.2A1, the LSAR, BOIP and the QQPRI. Quantify the number and types of the following resources required and transcribe them to the "Determination of Resource Shortfalls" form under the column labeled "New".

   - Personnel
     - classification grade structure, skill specialty
     - manpower required
   - Support
     - basic tools needed for relatively simple maintenance actions such as; adjustments, simple remove and replace, inspections, and service (i.e., clear, drain, point, refill)
     - basic test and diagnostic equipment to identify and isolate failures of equipment at the LRU/module level
     - supporting equipment such as lubrication guns, air pressure pumps, equipment cleaning materiels, materiel handling equipment, operators (Support Equipment), auxiliary fuel tanks, etc.

- maintenance facilities
- technical manuals for both equipment/system and test/diagnostic equipment

o Training

- instructors for basic troubleshooting analysis and servicing of equipment
- training equipment
- training materiels, aids, and devices

o Supplies

- basic sustainment materiel - fuel, ammunition, food and clothing

o Basic maintenance materiels:

- system/equipment modules or components
- fuses, relays
- batteries
- spark plugs, wires
- tires, etc.

o Facility Requirements

o Transportation Equipment

o Associated Items of Equipment

- sets, kits and outfits

Result:

New System/Equipment Qualitative/Quantitative organizational and operational maintenance resource requirements.

PROCESS - 402.2.3.2A3 - Identification of Intermediate Level Resource Requirements

Objective: Identify Intermediate level logistic maintenance resource requirements to troubleshoot and repair system LRUs/SRUs and transcribe to "Determination of Resource Shortfalls" under column "New".

Procedure:

1. Obtain the "Intermediate Level Maintenance Resource Requirements", from Process 402.2.3.2A1, task 401 results, and the BOIP & QQPRI from the program managers office. Quantify the amount and types of the following resources required:

LOGISTICS RESOURCE REQUIREMENTS FOR XXXXXXXXXXXXXXX LEVEL
PROCESS 402.2.3.Y

END ITEM NAME:
NOMENCLATURE:
PART NUMBER:

DETERMINATION OF RESOURCE SHORTFALLS

ELEMENT ID.	RESOURCE TYPE	RESOURCES REQUIRED		
	NAME/REFERENCE/MOS	OLD	NEW	(SHORT)OVER

- o Personnel
  - manpower
  - classification, grade structure, skill specialty
- o Support
  - tools needed for more complex actions such as alignment calibrations or repairs to an end item, assembly, subassembly, module or component
  - test, measurement and diagnostic equipment for LRUs/modules removed at the organizational level, or for system/equipment requiring more detailed fault detection then available at the O&O - level
  - materiel handling equipment such as lifts, cranes, dollys, etc.
  - facilities for the test equipment, tools and maintenance operations
  - tech manuals for both LRUs/modules, support equipment, TMDE.
- o Training
  - instructors qualified to train personnel to perform the required maintenance tasks at the I - level
  - training equipment such as the actual equipment, mock ups, etc.
  - training materiels, aids and devices
- o Supplies
  - all the supplies required at the O&O - level
  - SURs and spare/repair parts for the system/equipment modules or components
- o Facility requirements
- o Transportation equipment

Result:

Quantitative/Qualitative intermediate level maintenance resource requirements

PROCESS 402.2.3.2A - Identify Depot Level Resource Requirement

Objective: Identify depot level logistics resources required to perform complex maintenance tasks on LRUs/SRUs or the entire end item including overhauling and rebuilding and transcribe to "Determination of Resource Shortfalls" under column "New".

Procedure:

1. Obtain the "Depot Level Maintenance Resource Requirements" from Process 402.2.3.2A1, Task 401 results BOIP and QQPRI from the program manager's office. Quantify the amount and types of the following resources required:

   - o Personnel
     - classification, grade structure, skill specialty required for a wide range of actions such as fabrication of parts, major overhauls, complete rebuilding of equipment, etc.
     - manpower
   - o Support
     - tools and equipment for major repair work ranging from equipment overhaul rebuilding, parts fabrication, electronic component repair, circuit card assemblies, etc.
     - test and diagnostic equipment required for detailed analysis, sophisticated enough to pinpoint failures to the lowest level necessary.
     - materiel handling equipment ranging from instruments for handling microchips to hydraulic lifts.
     - facilities required for the tools, equipment, and for the actual maintenance operations. (ie. clean rooms, hangers, etc).
     - technical manuals for the test/diagnostic equipment, trouble shooting procedures, and for the system/equipment.
   - o Training
     - instructors
     - training equipment such as models, mock-ups, simulators, etc.

- training materiels such as course books, notebooks, writing instruments, etc., aids such as slides, transparencies, videos etc., and devices such as projectors, projection screens, etc.

o Supplies

- all the supplies required at the Depot level
- spare/repair parts down to the piece part level
- materiels such as metal, composites, etc., needed for fabrication and refurbishment.

o Facilities requirements

o Transportation equipment

Result:

Qualitative/quantitative depot-level logistics maintenance resources for the new system/equipment.

PROCESS 402.2.3.3 - Logistic Resources at Gaining Unit

Objective: To determine existing and planned logistics resources at gaining unit available to meet mission requirements upon receipt of the system. Consideration of those resources currently being procured but not yet available shall be addressed.

PROCESS 402.2.3.3A1 - ID Number and Type of Units

Objective: To determine the numbers and types of gaining units and maintenance support units.

Procedure:

1. Obtain the Materiel Fielding Plan that identifies the operational, organizational, intermediate and depot level maintenance units. Determine the numbers and types of the operational and maintenance support units.

Results:

Organization and Operational maintenance units }
I-level maintenance units } numbers and types
D-level maintenance facility }

PROCESS 402.2.3.3A2 - Identify Existing or Planned Logistic Resources at the Gaining Unit

Objective: To identify existing or planned logistics resources available at the gaining unit which can be used to operate and maintain the new system/equipment. Transcribe the results to "Determination of Resource Shortfalls" form under column "Old".

Procedure:

1. From process 402.2.3.3A1, obtain quantitative/qualitative data on resources required to operate the equipment and perform organizational level maintenance.

2. From the Table of Equipment and the Table of Distribution and Allowances, extract quantitative data that identifies the Equipment and Manpower Authorizations at the gaining unit.

3. Quantify the amount and types of the following resources required by the gaining unit that are either currently available or are planned to be available within a two year time period.

Operational Resources:

- o Personnel
  - classification, grade structure, skill specialty
  - manpower required
- o Support
  - tools
  - supporting equipment (i.e. generators, auxiliary fuel tanks, etc.
  - test, measurement and diagnostic equipment
  - technical manuals (for both system/equipment or support system/equipment)
  - support equipment facilities
  - handling equipment
- o Training
  - instructors
  - training equipment
  - training materiels, aids, and devices

- Supplies
  - base sustainment materiel
    - fuel
    - ammunition
    - food & clothing

Operational Level Maintenance Resources:

- Personnel
  - manpower requirements
  - classification, grade structure, skill specialty
- Support
  - basic tools needed for relatively simple maintenance action such as access, adjustments, simple remove and replace, inspections, and service (ie clean, drain, paint, refill)
  - basic test and diagnostic equipment to identify and isolate failures of equipment on the unit/module
  - supporting equipment such as lubrication guns, air pressure pumps, equipment cleaning materiels, materiel handling equipment, etc.
  - maintenance facilities
  - technical manuals for both equipment/system and test/diagnostic equipment
- Training
  - instructors for basic troubleshooting analysis and servicing of equipment
  - training equipment
  - training materiels, aids, and devices
- Supplies
  - basic maintenance materiels
    - system/equipment modules or components
    - fuses, relays
    - batteries
    - spark plugs, wires
    - tires
    - etc
- Facility Requirements
- Transportation equipment

Result:

Existing and/or planned quantitative/qualitative operational logistic resources for the gaining unit.

