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STRUCTURED ANALYSIS/DESIGN

**LSA TASK 303
EVALUATION OF ALTERNATIVES
AND TRADE-OFF ANALYSIS**

**SUBTASK 303.2.5
MANPOWER & PERSONNEL TRADE-OFFS**

APJ 966-219

APJ



AMERICAN POWER JET CO. RIDGEFIELD N.J.

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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 303.2.5, "Manpower and Personnel Trade-Offs", 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.					
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SYSTEMS ANALYSIS FUNDAMENTALS, AND MANPOWER AND PERSONNEL TRADE-OFFs.

APJ 966-219

STRUCTURED ANALYSIS/DESIGN

**LSA TASK 303
EVALUATION OF ALTERNATIVES
AND TRADE-OFF ANALYSIS**

**SUBTASK 303.2.5
MANPOWER & PERSONNEL TRADE-OFFS**

under

CONTRACT DAAA21-86-D-0025

for

**HQ US AMCCOM
INTEGRATED LOGISTIC SUPPORT OFFICE
AMSMC-LSP
ROCK ISLAND, IL**

by

AMERICAN POWER JET COMPANY

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FOREWORD

APJ, under contract to HQs, AMCCOM, has initiated the automation of the LSA Tasks (MIL-STD-1388-1) and the assessment of ILS elements (AR 700-127). A major goal is to unify military and contractor approach to the performance of ILS & 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 303.2.5, "Manpower and Personnel Trade-Offs" 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) that identify 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 monitor contractors. VERT tools 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 (Annex E) 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.

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 303 "Evaluation of Alternatives & Trade-Off Analysis", ("LSA Subtask 303.2.5, "Manpower & Personnel Trade-Offs") 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 for the identification of LSA Task 303 "Evaluation of Alternatives & Trade-Off Analysis", LSA Subtask 303.2.5, "Manpower and Personnel Trade-Off", 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 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 303.2.5 DESCRIPTION

The "Manpower and Personnel Trade-Offs" report examines the operation and support tasks associated with each alternate system equipment in order to select the system/equipment that meets the readiness, support, and cost criteria with the lowest overall manpower requirements. This is accomplished by examining the operation and support functional requirements developed during LSA Task 301. From this data, a qualitative and quantitative approach is provided to develop estimated manpower requirements and other parameters associated with operating and supporting the system/equipment.

The qualitative and quantitative manpower requirements for each alternative system/equipment are fed into the trade-off in order to determine those that meet readiness, cost, and supportability constraints. A sensitivity analysis based on the manpower parameters is performed to determine the best system/equipment. Finally, the best alternative system/equipment is selected considering operation and maintenance planning, and life cycle implications.

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 quantify any complex process identified in the top level DFD.

f

4. Complete the Data Dictionary portion of the Analysis by describing 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 303.2.5 - MANPOWER AND PERSONNEL TRADE-OFFS

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 five (5) DFDs have been developed to structure the LSA subtask relative to operations and other support functions:

1. 303.2.5 Manpower & Personnel Trade-Offs Overview
2. 303.2.5.4A Development of Manpower and Personnel Requirements
3. 303.2.5.5A Conduct Manpower & Personnel Trade-Offs
4. 303.2.5.6A Develop Plans for Training in Operations/Maintenance
5. 303.2.5.7A Life-Cycle Assessment

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 303.2.5
First Indenture.....LSA DFD 303.2.5.4A

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, "303.2.5", refers to the section in MIL-STD-1388-1A which describes the review items. One of the processes (bubbles) on the top level diagram (303.2.5.4) is expanded and identified as "303.2.5.4A". (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 report presents those Data Dictionary entries necessary to understand the overall concept and provides details of the processes depicted in the DFDs. To facilitate review of the diagrams, data flow, processes, and 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 Batch 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 303

EVALUATION OF ALTERNATIVES & TRADE-OFF ANALYSIS

ANNEX A

LSA TASK 303
EVALUATION OF ALTERNATIVES AND TRADE-OFF ANALYSIS*

303.1 PURPOSE: To determine the preferred support system alternative(s) for each system/equipment alternative and to participate in alternative system trade-offs to determine the best approach (support, design, and operation) which satisfies the need with the best balance between cost, schedule, performance, readiness, and supportability.

(Description of purpose abstracted from MIL-STD-1388-1 related to the specific LSA task being developed.)

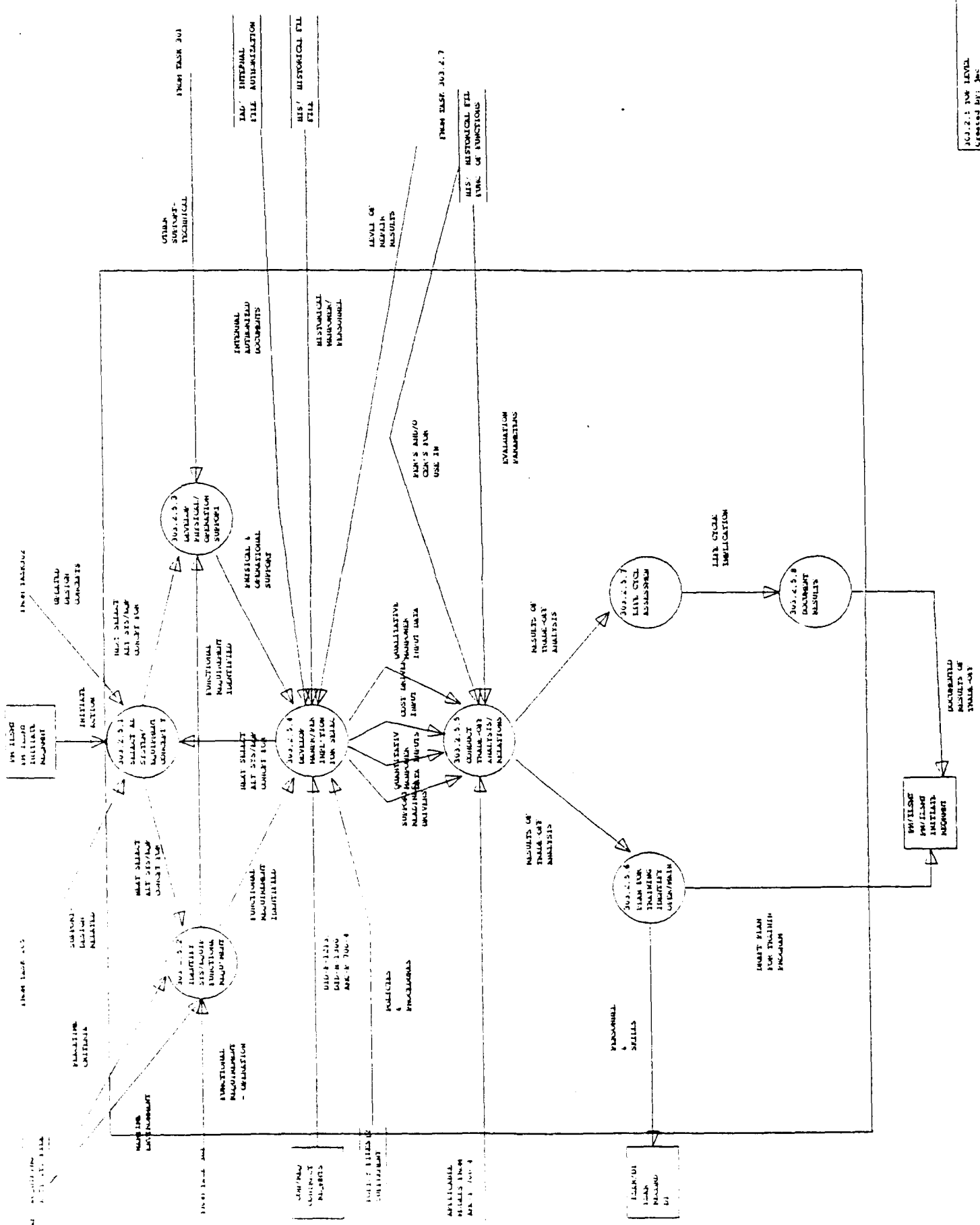
303.2.5 TASK DESCRIPTION: Estimate and evaluate the manpower and personnel implications of alternative system/equipment concepts in terms of total numbers of personnel required, Job classifications, skill levels, and experience required. This analysis shall include organizational overhead requirements, error rates, and training requirements.