PROCESS 402.2.3.3A3 - Identify Existing or Planned Resources at the Intermediate Maintenance Level

Objective: To identify existing or planned logistics resources at the intermediate level maintenance units. Transcribe them to the "Determination of Resource Shortfalls" under the column labeled "Old".

Procedure:

1. From process 402.2.3.3A1, obtain the quantitative/ qualitative resource using available information (such as field manuals, standard operating procedures etc.) describing the I-level maintenance unit.

2. From the Table of Equipment and the Table of Distribution and Allowances, extract qualitative and quantitative data on equipment and maintenance manpower authorizations at the I-level maintenance unit.

3. Quantify the number and types of the following resources that now exist or are being planned to support repair/calibration activities at the intermediate maintenance unit:

   - o Personnel
     - manpower
     - classification, grades structure, skill specialty
   - o Support
     - tools needed for more complex actions such as calibrations, repairs to an assembly, subassembly, module, component, or their end items, disassemble/assemble, and alignments
     - test and diagnostic equipment for units/modules removed at the organizational level, or for system/equipment requiring more detailed failure analysis then available at the O-level
     - materiel handling equipment such as lifts, cranes, dollys, etc.

- facilities for the test equipment and tools and for maintenance operations
- technical manuals for both unit/module and test/diagnostic

o Training

- instructors qualified to train personnel for the required maintenance tasks at the I-level
- training equipment such as the actual equipment, mock-ups, etc.
- training materiels, aids, and devices

o Supplies

- all the supplies required at the O-level
- sub-units and replacement parts of system/equipment modules or components

o Facility requirements

o Transportation equipment

Result:

Existing and/or planned quantitative/qualitative intermediate level maintenance resources for selected system/equipment.

PROCESS 402.2.3.3A4 - Identify Existing or Planned Resources at the Candidate Depot Facility

Objective: Identify existing or planned logistics resources to support the new system/equipment at the candidate depot facility. Transcribe these resources to the "Determination of Resource Shortfalls" under column "Old".

Procedure:

1. From Process 402.2.3.3A1 obtain the quantitative/ qualitative resources available at the depot facility.

2. Obtain the depot study results from the acquiring activities file.

3. From the Table of Equipment and the Table of Distribution and Allowances, extract qualitative and quantitative data specifying the available equipment authorized at the depot facility.

4. Quantify the numbers and types of the following resources that now exists or are planned to be available within a two year period at the depot facility:

- o Personnel
  - classification, grade structure, skill specialty required for a wide range of actions such as fabrication of parts, major overhauls, complete rebuilding of equipment, etc.
  - manpower
- o Support
  - tools and equipment for major repair work ranging from equipment overhauls and rebuilding, parts fabrication, to electronic components repair, circuit card assemblies, etc.
  - test and diagnostic equipment required for detailed analysis, sophisticated enough to pinpoint failure to the lowest level necessary
  - materiel handling equipment ranging from instruments for handling microchips to hydraulic lifts
  - facilities required for the tools, equipment, and for the actual maintenance operations(ie clean rooms, hangars, etc.)
  - technical manuals for the test/diagnostic equipment, troubleshooting procedures, and for the system/equipment
- o Training
  - instructors
  - training equipment such as models, mock-ups, simulators, etc.
  - training materiels such as course books, notebooks, writing instruments, etc., aids such as slides, transparencies, videos, etc., and devices such as projectors, projection screens, etc
- o Supplies
  - all the supplies required at the I-level
  - replacement parts down to the lowest unit
  - materiels such as metal, composites, etc. needed for fabrication and refurbishment

Result:

Existing and/or planned qualitative/quantitative depot-level logistics maintenance resources for selected system/equipment.

PROCESS 402.2.3.4 - IDENTIFY RESOURCE SHORTFALLS

Objective: To identify the shortfalls of the existing logistics resources when compared with the resources required to field the new system/equipment.

Procedure:

1. From the acquiring activity file (see B-1) obtain Logistics Resource Fielding schedules that specify when the gaining units will be receiving the resources required to support new system/equipment.

2. From the "Determination of Resource Shortfalls" form developed in processes 402.2.3.2 and 402.2.3.3, subtract the values in the column labeled "New" from the values listed in the column labeled "Old". The results will be an excess, if the Old is greater than the New, and a shortfall, if the New is greater than the Old. Shortfalls will be bracketed. Bear in mind, excess resources with the appropriate interchangeable capability (substitutability) may be used to bolster the shortfalls.

   a) For the first column, (Old) using the same format as in the second column, list the existing logistics resources at the gaining units.

   b) For the second column (New) of the chart list the resources required by the new system/equipment. Break the resources down by logistic elements into related groups (ie personnel, training, equipment, tools, transportation, etc) and within each group or subgroup, list the individual items and their availability information (ie quantity, hours, etc).

   c) Compare the resources required column (New) with the actual resources available column (Old). In a third column, list the excess or shortfall of resources. Generally, this can be calculated by individually subtracting the resources required in column 1 from the existing resources in column 2. A positive number would indicate a surplus, a negative number a deficiency.

3. When considering the resource shortfalls, keep in mind the Logistic Resource Fielding schedule. (Ex. A system/ equipment may sometimes be fielded with a component still not available for it. A substitute component or a bypass might have been performed to allow the system/equipment to be fielded). This consideration will have an impact on the resource shortfalls for the long term.

Result:

Identification of an excess or shortfall of operational and support resources.

PROCESS - 402.2.3.5 - DETERMINE SHORTFALL IMPACTS ON SYSTEM READINESS

Objective: If shortfalls are found to exist, determine their impacts on systems/equipment readiness.

Procedure:

1. Obtain and transcribe the system/equipment readiness objectives from the O&O Plan, the Required Operational Capability (ROC) and Reliability and Maintainability Rationale Annex to the relevant "Resource Shortfall Effect on Readiness Objectives" forms. These forms will be developed from the O&O, Intermediate and Depot levels.

2. Transcribe the individual resource shortfalls from the "Determination of Resource Shortfalls" form to the relevant "Resource Shortfall Effect on Readiness Objectives".

3. At each level, perform an analysis either using an existing readiness model or mathematical relationships to determine the overall impact of a resource shortfall on system readiness. The shortfall may indirectly effect readiness through longer maintenance/repair times, increased ALDTs, or decreased operating hours.

4. Review readiness assessments made for each level and develop an overall assessment for the system/equipment taking into account the interaction between levels and stated readiness objectives.

Results:

Assessment of resource shortfall on system/equipment readiness.

EFFECT OF RESOURCE SHORTFALLS ON SYSTEM READINESS OBJECTIVES			
END ITEM NAME: NOMENCLATURE: PART NUMBER:			
READINESS DRIVER: READINESS OBJECTIVE:			
LEVEL	ELEMENT ID.	SHORTFALL	IMPACT ASSESSMENT

IMPACT ASSESSMENT
(PROCESS 402.2.3.5)

END ITEM NAME:
NOMENCLATURE:
PART NUMBER:

ELEMENT: **SHORTFALL:**

IMPACT ON SYSTEM READINESS ANALYSIS RESULTS:

(TEXT DESCRIPTION)

ANNEX D

—

LSA SUBTASK 402.2.3
VERT BATCH INPUT FILES

VERT APPLICATION METHODOLOGY

BACKGROUND:

Venture Evaulation and Review Technique (VERT) was developed as a network analysis technique to facilitate management decision making. It allows a systematic planning and control of programs and enables managers to find solutions to real life managerial problems.

The terms of the APJ contract require the provision of batch files for each fo the VERT networks associated with the various Data Flow Diagrams in the APJ 966 projects.

APJ has been successful in adopting a method for the creation of these networks using the existing EXCELERATOR software package and establishing a naming convention compatible with that used in the Data Flow Diagrams. To do this APJ has made use of the PC model of VERT. A Structured Analysis project was used for this purpose. The prototype VERT network structure was made for one top level and one lower level data flow diagram.

The PC model of VERT has certain limitations built into it. To overcome some of thse limitations, certain conventions were used to create the input files. To maintain full generality a set of "dummy" default values were established. The model allows the user to alter the default values of time, cost, and performance to satisfy their specific requirements.

METHODOLOGY:

The basic symbols used to structure the network are:

(i) **SQUARES** - to indicate NODES. These are decision points in the project, or points beyond which the project cannot proceed unless certain criteria are met. There are two type of nodes, one which supports input operations and, the second type which supports output operations.

(ii) **LINES** - to indicate ARCS which are activities that have time, cost, and performance criteria associated with them.

In practice, however, both the arcs and nodes are similar, in that both have time, ocst, and performance criteria associated with them. The arcs have a primary and a cumulative set of time, cost, and performance criteria whereas the nodes have only a single cumulative set.

(iii) **NAMING CONVENTIONS** - Efforts have been made to keep the naming convention as compatible as possible to the Data Flow Diagrams. The naming convention used is displayed below.

NODES - All nodes are prefixed with the letter **N**. The individual Nodes are identified by a number and a letter. The number refers to the number of the node within the diagram and the letter refers to the diagram number in the project. In the event that a node has been referenced in an earlier diagram they also carry the number of the node in the earlier diagram as a prefix to the idividual node number.

N2.4A

N - All nodes are prefixed with the letter **N**
2 - Gives the number of the node it relates to in a higher level diagram or an earlier data flow diagram within the project. In this case it refers to node **N2** of the top level diagram.
4 - Gives the number of the node it relates to in a higher level diagram or an earlier data flow diagram within the project. In this case it refers to node **N2** of the top level diagram.
A - The nodes in each subsequent explosion are alloted an alphabetical suffix indication the number of the explosion diagram in the particular project. In this case it is the first lower level diagram within the project.

ARCS - All arcs are prefixed with either the letter **C** or **E**. The individual Arcs are identified by two numbers. The first number refers to the number of the arc within the diagram and the second number refers to the number of the diagram within thej project. In the event that an arc has been referenced in an earlier diagram they also carry the number of the arc in the earlier diagram as a prefix to the individual arc number. The arcs which are identified by the letter **E** have direct reference to a process in the corresponding data flow diagram and as usch are named the same as the process itself.

C - All arcs are prefixed with the letter C. In some cases, however, arcs carry a prefix of E. These particular arcs correspond to a process within the data flow diagram and are thus named the same as the process itself.

3.3- Gives the number of the arc it relates to in a higher level diagram or an earlier data flow diagram within the project. In this case it refers to arc number 3 in lower level diagram #3 within the project.

8.4- Indicates that this particular arc is the #8 arc in the #4 lowever level diagram of the project.

BATCH FILES

INPUT FILES - The input file names are given the extension *.IN.

OUTPUT FILES - The simulation output files are given the extension *OU.

PRINT FILES - The print files have been given the extension *.PR.

(This would allow subsequent updates of the input files to be numbered as IN1..., OU1..., PR1... etc.)

DEFAULT SETTINGS:

Control Record:

(i) The output option selected is "0" which provides a detailed listing, and high level of summary information.

(ii) The input record listing option selected is "0" which prints all input records.

(iii) The composite terminal node output option selected is "16" which assumes family mode and intrafamily transfer of histogram data.

(iv) The number of interations used are "10" in the demonstration model to facilitate operation in the debug mode if required.

(v) The composite node name and the network name are left as blanks.

(vi) In the run identification the name of the corresponding Data Flow Diagram is used as identification for the network description.

Arc Records:

(i) For each of the arcs the following records are provided:
(a) Master Arc Record
(b) Time Distribution Satellite
(c) Cost Distribution Satellite
(d) Performance Distribution Satelitte

(ii) The Distribution Satellite Records are created to provide a uniform statistical distribution.

(iii) The default values used for the minimum and maximum in each criteria are:

TIME	10.0	10.0
COST	10.0	100.0
PERFORMANCE	10.0	50.0

Node Records:

(i) Input Logic - The input logic for the nodes are either "**INITIAL**" or "**AND**".

(ii) Output Logic - The output logic has been defaulted to "**AND**" or "**TERMINAL**".

(iii) The output option indicator and the storage option indicator are defaulted to read "0".

(iv) The node description has also been left blank.

(It is again noted that the user can cange the default values to desired values as identified by the particular requirement and applications.)