A-1

* Abstracted verbatim from MIL-STD-1388-1A, April 11, 1983, Pages 36-37.

ANNEX B

MANPOWER & PERSONNEL TRADE-OFFS
SUBTASK 303.2.5
DATA FLOW DIAGRAMS
AND
PROCESS DATA DICTIONARY



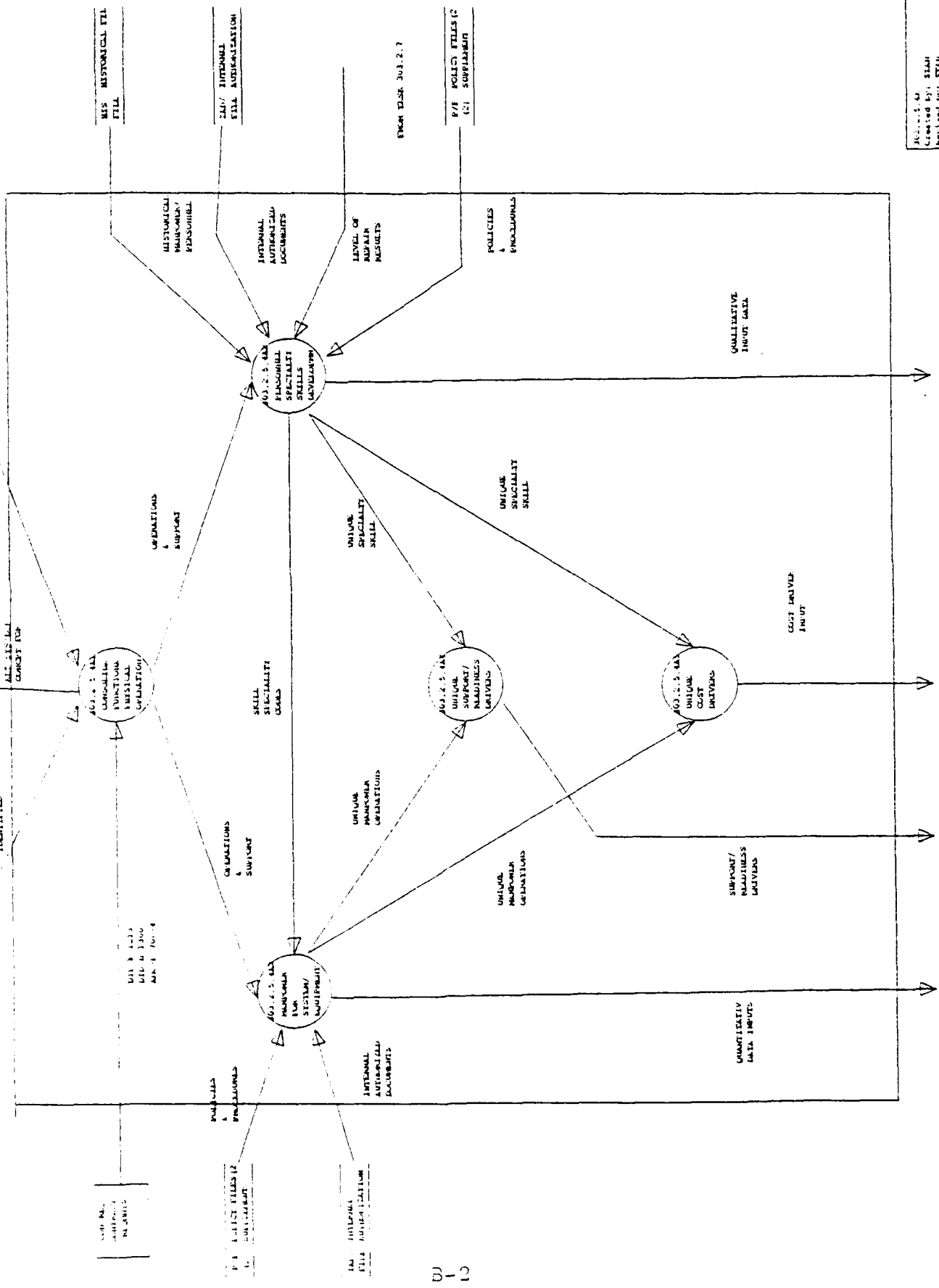
303.2.1 WORK LEVEL
 Created by: JAC
 Revised by: STB
 Date changed: 21-Jan-85