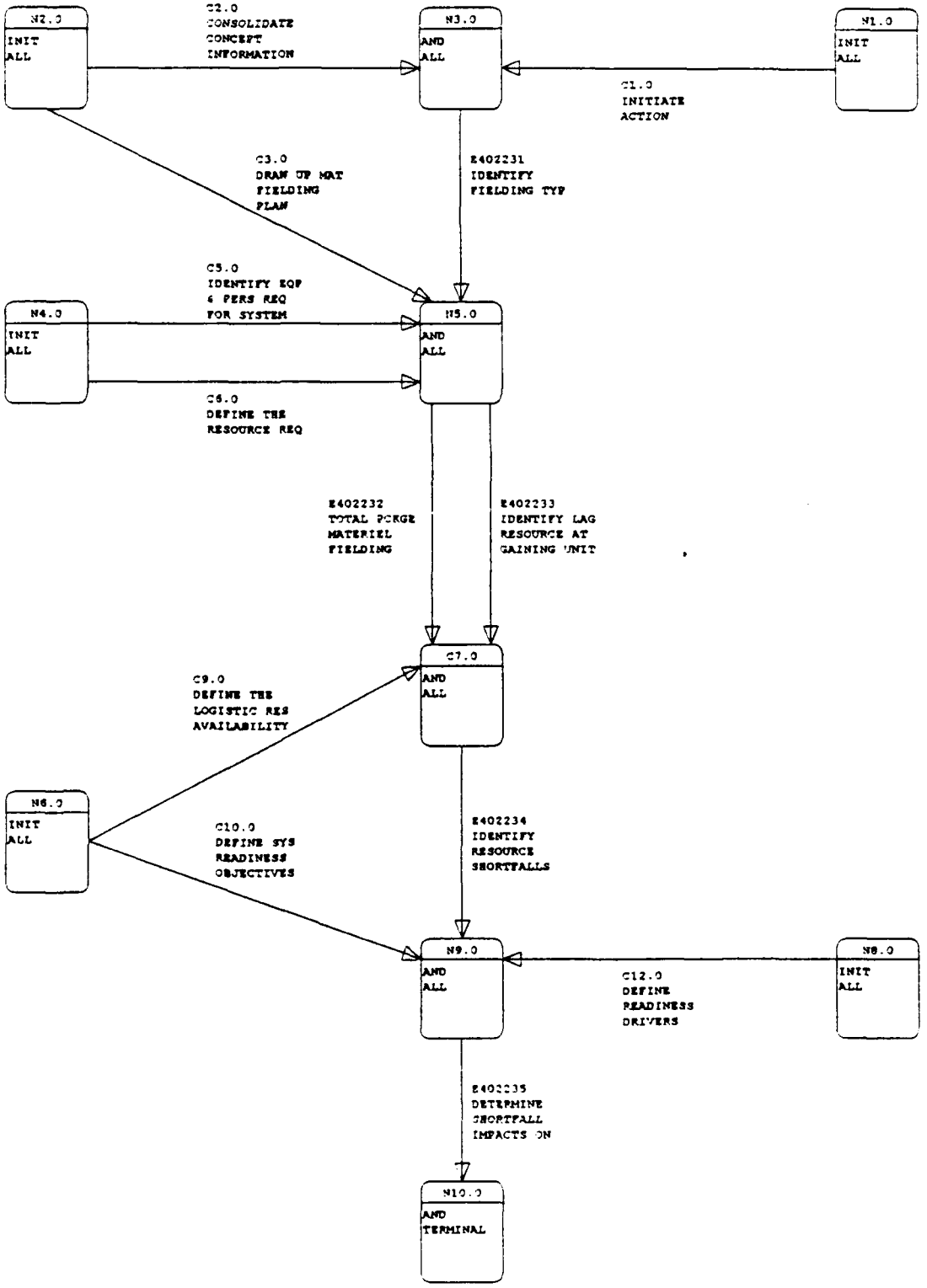
DOCUMENTATION:

With every project report APJ will be providing the following documents relating to the VERT:

(i) A VERt network diagram corresponding to a particular data flow diagram.

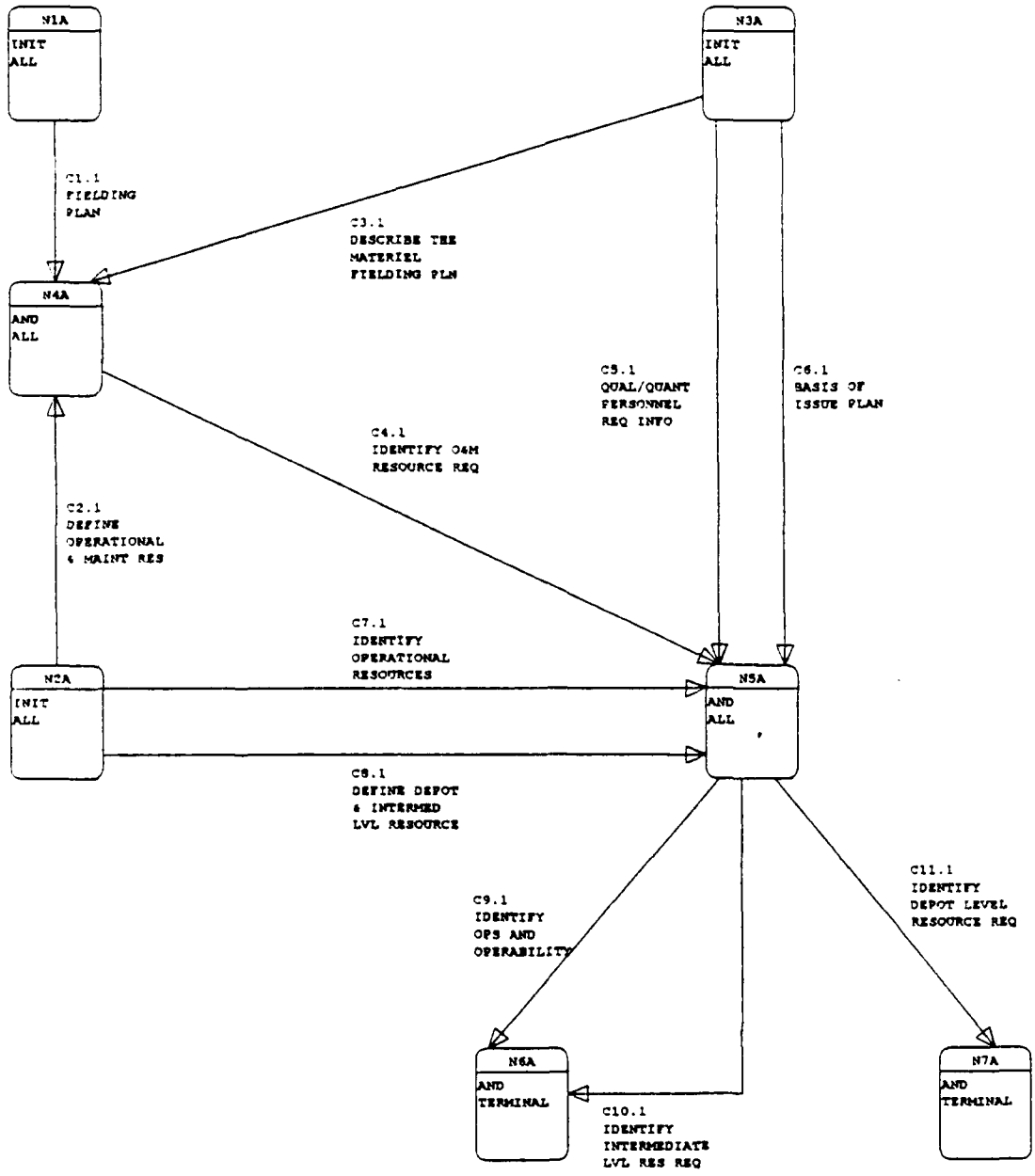
(ii) A print out of the VERT network inputs for the particular data flow diagrams.

(iii) A floppy disc containing the sample input, print and the simulation output files for the default VERT network.


N2.0
INIT
ALL
C2.0
CONSOLIDATE
CONCEPT
INFORMATION
N3.0
AND
ALL
N1.0
INIT
ALL
C1.0
INITIATE
ACTION
C3.0
DRAW UP MAT
FIELDING
PLAN
E402231
IDENTIFY
FIELDING TYP
C5.0
IDENTIFY EQP
& PERS REQ
FOR SYSTEM
N4.0
INIT
ALL
N5.0
AND
ALL
C6.0
DEFINE THE
RESOURCE REQ
E402232
TOTAL PCRGE
MATERIEL
FIELDING
E402233
IDENTIFY LAG
RESOURCE AT
GAINING UNIT
C7.0
AND
ALL
C9.0
DEFINE THE
LOGISTIC RES
AVAILABILITY
N6.0
INIT
ALL
C10.0
DEFINE SYS
READINESS
OBJECTIVES
E402234
IDENTIFY
RESOURCE
SHORTFALLS
N9.0
AND
ALL
N8.0
INIT
ALL
C12.0
DEFINE
READINESS
DRIVERS
E402235
DETERMINE
SHORTFALL
IMPACTS ON
N10.0
AND
TERMINAL
402.2.3 IMPACT OF SHORTFALLS
Created by: CRAO
Revised by: CRAO
Date changed: 15-OCT-89

```
1          N E W    N E T W O R K                    PAGE   1
                1         2         3         4         5         6         7
       12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
 1. 0016  10                    IMPACT OF RESOURCE SHORTFALLS
                +         +         +         +         +         +         +
 2. C1.0     N1.0     N3.0      1.0 INITIATE ACTION
 3. C1.0     DTIME 1           2       10.0      20.0
 4. C1.0     DCOST 1           2       10.0     100.0
 5. C1.0     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
 6. C2.0     N2.0     N3.0      1.0 CONSOLIDATE CONCEPT INFORMATION
 7. C2.0     DTIME 1           2       10.0      20.0
 8. C2.0     DCOST 1           2       10.0     100.0
 9. C2.0     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
10. C3.0     N2.0     N5.0      1.0 DRAW UP MATERIEL FIELDING PLAN
11. C3.0     DTIME 1           2       10.0      20.0
12. C3.0     DCOST 1           2       10.0     100.0
13. C3.0     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
14. E402231  N3.0     N5.0      1.0 IDENTIFY FIELDING TYPE
15. E402231  DTIME 1           2       10.0      20.0
16. E402231  DCOST 1           2       10.0     100.0
17. E402231  DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
18. C5.0     N4.0     N5.0      1.0 IDENTIFY EQUIPMENT AND PERSONNEL REQ FOR TH
19. C5.0     DTIME 1           2       10.0      20.0
20. C5.0     DCOST 1           2       10.0     100.0
21. C5.0     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
22. C6.0     N4.0     N5.0      1.0 DEFINE THE RESOURCE REQUIREMENTS
23. C6.0     DTIME 1           2       10.0      20.0
24. C6.0     DCOST 1           2       10.0     100.0
25. C6.0     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
26. E402232  N5.0     N7.0      1.0 TOTAL PACKAGE MATERIEL FIELDING PLAN
27. E402232  DTIME 1           2       10.0      20.0
28. E402232  DCOST 1           2       10.0     100.0
29. E402232  DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
30. E402233  N5.0     N7.0      1.0 IDENTIFY LAG RESOURCE AT GAINING UNIT
31. E402233  DTIME 1           2       10.0      20.0
32. E402233  DCOST 1           2       10.0     100.0
33. E402233  DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
34. C9.0     N6.0     N7.0      1.0 DEFINE THE LOGISTIC RESOURCE AVAILABILITY
35. C9.0     DTIME 1           2       10.0      20.0
36. C9.0     DCOST 1           2       10.0     100.0
37. C9.0     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
38. C10.0    N6.0     N9.0      1.0 DEFINE SYSTEM READINESS OBJECTIVES
39. C10.0    DTIME 1           2       10.0      20.0
40. C10.0    DCOST 1           2       10.0     100.0
41. C10.0    DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
42. E402234  N7.0     N9.0      1.0 IDENTIFY RESOURCE SHORTFALLS
43. E402234  DTIME 1           2       10.0      20.0
44. E402234  DCOST 1           2       10.0     100.0
45. E402234  DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
```

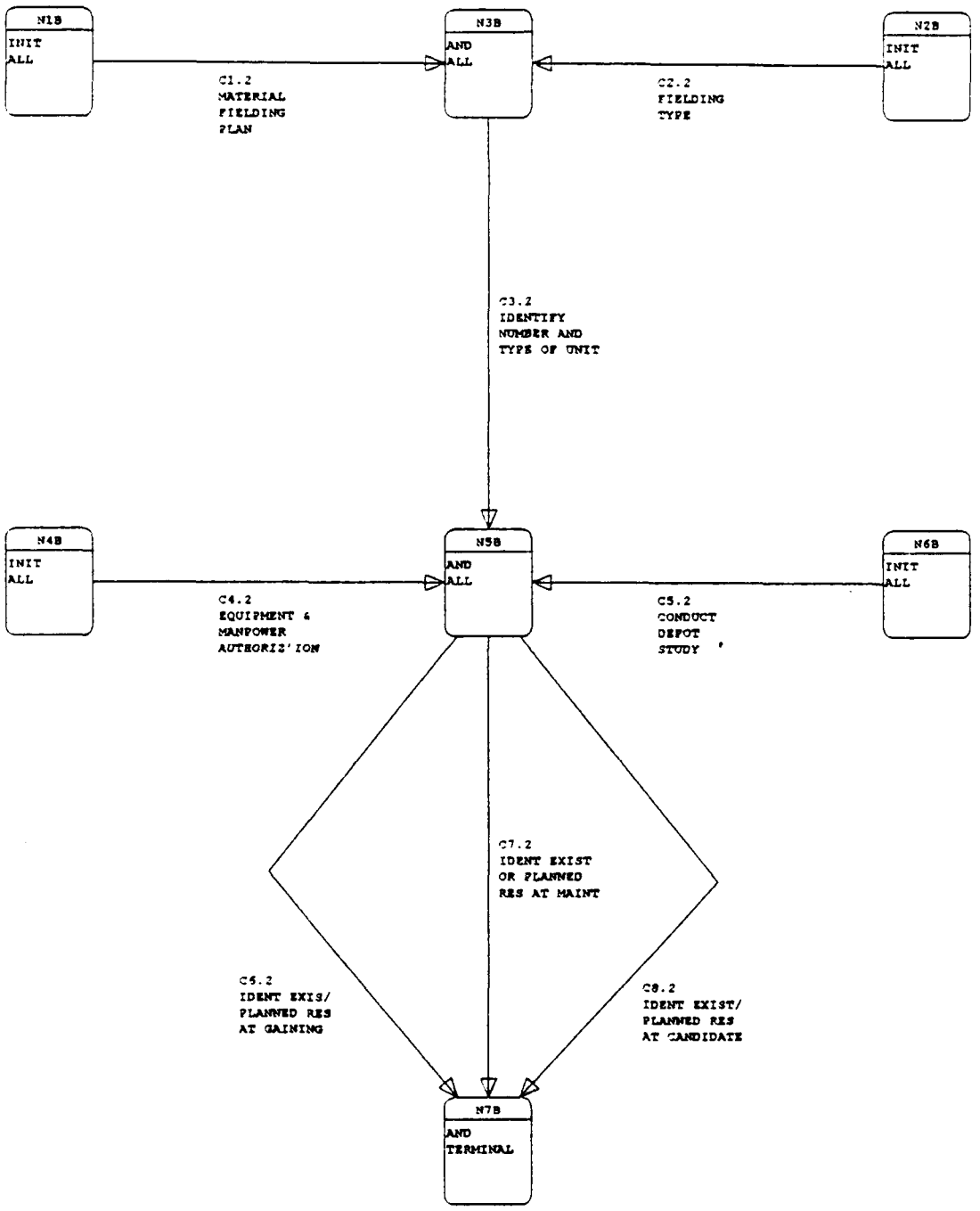
```
                1         2         3         4         5         6         7
       12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
1         N E W    N E T W O R K                    PAGE   2
                1         2         3         4         5         6         7
       12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
   46. C12.0    N8.0     N9.0      1.0 DEFINE READINESS DRIVERS
   47. C12.0    DTIME 1           2       10.0       20.0
   48. C12.0    DCOST 1           2       10.0      100.0
   49. C12.0    DPERF 1           2       10.0       50.0
                 +         +         +         +         +         +         +
   50. E402235 N9.0     N10.0     1.0 DEFINE SHORTFALLS IMPACT ON SYSTEM READINES
   51. E402235 DTIME 1           2       10.0       20.0
   52. E402235 DCOST 1           2       10.0      100.0
   53. E402235 DPERF 1           2       10.0       50.0
                 +         +         +         +         +         +         +
   54. ENDARC
                 +         +         +         +         +         +         +
   55. N1.0     1  2 0 0
                 +         +         +         +         +         +         +
   56. N3.0     2  2 0 0
                 +         +         +         +         +         +         +
   57. N2.0     1  2 0 0
                 +         +         +         +         +         +         +
   58. N5.0     2  2 0 0
                 +         +         +         +         +         +         +
   59. N4.0     1  2 0 0
                 +         +         +         +         +         +         +
   60. N7.0     2  2 0 0
                 +         +         +         +         +         +         +
   61. N6.0     1  2 0 0
                 +         +         +         +         +         +         +
   62. N9.0     2  2 0 0
                 +         +         +         +         +         +         +
   63. N8.0     1  2 0 0
                 +         +         +         +         +         +         +
   64. N10.0    2  1 0 0
                 +         +         +         +         +         +         +
   65. ENDNODE
                1         2         3         4         5         6         7
       12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
```