FROM USE 203.2.7

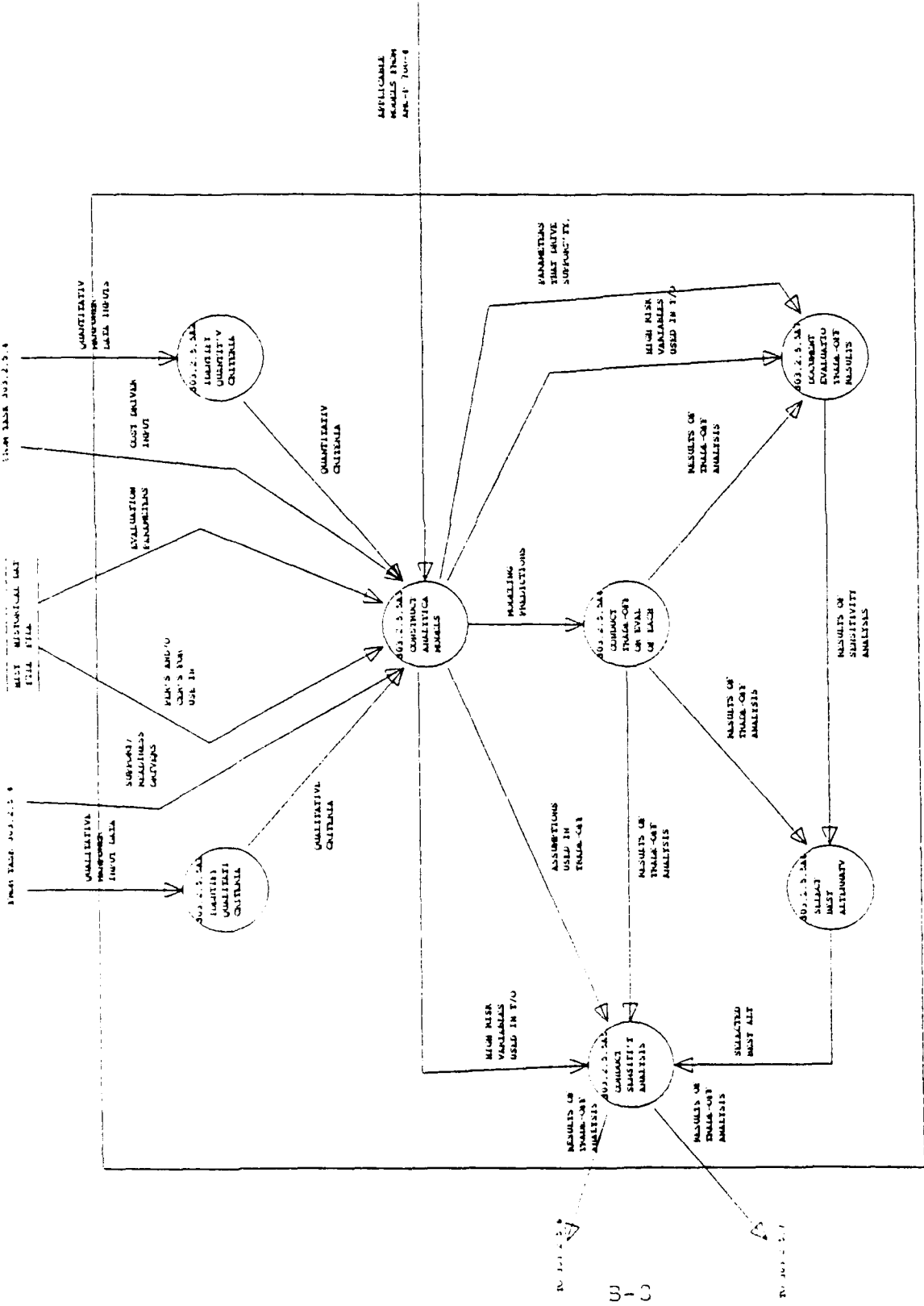
MISSION & OPERATIONAL SUPPORT

FUNCTIONAL REQUIREMENT IDENTIFIER

FROM USE 203.2.7



AC-111-01
 Created by: RLH
 Revised by: RLH
 Date changed: 30-05-08



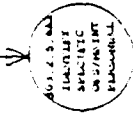
APPLICABLE
MODELS FROM
APR-17 TO APR-4

TRADE-OFF ANALYSIS PROCESS

FIG. 2.5.31
Created by: JAC
Revised by: STAN
Date changed: 31-JAN-89

FINAL REPORT 1977-1978

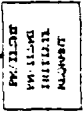
RESULTS OF
THREE CITY
ANALYSES



PROGRAM
SKILLS



ANALYSIS
OF THE
PROGRAM

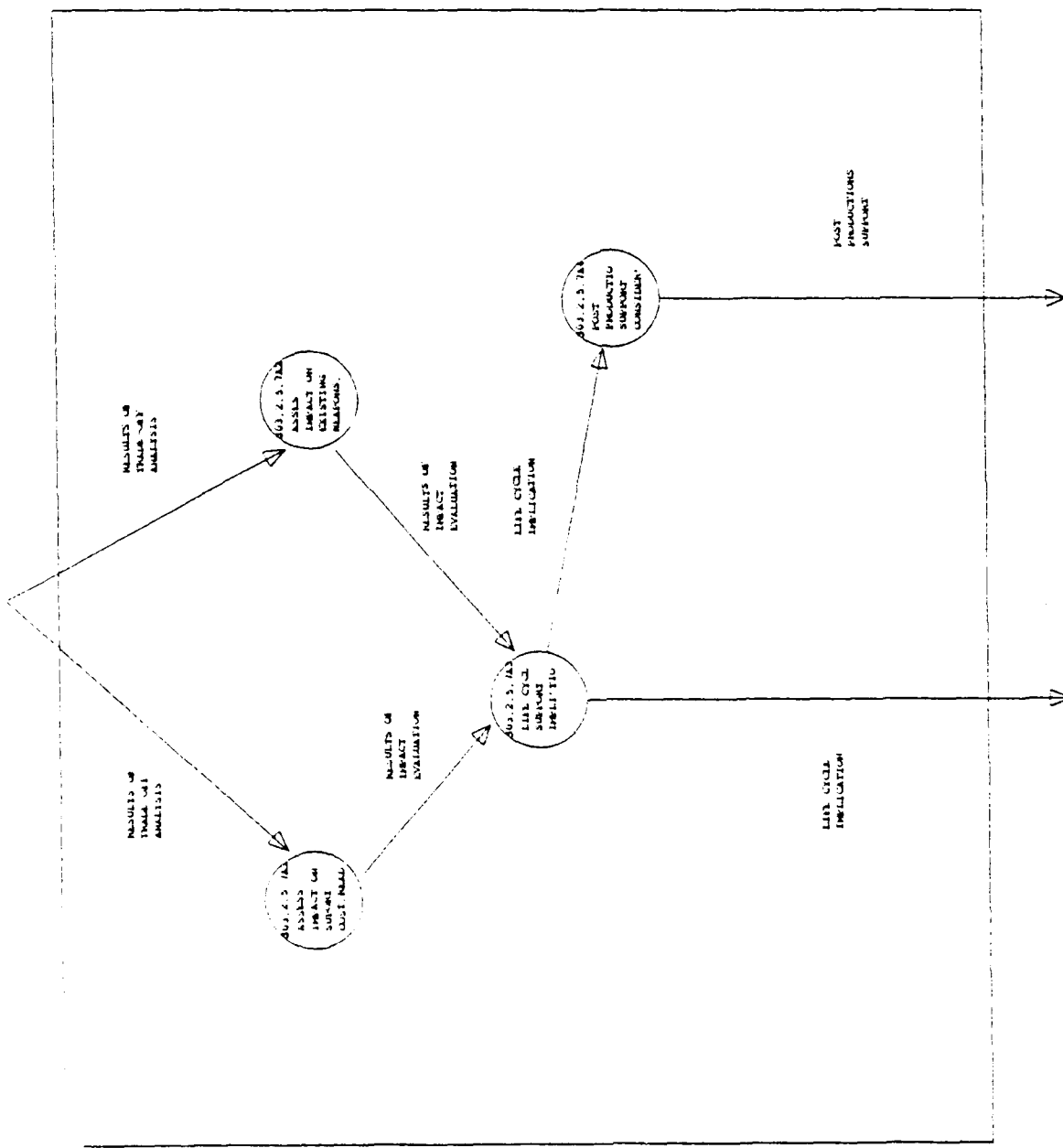


STRIP
PROGRAM



302-3 44
 Created by: STSM
 Revised by: STSM
 Date changed: 01-11-88

FORM IASB 403.2.5



TO TASK 403.2.5.8

403.2.5.7a
 Created by: STAM
 Revised by: STAM
 Date changed: 28-MAR-88

Name	Label	Description
303.2.5.1	SELECT ALT	<p>AFTER REVIEWING THE NEEDS FOR THE EXISTING OR BASELINE SYSTEM/EQUIPMENT, SELECT ONE OF THE POTENTIAL ALTERNATE SYSTEM/EQUIPMENT CONCEPTS FOR FURTHER STUDY. THIS IS AN ITERATIVE PROCESS (SEE TASK CONCEPT TO 303.2.5.4) SO THAT ALL POTENTIAL CANDIDATES WILL BE SELECTIVELY ANALYZE REVIEWED.</p> <p>EACH POTENTIAL ALTERNATE SYSTEM/EQUIPMENT MUST BE EVALUATED TO ENSURE THAT IT IS COMPATABLE WITH THE ALTERNATE OPERATIONAL & SUPPORT CONCEPTS REQUIRED TO FULFILL THE IDENTIFIED NEEDS.</p> <p>SOURCE OF DATA: - PROGRAM MANAGER'S INITIAL ACTION FILE. - TASK 302 (UPDATED DESIGN CONCEPTS). - TASK 205 (SUPPORT - DESIGN RELATED). - TASK 203 (TRADEOFF & SENSITIVITY STUDIES).</p>
303.2.5.2	IDENTIFY	<p>IDENTIFY THE FUNCTIONAL REQUIREMENTS OF THE ALTERNATE SYS/EQUIP' SYSTEM/EQUIPMENT TO ACCOMPLISH THE INTENDED MISSION OR TASK. FOR FUNCTIONAL EXAMPLE, AN AIRCRAFT WOULD HAVE TO TAKE OFF, FLY, LAND, USE RADAR ETC.; REQU'MENTS</p> <p>*ANY UNIQUE FUNCTIONS MAY REQUIRE SPECIAL ATTENTION WHEN PLANNING SUPPORT FOR THE ALTERNATE EQUIPMENT.</p> <p>SOURCE OF DATA: - 303.2.5.1 (THE SELECTED ALTERNATIVE). - TASK 301 (FUNCTIONAL REQUIREMENT IDENTIFICATION). - ACQUIRING ACTIVITY FILE (PEACETIME/WARTIME CRITERIA).</p>
303.2.5.3	DEVELOP	<p>IDENTIFY PHYSICAL OPERATIONS & SUPPORT FUNCTIONS FOR THE ALTERNATE PHYSICAL/ SYSTEM/EQUIPMENT RELATIVE TO THE FUNCTIONAL REQUIREMENTS DEVELOPED IN OPERATIONS SUBTASK 303.2.5.2. FOR EXAMPLE, SPECIFIC OPERATORS OF THE SUPPORT SYSTEM/EQUIPMENT- DRIVER, NAVIGATOR, GUNMAN ETC., SUPPORT PERSONNEL- CHARC/TICS MECHANICS, MACHINIST, WELDER, ETC.</p> <p>SOURCE OF DATA: - 303.2.5.1 (THE SELECTED ALTERNATIVE). - TASK 301 (OTHER OPERATION AND SUPPORT FUNCTIONS). - 303.2.5.2 (IDENTIFIED FUNCTIONAL REQUIREMENTS).</p>
303.2.5.4	DEVELOP FOR SELECT ALTERN'IVE	<p>I. DETERMINE MANPOWER & PERSONNEL REQUIREMENTS NEEDED TO OPERATE MANPR/PERS AND SUPPORT THE ALTERNATE SYSTEM/EQUIPMENT THROUGHOUT ITS INTENDED INPL'TIONS LIFE-CYCLE.</p> <p>II. RETURN TO TASK 303.2.5.1 TO SELECT THE NEXT ALTERNATE SYSTEM/EQUIPMENT. THIS PROCESS IS A ITERATIVE PROCESS IN ORDER THAT ALL POTENTIAL CANDIDATE SYSTEM/EQUIPMENT ARE FULLY INVESTIGATED IN THE TRADE-OFF STUDIES (TASK 303.2.5.5).</p> <p>SOURCE OF DATA: - INTERNAL AUTHORIZED DOCUMENTATION FILE. - HISTORICAL FILE (MANPOWER & PERSONNEL DATA). - 303.2.7 (LEVEL OF REPAIR ANALYSIS). - 303.2.5.2 (IDENTIFIED FUNCTIONAL REQUIREMENTS). - 303.2.5.3 (PHYSICAL OPERATIONS & SUPPORT REQUIREMENTS). - POLICY FILES (DID-F-1213, DID-H-1300, AMC-P 700-4).</p>

Name	Label	Description
303.2.5.4A1	CONSOLIDAT	<p>CONSOLIDATE IDENTIFIED FUNCTIONAL REQUIREMENTS, PHYSICAL AND FUNCTIONAL OPERATIONAL SUPPORT CHARACTERISTICS AND COMPILE THE EXACT TASKS THAT PHYSICAL & MUST BE ACCOMPLISHED, THE PREDICTED FREQUENCY THAT THE TASK MUST BE OPERATIONL PERFORMED AND THE PREDICTED TIME REQUIRED TO PERFORM THE TASK.</p> <p>REQUIREMTS</p> <p>SOURCE OF DATA: - 303.2.5.2 (FUNCTIONAL REQUIREMENTS IDENTIFIED). - 303.2.5.3 (DEVELOP PHYSICAL & OPERATONAL SUPPORT CHARACTERISTICS).</p>
303.2.5.4A2	PERSONNEL	<p>USING A LIST OF TASKS THAT MUST BE ACCOMPLISHED AND THE PREDICTED SPECIALTY TIME REQUIRED TO PERFORM THEM(LSA TASK 302.2.5.4A1), DEVELOP SKILLS REQUIREMENTS FOR SPECIFIC SKILL SPECIALTIES (SSC'S) IN ACCORDANCE TO AR DEVELOPMNT 611-1 (MOS DEVELOPMENT AND IMPLEMENTATION). STANDARDIZE MAINTENANCE TASKS WITH THE EXISTING SERVICE SKILL SPECIALTY STRUCTURE. THIS PROCESS IS DONE BY DETERMINING THE EXISTING PERSONNEL RESOURCES THAT CAN BE AVAILABLE TO SUPPORT THE ALTERNATE SYSTEM/EQUIPMENT.</p> <p>AFTER THE FRAMEWORK OF SSC'S HAS BEEN DEVELOPED, CATEGORIZE THE OPERATION AND/OR MAINTENANCE TASK INTO TO GROUPS--</p> <p>A. TASKS COMPARABLE TO THOSE REQUIRED BY EXISTING SSC'S. B. TASKS NOT COVERED BY EXISTING SSC'S WHICH MAY BE DUE TO NEW TECHNOLOGY (MODIFYING SSC'S OR CREATING NEW SSC'S WILL BE REQUIRED).</p> <p>PREDICT THE ANNUAL HOURS OF LABOR PER SSC BY MAINTENANCE LEVEL USING THE RESULTS OF THE REPAIR LEVEL ANALYSIS FROM TASK 303.2.7.</p> <p>SOURCE OF DATA: - HISTORICAL FILE (MANPOWER & PERSONNEL). - IAD FILE (INTERNAL AUTHORIZED DOCUMENTS). - 302.2.7 (LEVEL OF REPAIR ANALYSIS). - 303.2.5.4A1 (CONSOLIDATE FUNCTIONAL PHYSICAL & OPERATIONAL REQUIREMENTS).</p>
303.2.5.4A3	MANPOWER	<p>FOR SIMILAR SYSTEM/EQUIPMENT AND OPERATIONS & SUPPORT TASKS IDENTIFIED FOR SYSTEM/ THE SELECTED ALTERNATE SYSTEM/EQUIPMENT, DEVELOP THE MANPOWER EQUIPMENT REQUIREMENTS TO--</p> <p>DEVELOPMNT</p> <p>1. OPERATE THE SELECTED ALTERNATE SYSTEM/EQUIPMENT. 2. MAINTAIN & SUPPORT THE SELECTED ALTERNATE SYSTEM/EQUIPMENT.</p> <p>DETERMINE THE TOTAL NUMBER OF OPERATION & MAINTENANCE HOURS TO SUPPORT ONE ITEM OF EQUIPMENT. THEN, PREDICT THE TOTAL HOURS OF LABOR.</p> <p>SOURCE OF DATA: - 303.2.5.4A1 (OPERATIONS & SUPPORT TASKS IDENTIFIED). - HISTORICAL FILE (MANPOWER & PERSONNEL). - INTERNAL AUTHORIZATION DOCUMENTATION.</p>
303.2.5.4A4	UNIQUE	<p>SUPPORT/ THE LARGEST EFFECT ON THE SELECTED ALTERNATE SYSTEM/EQUIPMENT'S SUPPORT READINESS AND READINESS VALUES. THE EFFECTS ARE RELATED TO IDENTIFIED RISKS DRIVERS INVOLVED DUE TO NEW TECHNOLOGY, NEW SUPPORT EQUIPMENT, NEW THREATS OR NEW OPERATIONS.</p> <p>SOURCE OF DATA: - 303.2.5.4A2 (PERSONNEL SPECIALTY SKILL DEVELOPMENT). - 303.2.5.4A3 (MANPOWER FOR SYSTEM/EQUIPMENT DEVELOPMENT).</p>