402.2.3.2A LOG RES REQ FLD SYS
Created by: CRAU
Revised by: CRAU
Date changed: 13-OCT-89

```
      N E W    N E T W O R K                    PAGE   1
               1         2         3         4         5         6         7
     12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
  1. 0016  10                    RESOURCE REQUIREMENT FIELD SYSTEM
                +         +         +         +         +         +         +
  2. C1.1     N1A      N4A       1.0 GET TYPE OF FIELDING PLAN
  3. C1.1     DTIME 1           2       10.0      20.0
  4. C1.1     DCOST 1           2       10.0     100.0
  5. C1.1     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
  6. C2.1     N2A      N4A       1.0 GET INTERMEDIATE LEVEL RESOURCE REQUIREMENT
  7. C2.1     DTIME 1           2       10.0      20.0
  8. C2.1     DCOST 1           2       10.0     100.0
  9. C2.1     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
 10. C3.1     N3A      N4A       1.0 DESCRIBE THE MATERIEL FIELDING PLAN
 11. C3.1     DTIME 1           2       10.0      20.0
 12. C3.1     DCOST 1           2       10.0     100.0
 13. C3.1     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
 14. C4.1     N4A      N5A       1.0 IDENTIFY O&M RESOURCE REQUIREMENTS
 15. C4.1     DTIME 1           2       10.0      20.0
 16. C4.1     DCOST 1           2       10.0     100.0
 17. C4.1     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
 18. C5.1     N3A      N5A       1.0 QUAL AND QUANT PERSONNEL REQUIREMENT INFORM
 19. C5.1     DTIME 1           2       10.0      20.0
 20. C5.1     DCOST 1           2       10.0     100.0
 21. C5.1     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
 22. C6.1     N3A      N5A       1.0 GET BASIS OF ISSUE MAINTENANCE SUPPORT PLAN
 23. C6.1     DTIME 1           2       10.0      20.0
 24. C6.1     DCOST 1           2       10.0     100.0
 25. C6.1     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
 26. C7.1     N2A      N5A       1.0 IDENTIFY OPERATIONAL RESOURCES
 27. C7.1     DTIME 1           2       10.0      20.0
 28. C7.1     DCOST 1           2       10.0     100.0
 29. C7.1     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
 30. C8.1     N2A      N5A       1.0 DEFINE DEPOT AND INTERMEDIATE LEVEL RESOURC
 31. C8.1     DTIME 1           2       10.0      20.0
 32. C8.1     DCOST 1           2       10.0     100.0
 33. C8.1     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
 34. C9.1     N5A      N6A       1.0 IDENTIFY OPERATIONS AND ORGANIZATION RESOUR
 35. C9.1     DTIME 1           2       10.0      20.0
 36. C9.1     DCOST 1           2       10.0     100.0
 37. C9.1     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
 38. C10.1    N5A      N6A       1.0 IDENTIFY INTERMEDIATE LEVEL RESOURCE REQUIR
 39. C10.1    DTIME 1           2       10.0      20.0
 40. C10.1    DCOST 1           2       10.0     100.0
 41. C10.1    DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
 42. C11.1    N5A      N7A       1.0 IDENTIFY DEPOT LEVEL RESOURCE REQUIREMENTS
 43. C11.1    DTIME 1           2       10.0      20.0
 44. C11.1    DCOST 1           2       10.0     100.0
 45. C11.1    DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
```

```
                1         2         3         4         5         6         7
       12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
1         N E W    N E T W O R K                    PAGE   2
                1         2         3         4         5         6         7
       12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
   46. ENDARC
                +         +         +         +         +         +         +
   47. N1A      1  2 0 0
                +         +         +         +         +         +         +
   48. N4A      2  2 0 0
                +         +         +         +         +         +         +
   49. N2A      1  2 0 0
                +         +         +         +         +         +         +
   50. N3A      1  2 0 0
                +         +         +         +         +         +         +
   51. N5A      2  2 0 0
                +         +         +         +         +         +         +
   52. N6A      2  1 0 0
                +         +         +         +         +         +         +
   53. N7A      2  1 0 0
                +         +         +         +         +         +         +
   54. ENDNODE
                1         2         3         4         5         6         7
       12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
```