Name	Label	Description
303.2.5.4A5	UNIQUE COST DRIVERS	DETERMINE THOSE MANPOWER & PERSONNEL SPECIALTY SKILL REQUIREMENTS THAT HAVE THE LARGEST EFFECT ON THE ALTERNATE SYSTEM/EQUIPMENT'S OPERATION & SUPPORT COSTS THROUGH IT'S INTENDED LIFE-CYCLZ. THE ADDED COSTS ARE DUE TO IDENTIFIED RISK FACTORS RELATED TO NEW TECHNOLOGY OR NEW SUPPORT EQUIPMENT. SOURCE OF DATA: - 303.2.5.4A2 (PERSONNEL SPECIALTY SKILL DEVELOPMENT). - 303.2.5.4A3 (MANPOWER FOR SYSTEM/EQUIPMENT DEVELOPMENT).
303.2.5.5	CONDUCT TRADE-OFF ANALYSIS/ RELATIONS EVALUATION	USING THE RESULTS OF THE MANPOWER AND PERSONNEL ANALYSES FOR EACH ALTERNATIVE SUPPORT CONCEPT, DETERMINE THE ALTERNATIVE THAT OPTIMIZES USE OF PERSONNEL SPECIALITIES & MANPOWER THAT MEETS SUPPORT AND OPERATIONS REQUIREMENTS. SOURCE OF DATA: - HISTORICAL FILE (PER & CER REQUIREMENTS). (EVALUATION PARAMETERS). - AMC-P 700-4 (APPLICATION MODELS). - 303.2.5.4 (QUANTITATIVE & QUALITATIVE INPUTS).
303.2.5.5A1	IDENTIFY QUALITATIV CRITERIA	IDENTIFY THE QUALITATIVE CRITERIA WHICH ARE RELATED TO SUPPORTABILITY, COST, AND READINESS REQUIREMENTS. THESE CRITERIA ARE ABSTRACTED FROM THE FULL SET OF QUALITATIVE CRITERIA WHICH WERE DEVELOPED IN SUBTASK 303.2.5.4 SOURCE OF DATA: - 303.2.5.4 (QUALITATIVE INPUT DATA).
303.2.5.5A2	IDENTIFY CRITERIA	IDENTIFY THE QUANTITATIVE CRITERIA RELATED TO SUPPORTABILITY, COST QUANTITATIVE AND READINESS REQUIREMENTS. THESE CRITERIA ARE TO BE DRAWN FROM THE FULL SET OF QUANTITATIVE CRITERIA DEVELOPED IN SUBTASK 303.2.5.3. SOURCE OF DATA: 303.2.5.4 (QUALITATIVE INPUT DATA).
303.2.5.5A3	CONSTRUCT ANALYTICAL MODELS	CONSTRUCT THE ANALYTICAL RELATIONSHIPS CONCERNING SUPPORTABILITY, DESIGN AND OPERATIONS PARAMETERS. USING HISTORICAL DATA BASES FROM LOGISTICALLY EQUIVALENT SYSTEMS/EQUIPMENTS, DEVELOP THE MODELING PREDICTIONS FOR EACH SYSTEM/EQUIPMENT CONCEPT FUNCTIONAL REQUIREMENT FROM 303.2.5.2. SOURCE OF DATA: - 303.2.5.5A1 (QUALITATIVE CRITERIA). - 303.2.5.5A2 (QUANTITATIVE CRITERIA). - AMC-P 700-4 (APPROVED AMC MODELS).
303.2.5.5A4	CONDUCT OR EVAL OF EACH ALT SYS	USE INDICATED FUNCTIONAL, OPERATIONAL, & SUPPORT REQUIREMENTS AS A STANDARD TO ALLOW A COMPLETE ANALYSIS OF EACH SELECTED ALTERNATIVE AS THEY ARE SELECTED. CONDUCT THE INITIAL TRADE-OFF ANALYSIS OF THE SELECTED ALTERNATIVE UNDER CONSIDERATION, USING THE MODEL DEVELOPED IN SUBTASK 303.2.5.5A3, AND ITERATE THE PROCESS FOR THE MOST APPROPRIATE ALTERNATIVES, BASED ON QUALITATIVE AND QUANTITATIVE INPUTS. SOURCE OF DATA: - 303.2.5.5A3 (CONSTRUCTING ANALYTICAL MODELS).

Name	Label	Description
303.2.5.5A5	CONDUCT ANALYSIS	<p>CONDUCT A SENSITIVITY ANALYSIS TO IDENTIFY THOSE MANPOWER & SPECIALTY SKILL PARAMETERS THAT CAN BE INFLUENCED BY VARIATIONS IN EITHER OPERATIONS AND SUPPORT PARAMETERS AND DETERMINE THE RISKS OF EACH ALTERNATIVE..</p> <p>THIS IDENTIFIES THOSE AREAS WHERE CHANGES IN OPERATIONS & SUPPORT PARAMETERS CAN INFLUENCE MANPOWER & PERSONNEL READINESS.</p> <p>SOURCE OF DATA: - 303.2.5.5A3 (CONSTRUCT ANALYTICAL MODELS). - 303.2.5.5A4 (RESULTS OF TRADE-OFF ANALYSIS).</p>
303.2.5.5A6	SELECT BEST ALTERNATIVE	<p>EVALUATE THE RESULTS OF TRADE-OFF AND SENSITIVITY ANALYSIS OF THE SELECTED ALTERNATIVES AND SELECT THE MOST APPROPRIATE ALTERNATIVE FROM A MANPOWER & PERSONNEL BASIS.</p> <p>SOURCE OF DATA: - 303.2.5.5A4 (RESULTS OF TRADE-OFF ANALYSIS). - 303.2.5.5A7 (RESULTS OF SENSITIVITY ANALYSIS).</p>
303.2.5.5A7	DOCUMENT RESULTS	<p>DOCUMENT, IN NARRATIVE FORMAT, THE MOST APPROPRIATE ALTERNATIVE SELECTED, THE RESULTS OF TRADE-OFF ANALYSIS, HIGH RISK VARIABLES AND ANY ASSUMPTIONS USED IN TRADE-OFF ANALYSIS.</p> <p>SOURCE OF DATA: - 303.2.5.5A3 (CONSTRUCTING ANALYTICAL MODELS). - 303.2.5.5A4 (TRADE-OFF ANALYSIS). - 303.2.5.5A6 (SELECTED BEST ALTERNATIVE).</p>
303.2.5.5	PLAN FOR TRAINING & PERSONNEL	<p>REVIEW RESULTS OF TRADEOFF STUDIES AND DETERMINE OPTIMUM TRAINING METHODS REQUIRED AND DESCRIBE, SPECIFICALLY, ALL PERSONNEL REQUIREMENTS FOR THE ALTERNATIVE SELECTED FROM THE TRADE-OFF OPER/MAINT STUDIES.</p> <p>SOURCE OF DATA: - 303.2.5.5 (RESULTS OF TRADEOFF ANALYSIS).</p>
303.2.5.5A1	IDENTIFY SPECIFIC OPS/MAINT PERSONNEL REQMENTS	<p>IDENTIFY THE SPECIFIC OPERATIONS AND MAINTENANCE PERSONNEL REQUIREMENTS BY:</p> <ul style="list-style-type: none">NUMBERSKILLSOTHER QUALIFICATIONS <p>THIS DATA SHOULD BE SUITABLE FOR OR BE TAKEN FROM THE CONTRACTORS QOPRI IN ACCORDANCE WITH DI-H-1300.</p> <p>SOURCES: - 303.2.5.5 (RESULTS OF TRADEOFF EVALUATION). - DI-H-1300</p>
303.2.5.5A2	PLAN FOR NECESSARY TRAINING IN OPS & MAINT	<p>IDENTIFY OPTIMUM TRAINING METHODS REQUIRED TO IMPLEMENT EACH ALTERNATIVE IN ACCORDANCE WITH GUIDELINES IN MIL-STD 1379C:</p> <ul style="list-style-type: none">- HOW TRAINING REQUIREMENTS WILL BE DEVELOPED.- PERSONNEL AND RESOURCES REQUIRED TO SUPPORT TRAINING.- TRAINING EQUIPMENT.- SCHEDULE FOR THE TRAINING PROGRAM <p>SOURCE OF DATA: - 303.2.5.5A1 (SPECIFIC PERSONNEL REQUIREMENTS).</p>

Name	Label	Description
303.2.5.7	LIFE CYCLE ASSESSMENT	DETERMINE AND DESCRIBE THOSE MANPOWER & PERSONNEL REQUIREMENTS NECESSARY TO OPERATE & SUPPORT THE ALTERNATIVE THROUGHOUT ITS INTENDED LIFE CYCLE DURING PRODUCTION AND POST PRODUCTION. ALSO, DESCRIBE THE ALTERNATE SYSTEM/EQUIPMENT MANPOWER AND PERSONNEL IMPACT ON THE EXISTING OR PLANNED WEAPONS SYSTEM/EQUIPMENT AND ON COST, SUPPORT, SUPPLY, MAINTENANCE, TRANSPORTATION SYSTEMS AND READINESS REQUIREMENTS SOURCE OF DATA: - 303.2.5.5 (RESULTS OF TRADEOFF ANALYSIS).
303.2.5.7A1	ASSESS IMPACT ON SUPPORT, COST, READ	DETERMINE THOSE MANPOWER & PERSONNEL REQUIREMENTS FOR THE NEW SYSTEM/EQUIPMENT THAT HAS A UNIQUE IMPACT ON SUPPORT, COST, AND READINESS REQUIREMENTS ON THE ALTERNATE SYSTEM/EQUIPMENT. REMENTS SOURCE OF DATA: - 303.2.5.5 (RESULTS OF TRADEOFF ANALYSIS).
303.2.5.7A2	ASSES WEAPONS, SUPPLY, ETC	IDENTIFY CURRENT MANPOWER & PERSONNEL RESOURCES USED WITH EXISTING IMPACT ON WEAPONS, SUPPLY SYSTEMS ETC., THAT MIGHT BE IMPACTED BY THE REQUIREMENTS EXISTING OF THE NEW ALTERNATE SYSTEM/EQUIPMENT. WEAPONS, SUPPLY, ETC SOURCE OF DATA: - 303.2.5.5 (RESULTS OF TRADEOFF ANALYSIS).
303.2.5.7A3	LIFE CYCLE SUPPORT IMPLI'TION	IDENTIFY ALL REQUIRED MANPOWER & PERSONNEL SUPPORT RESOURCES (SPECIALTIES & QUANTITIES) FOR EVERY OPERATION & MAINTENANCE TASK REQUIRED AND IDENTIFY ALL RESULTING CONDITIONS TOWARDS SUPPORTING THE ALTERNATE SYSTEM/EQUIPMENT THROUGHOUT THE INTENDED LIFE-CYCLE. SOURCE OF DATA: - 303.2.5.7A1 (IMPACT ON SUPPORT, COST, READINESS). - 303.2.5.7A2 (ASSESS IMPACT ON EXISTING WEAPONS, SUPPLY, ETC..).
303.2.5.7A4	POST SUPPORT CONSIDER'S	IDENTIFY THE SOURCES OF MANPOWER & PERSONNEL RESOURCES THAT PRODUCTION WILL BE AVAILABLE AFTER PRODUCTION CEASES. THIS IS THE TIME BETWEEN THE END OF PRODUCTION AND DISPOSAL OF THE ALTERNATE SYSTEM/EQUIPMENT. SOURCE OF DATA: - 303.2.5.7A3 (LIFE CYCLE IMPLICATIONS).
303.2.5.8	DOCUMENT RESULTS	DOCUMENT, IN NARRATIVE FORMAT, RESULTS OF EACH OF THE TRADE-OFF STUDIES. ESTIMATES OF TOTAL MANPOWER & PERSONNEL REQUIREMENTS FOR ALTERNATE SYSTEM/EQUIPMENT CONCEPTS, AND THE RECOMENDED SYSTEM/EQUIPMENT CONCEPT BASED ON MANPOWER AND PERSONNEL IMPLICATIONS. SOURCE OF DATA: - 303.2.5.7 (LIFE-CYCLE IMPLICATIONS).