402.2.3.3A LOG FSRCE AVAILABLE
Created by: CHAU
Revised by: CHAU
Date changed: 13-OCT-99

```
      N E W    N E T W O R K                    PAGE   1
               1         2         3         4         5         6         7
      12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
 1. 0016  10                    LOGISTIC RESOURCE AVAILABILITY
                +         +         +         +         +         +         +
 2. C1.2     N1B      N3B       1.0 MATERIEL FIELDING PLAN
 3. C1.2     DTIME 1           2       10.0      20.0
 4. C1.2     DCOST 1           2       10.0     100.0
 5. C1.2     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
 6. C2.2     N2B      N3B       1.0 GET TYPE OF FIELDING
 7. C2.2     DTIME 1           2       10.0      20.0
 8. C2.2     DCOST 1           2       10.0     100.0
 9. C2.2     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
10. C3.2     N3B      N5B       1.0 IDENTIFY NUMBER AND TYPE OF UNIT
11. C3.2     DTIME 1           2       10.0      20.0
12. C3.2     DCOST 1           2       10.0     100.0
13. C3.2     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
14. C4.2     N4B      N5B       1.0 EQUIPMENT AND MANPOWER AUTHORIZATIONS
15. C4.2     DTIME 1           2       10.0      20.0
16. C4.2     DCOST 1           2       10.0     100.0
17. C4.2     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
18. C5.2     N6B      N5B       1.0 GET MAINTENANCE SUPPORT PLAN
19. C5.2     DTIME 1           2       10.0      20.0
20. C5.2     DCOST 1           2       10.0     100.0
21. C5.2     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
22. C6.2     N5B      N7B       1.0 IDENTIFY EXISTING/PLANNED RESOURCES AT GAIN
23. C6.2     DTIME 1           2       10.0      20.0
24. C6.2     DCOST 1           2       10.0     100.0
25. C6.2     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
26. C7.2     N5B      N7B       1.0 IDENTIFY EXISTING/PLANNED RSRCE AT MAINTENA
27. C7.2     DTIME 1           2       10.0      20.0
28. C7.2     DCOST 1           2       10.0     100.0
29. C7.2     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
30. C8.2     N5B      N7B       1.0 IDENTIFY EXISTING/PLANNED RSRCE AT CANDIDAT
31. C8.2     DTIME 1           2       10.0      20.0
32. C8.2     DCOST 1           2       10.0     100.0
33. C8.2     DPERF 1           2       10.0      50.0
                +         +         +         +         +         +         +
34. ENDARC
                +         +         +         +         +         +         +
35. N1B      1  2 0 0
                +         +         +         +         +         +         +
36. N3B      2  2 0 0
                +         +         +         +         +         +         +
37. N2B      1  2 0 0
                +         +         +         +         +         +         +
38. N5B      2  2 0 0
                +         +         +         +         +         +         +
39. N4B      1  2 0 0
                +         +         +         +         +         +         +
40. N6B      1  2 0 0
                +         +         +         +         +         +         +
                1         2         3         4         5         6         7
```

```
      12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
1        N E W    N E T W O R K                    PAGE   2
                 1         2         3         4         5         6         7
      12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
   41. N7B      2  1 0 0
                 +         +         +         +         +         +         +
   42. ENDNODE
                 1         2         3         4         5         6         7
      12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012
```

ANNEX E

STRUCTURED SYSTEMS ANALYSIS

Fundamentals

ANNEX E
STRUCTURED SYSTEMS ANALYSIS

Fundamentals

Structured Systems Analysis (SSA) has recently become an industry standard for generating Data Flow Diagrams (replacing "logic diagrams" or "flow charts") to aid in coordinating the functions to be performed by a computer program and its associated Inputs/Outputs (I/O). During the SSA, each set of "flow charts" can be checked by the potential user to assure that there is complete agreement on what is to be done by the program, and how it is to be accomplished. It also provides considerable flexibility for updating or changing the program.

Six basic elements (see figure 1) are used in SSA:

1. Process (PRC)
2. Data Flow (DAF)
3. Data Store (DAS)
4. External Entity (EXT)
5. Data Flow Diagram (DFD)
6. Data Dictionary (DCT)

PROCESS (Represented by a Circle):

A function or operation to be performed which can be explained by a set of instructions representing a single task, e.g., "calculate interest on a loan", "prepare a draft report". If the Process description is too complex to describe in a few steps, it may be necessary to develop a lower level description (see below).

DATA FLOW (Lines interconnecting Processes or I/Os):

Each function or Process cannot be a stand-alone in a complex network. To have any meaning in a program, each process must be initiated by a previous action and/or provided information on which to act. Furthermore, a Process must result in an output which is the input to the next logical Process. These inputs, outputs, or initiating actions are identified as Data Flows, and are represented by the Data Flow lines indicating its point of origin and the process to which it provides data.

DATA STORE (Represented by two parallel lines):

Although some Processes generate data used as input to a succeeding Process, there is often a need to "gather or collect" information from files in which it is stored. This information may come from an external source (such as a MIL-STD, Army regulation, historical experience files, etc.), or an internal source or file in which data is temporarily stored for use by succeeding processes. These Data Stores can be visualized as a "file cabinet", in which the data are stored for later retrieval).

EXTERNAL ENTITY (Represented by a Rectangle):

Each program or logical process must have an initiating action, a "point" of disposition of the results, and possible input guidance or instructions. Each of these have authorities, functions, or applications which are independent of the program Process (although required by the program Process). Thus, these activities, agencies, or facilities are considered "External Entities" to the program.

DATA FLOW DIAGRAM:

The general arrangement of the above can be readily seen. First, the circle or Process describes what has to be done; the interconnecting lines represent the Data Flows, together with the specific description of all I/Os. The Data Stores identify the source and/or file designation of a data base, and the External Entities represent those activities remote from the Process, which are the source of guidance or the recipients of the program. This combination of Processes, Data Flows, Data Stores, and External Entities constitutes a "Data Flow Diagram". The unique feature of the Data Flow Diagram (DFD) is that each process can be considered independently, permitting a change to be made in one Process without a major change in the overall program.

DATA DICTIONARY:

The Data Dictionary consists of a complete description of each of the basic elements. For the Process, it contains a step-by-step description of what has to be performed. The description of the Data Flow identifies the nomenclature of the data, a detailed description of its content, and its source. The Data Stores and External Entities are described, including possible location.

The Data Dictionary (a living document) begins with a description of the first Process and is continually built-up as the Data Flow Diagrams are expanded, detailed, and eventually completed.

APPROACH TO PERFORMING STRUCTURED SYSTEM ANALYSIS:

The best approach to Structured Systems Analysis is to assume that the program consists of a series of processes, each of which are to be assigned to an inexperienced analyst. Each analyst is to be walked through the assigned process of the Program, explaining step-by-stepwhat functions have to be performed or what actions have to be taken to accomplish the process. The analyst is also informed where the information is coming from (input Data Flow), what is to be generated by each process (output Data Flow), where the data base may to be found (Data Stores), and who to contact for guidance (External Entities).

The best way to initiate a SSA is to set down the point of origin of a program, its final goal(s), and the intermediate functions or actions needed to get from beginning to goal. Each step should be considered as a Process - some may be sequential and others parallel. Then, the steps needed to accomplish the Process should be described. If the description is complex and needs intermediate steps, the Process is then a candidate for an "explosion". That is, the top (or upper) level Process is considered as a "project" and its own Data Flow Diagram is prepared.

When writing the step-by-step procedures in the Process, certain elements of data (or information) must be made available for the procedure. Each element of data is considered as an input Data Flow, which is identified and described. The product (or result) of a Process is an output Data Flow element.

Each Data Flow to the Process must originate from:

1. an earlier Process
2. a Data Store (or file)
3. an External Entity.

These sources are also identified, described and put into the Data Dictionary. As soon as the last portion of the Data Flow Diagram has been described, the SSA is complete.

The structured Analysis phase is followed by Structured Design, then by programming and finally software test and validation. The organization of Structured Analysis and its relationship to Structured System Design is shown on Figure 2.