Label	Description
APPLICABLE MODELS FROM AMC-P 700-4 OR EQUIVAL	<p>PURPOSE: APPLICABLE MODELS* USED AS A GUIDE FOR CONSTRUCTING AN ANALYTICAL MODEL IN DETERMINING THE MOST FEASIBLE MANPOWER/PERSONNEL REQUIREMENTS FOR THE ALTERNATE SYSTEM/EQUIPMENT UNDER ANALYSIS.</p> <p>* MODEL MUST BE TAILORED TO THE SYSTEM/EQUIPMENT UNDER ANALYSIS (I.E., HARDWARE/MANPOWER INTEGRATION (HARDMAN), PERSONNEL AVAILABILITY MODEL (PAM), PERSONNEL REQUIREMENTS ANALYSIS MODEL (PRAMOD) ETC.).</p> <p>SOURCE OF DATA: AMC-P 700-4 (LOGISTIC SUPPORT ANALYSIS TECHNIQUES GUIDE)... AND EQUIVALENT DOCUMENTATION ON FILE.</p>
ASSUMPTIONS USED IN TRADE-OFF ANALYSES	<p>PURPOSE: DATA CONTAINING MANPOWER & PERSONNEL INFORMATION USED IN EVALUATING THE ALTERNATE SYSTEM/EQUIPMENT. THIS DATA MAY BE MANPOWER & PERSONNEL REQUIREMENTS OF A LOGISTICALLY SIMILAR SYSTEM/EQUIPMENT.</p> <p>SOURCE OF DATA: - 303.2.5.5A3 (CONSTRUCTING ANALYTICAL MODELS).</p>
COST DRIVERS INPUT	<p>PURPOSE: DATA IDENTIFYING THOSE "HIGH DRIVERS" THAT HAVE A LARGE EFFECT ON THE COST OF OPERATING & SUPPORTING THE ALTERNATE SYSTEM/EQUIPMENT. THESE "HIGH DRIVERS" ARE REQUIRED REGARDLESS OF MANPOWER & SPECIALTY SKILL COSTS INCURRED.</p> <p>SOURCE OF DATA: 303.2.5.4A5 (UNIQUE COST DRIVERS).</p>
DID-F-1213, DID-H-1300 AMC-P 700-4	<p>PURPOSE: SPECIFIED DOCUMENTS USED TO DESCRIBE AND DEFINE THE DATA REQUIRED TO BE FURNISHED BY THE CONTRACTOR OF THE ALTERNATE SYSTEM/EQUIPMENT.</p> <p>I. SPECIFIED DOCUMENTS.</p> <ol style="list-style-type: none">1. DI-F-1213 (COMPARING AND EVALUATING MANAGEMENT EFFICIENCY OF PRODUCING THE ALTERNATE SYSTEM/COMPONENT AT DIFFERENT PLANTS).2. DI-H-1300 (QUALITATIVE & QUANTITATIVE PERSONNEL REQUIREMENTS DEVELOPMENT).3. AMC-P 700-4 (LOGISTICS SUPPORT ANALYSIS TECHNIQUES GUIDE).<ol style="list-style-type: none">A. MANPOWER AND PERSONNEL INTEGRATION CONTINUOUS AND COMPREHENSIVE EVALUATION.B. MANPOWER REQUIREMENTS CRITERIA.C. MILITARY MANPOWER/HARDWARE PROCUREMENT (HARDMAN) TRAINING REQUIREMENTS DETERMINATION METHODOLOGY. <p>SOURCE OF DATA: POLICY FILES</p>

Label	Description
DOCUMENTED RESULTS OF TRADE-OFF ANALYSES	<p>PURPOSE: DOCUMENTED RESULTS OF OPTIMUM MANPOWER/PERSONNEL REQUIREMENTS & CHARACTERISTICS OF ALL SYSTEMS/EQUIPMENT STUDIED.</p> <ol style="list-style-type: none">1. DETAILED MAINPOWER & PERSONNEL COSTS.2. COMPLETE OPERATIONS & MAINTENANCE MANPOWER STAFFING NEEDS.3. PERSONNEL REQUIREMENTS (SKILL LEVEL, APTITUDE, ETC.).4. MANPOWER & PERSONNEL SPECIALITIES REQUIRED TO SUPPORT THE ALTERNATE SYSTEM/EQUIPMENT THROUGHOUT ITS INTENDED LIFE-CYCLE.
DRAFT PLAN FOR TRAINING PROGRAM	<p>PURPOSE: OUTLINED TRAINING PROGRAM DESCRIBING--</p> <ul style="list-style-type: none">- PURPOSE- PREREQUISITES- LENGTH OF TIME- CLASS SIZE- MILESTONES- RESOURCE REQUIREMENTS<ol style="list-style-type: none">1. PERSONNEL2. ITEM OF EQUIPMENT3. TRAINING EQUIPMENT4. AUDIOVISUAL AIDS5. TRAINING MATERIAL6. TECHNICAL MANUALS7. FACILITIES <p>SOURCE OF DATA: 303.2.5.6 (PLAN FOR TRAINING & IDENTIFICATION OF OPERATION/MAINTENANCE REQUIREMENTS).</p>
EVALUATION PARAMETERS	<p>PURPOSE: HISTORICAL DATA FOR A LOGISTICALLY SIMILAR SYSTEM/EQUIPMENT PERTAINING RESTRICTIONS/LIMITATIONS (I.E., EXISTING PERSONNEL, UNIQUE PERSONNEL, MANPOWER, COST, ETC.) THAT MUST BE CONSIDERED PRIOR TO CONSTRUCTING PERSONNEL & MANPOWER MODELS FOR ANALYSIS.</p> <p>SOURCE OF DATA: HISTORICAL DATA FILE</p>

Label	Description
FUNCTIONAL REQUIREMENTS IDENTIFIED FOR SELECTED SYS/EQUIP	<p>PURPOSE: A LIST OF FUNCTIONAL AND SUPPORT REQUIREMENTS FOR THE ALTERNATE SYSTEM/EQUIPMENT DESCRIBING WHAT IT MUST DO IN ORDER TO ACCOMPLISH ITS INTENDED MISSION.</p> <p>DATA CONTAINS:</p> <ol style="list-style-type: none">1. FUNCTIONAL REQUIREMENTS - EXAMPLES:<ol style="list-style-type: none">A. TAKE OFF, FLY, LANDB. MILES PER HOURC. PROVIDE LIFE SUPPORT TO CREWD. NAVIGATE, USE RADAR,E. MAXIMUM/MINIMUM LOAD, ETC..2. MAINTENANCE SUPPORT REQUIREMENTS - EXAMPLES:<ol style="list-style-type: none">I. SCHEDULED/UNSCHEDULED TASKSA. SERVICE/REPAIRB. OVERHAULC. REPLACE/DISCARD, ETC. <p>SOURCE OF DATA: 303.2.5.2 (IDENTIFICATION OF SYSTEM EQUIPMENT FUNCTIONAL AND SUPPORT REQUIREMENTS).</p>
FUNCTIONAL REQUIREMENTS - OPERATIONS AND SUPPORT	<p>PURPOSE: DESCRIPTIVE DATA OF:</p> <ol style="list-style-type: none">1. WHAT THE NEW SYSTEM/EQUIPMENT MUST DO IN ORDER TO ACCOMPLISH INTENDED MISSION OR TASKS2. UNIQUE FUNCTIONS DUE TO NEW TECHNOLOGY IN THE DESIGN OR NEW OPERATIONAL CONCEPTS3. IDENTIFICATION OF RISKS INVOLVED WITH THE SUPPORTABILITY OF THE SYSTEM/EQUIPMENT DUE TO FUNCTIONAL REQUIREMENTS4. OPERATION AND MAINTENANCE TASKS THAT MUST BE PERFORMED IN ORDER FOR THE NEW SYSTEM/EQUIPMENT TO BE ABLE TO ACCOMPLISH THE IDENTIFIED FUNCTIONS. <p>SOURCE OF DATA: FUNCTIONAL REQUIREMENTS IDENTIFICATION IN SUBTASKS--</p> <ul style="list-style-type: none">301.2.1301.2.2301.2.3401.2.4
HIGH RISK VARIABLES USED IN T/O ANALYSES	<p>PURPOSE: DATA CONTAINS IDENTIFIED QUALITATIVE & QUANTITATIVE RISKS INVOLVED WITH THE ALTERNATIVE SUPPORT CONCEPTS. THIS INCLUDES SHORTAGES OF CERTAIN SPECIALITY SKILL RESOURCES CRITICAL TO THE SUCCESS OF THE SUPPORT CONCEPTS.</p> <p>SOURCE OF DATA: - 303.2.5.5A3 (CONSTRUCT ANALYTICAL MODELS).</p>