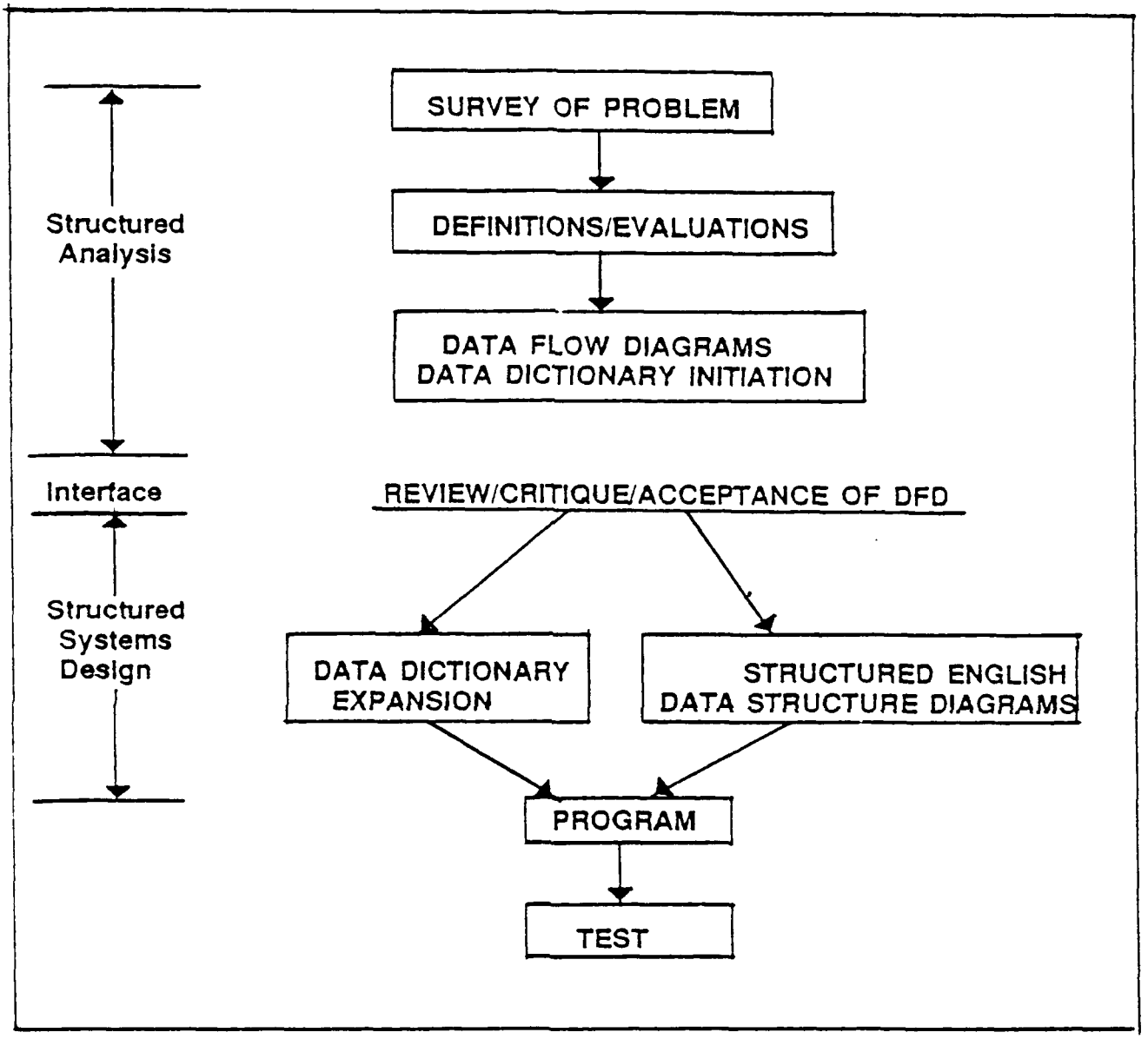


Figure 1. Structured Analysis & Structured Systems Design Organization

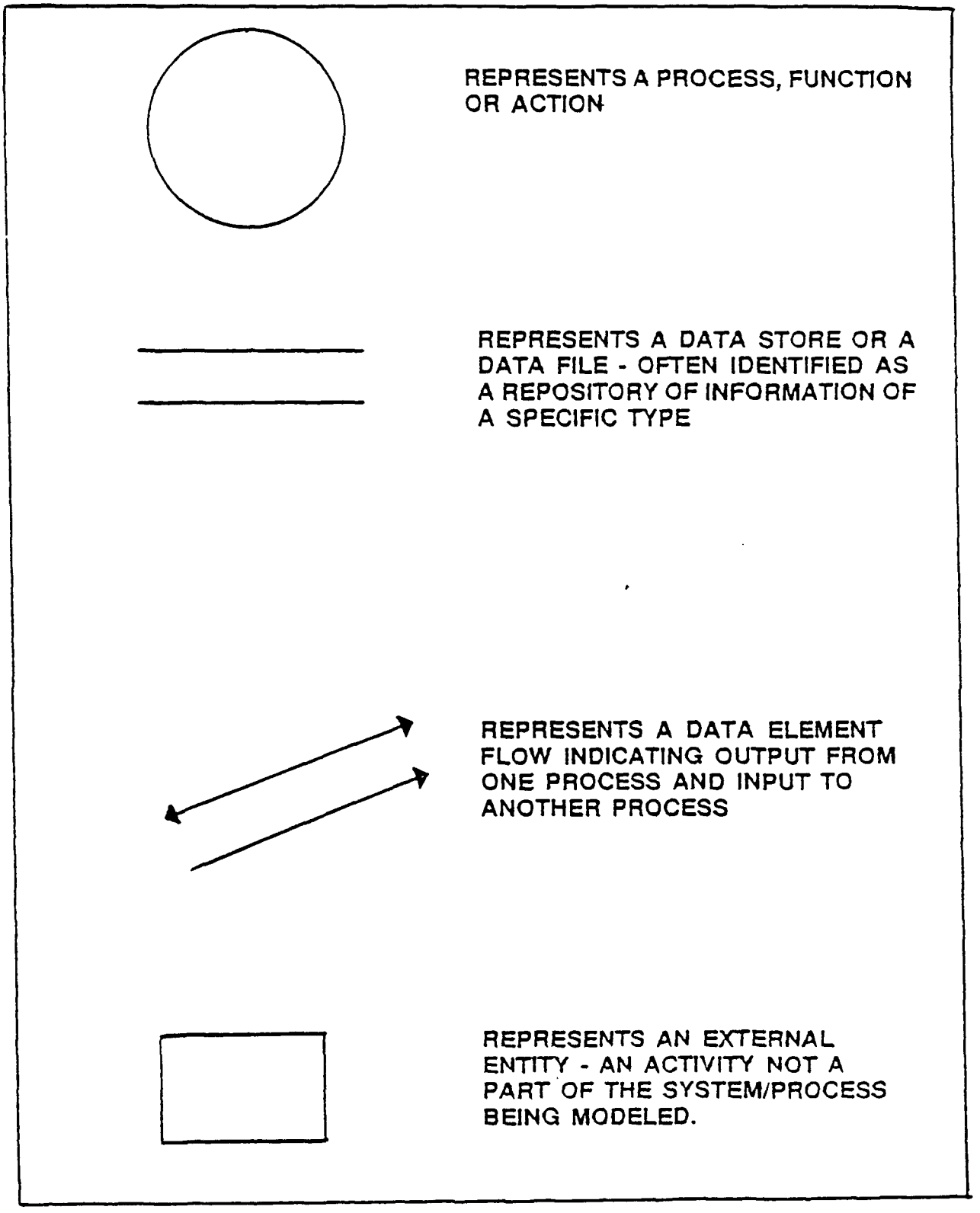


Figure 2. Standard DFD Symbol Definitions