Label	Description
HISTORICAL MANPOWER/ PERSONNEL REQMNTS FOR	<p>PURPOSE: HISTORICAL MANPOWER/PERSONNEL DATA OF A LOGISTICALLY SIMILAR SYSTEM/COMPONENT THAT IS APPLICABLE TO THE ALTERNATE SYSTEM/COMPONENT UNDER ANALYSIS.</p> <p>THIS DATA CONTAINS:</p> <ol style="list-style-type: none">1. PERSONNEL GRADE STRUCTURE2. SKILL SPECIALTY REQUIRED TO PERFORM OPERATION & MAINTENANCE3. TOTAL NUMBER OF PERSONS REQUIRED TO OPERATE & MAINTAIN THE SYSTEM EQUIPMENT4. STAFFING & ORGANIZATIONAL DEVELOPMENT5. MANHOUR REQUIREMENTS6. TASK TIMES & FREQUENCIES <p>SOURCE OF DATA: HISTORICAL MANPOWER/PERSONNEL DATA FILE.</p>
INITIATE ACTION	<p>PURPOSE: DATA IDENTIFYING THE NEED FOR ASSESSING AN ALTERNATIVE SYSTEM/EQUIPMENT. THIS NEED MAY BE BASED ON AN EVALUATION OF THE EXISTING MANPOWER/PERSONNEL REQUIREMENTS ON THE BASELINE SYSTEM/EQUIPMENT.</p> <p>THIS DATA:</p> <ol style="list-style-type: none">1. ESTABLISHES MISSION PROFILE.2. IDENTIFIES THE RESOURCES THAT EXIST AND/OR MUST BE DEVELOPED3. ESTABLISH PRIORITIES. <p>SOURCE OF DATA: PROGRAM MANAGER</p>
INTERNAL AUTHORIZED DOCUMENTS INPUTS	<p>PURPOSE: DATA INPUTS USED IN DETERMINING MANPOWER & PERSONNEL REQUIREMENTS. THIS DATA CONTAINS:</p> <ol style="list-style-type: none">1. NUMBER OF PERSONNEL BY GRADE2. TYPES AND QUANTITIES OF PERSONNEL (i.e., MECHANICS, TANK CREWS, SUPPLY PERSONNEL, COOKS) REQUIRED TO OPERATE & SUPPORT THE ALTERNATE SYSTEM/EQUIPMENT. <p>SOURCE OF DATA: (INTERNAL AUTHORIZATION DOCUMENTS FILE).</p>
LEVEL OF REPAIR RESULTS	<p>PURPOSE: LEVEL OF REPAIR RESULTS CONTAINING:</p> <ol style="list-style-type: none">1. MAINTENANCE TASK LEVELS IDENTIFICATION.2. MANHOURS REQUIRED PER TASK.3. MATERIALS REQUIRED PER REPAIR:<ol style="list-style-type: none">A. TECHNICAL DOCUMENTATIONB. SUPPORT EQUIPMENTC. TRAININGD. LABOR. <p>SOURCE OF DATA: TASK 303.2.7 (LEVEL OF REPAIR ANALYSIS).</p>
LIFE CYCLE IMPLICATIONS	<p>PURPOSE: MANPOWER AND PERSONNEL SPECIALTIES REQUIRED FOR EVERY LEVEL OF OPERATION & MAINTENANCE NECESSARY TO SUPPORT THE ALTERNATE SYSTEM/EQUIPMENT THROUGHOUT ITS INTENDED LIFE-CYCLE. THIS DATA ALSO INCLUDES SUPPORT OF IDENTIFIED FACILITIES AND TRAINING.</p> <p>SOURCE OF DATA: - 303 2 5 TAB (LIFE CYCLE IMPLICATIONS)</p>

Label	Description
MODELING PREDICTIONS	<p>PURPOSE: CONTAINS MANPOWER & PERSONNEL DATA RELATIONSHIPS RELATIVE TO DESIGN CHANGE, AND VARIED OPERATIONAL & SUPPORT SCENARIOS. ALSO CONTAINS MODELING ASSUMPTIONS, HIGH RISK VARIABLES AND HIGH DRIVERS. THE RESULTS OF THE ANALYTICAL MODELS PROVIDE THE BASIC INPUTS TO THE TRADE-OFF EVALUATION IN PROCESS 303.2.5.SA4.</p> <p>SOURCE OF DATA - 303.2.5.SA3 (CONSTRUCTING ANALYTICAL MODELS).</p>
NEXT SELECTD ALT SYS/EQPT CONCEPT FOR ANALYSIS	<p>PURPOSE: DATA CONTAINING THE SELECTED ALTERNATIVE THAT, CONCEPTUALLY, FULFILLS THE MISSIONS/OPERATIONAL REQUIREMENTS AS DEFINED BY THE INTERGRATED LOGISTICS SUPPORT MANAGEMENT TEAM.</p> <p>SOURCE OF DATA: TASK 303.2.5.1 (SELECTION OF SYSTEM/EQUIPMENT ANALYZED).</p>
OPERATIONS & SUPPORT TASKS IDENTIFIED	<p>PURPOSE: DATA THAT IDENTIFIES EXACTLY WHAT OPERATIONS & MAINTENANCE TASK MUST BE ACCOMPLISHED. THIS DATA ALSO CONTAINS THE PREDICTED FREQUENCY THAT THE TASKS MUST BE PERFORMED AND THE PREDICTED TIME REQUIRED TO PERFORM THEM.</p> <p>SOURCE OF DATA: - 303.2.5.4A1 (CONSOLIDATE FUNCTIONAL, PHYSICAL & OPERATIONAL REQUIREMENTS IDENTIFIED.)</p>
OTHER SUPPORT-TECHNICAL INFORMATION	<p>PURPOSE: DATA DESCRIBING OTHER OPERATION AND MAINTENANCE SUPPORT TASKS NECESSARY TO SUPPORT THE FUNCTIONAL REQUIREMENTS OF THE ALTERNATE SYSTEM/EQUIPMENT SELECTED (e.g., FACILITIES, TRAINING EQUIPMENT, TOOLS, SUPPORT EQUIPMENT, OPERATORS, ETC).</p> <p>SOURCE OF DATA: OPERATIONS AND OTHER SUPPORT TASKS - TASK 301.2.6</p>
PARAMETERS THAT DRIVE SUPPORT' TY, COST, READI REQUIREMENTS	<p>PURPOSE: DATA IDENTIFIES THE AVAILABILITY OF SCARCE OR LIMITED SPECIALTY SKILL RESOURCES REQUIRED TO OPERATE & SUPPORT THE ALTERNATE SYSTEM/EQUIPMENT UNDER EVALUATION.</p> <p>SOURCE OF DATA: - 303.2.5.SA3 (CONSTRUCT ANALYTICAL MODELS).</p>
PEACETIME CRITERIA	<p>PURPOSE: DATA IDENTIFYING PEACETIME STANDARDS THAT MUST BE APPLIED TO THE SELECTED ALTERNATIVE. THIS DATA CONTAINS:</p> <ul style="list-style-type: none">- STANDARDS FOR STORAGE (TIME, LOCATION, ETC.)- READINESS (PREPARATION TIME TO USE). <p>SOURCE OF DATA: ACQUIRING ACTIVITY FILE.</p>
PER'S AND/OR CER'S FOR USE IN RELATIONSHIP	<p>PURPOSE: HISTORICAL RESULTS FOR A LOGISTICALLY SIMILAR SYSTEM/COMPONENT CONTAINING:</p> <ul style="list-style-type: none">A. (PER) PARAMETRIC ESTIMATING RELATIONSHIPS - QUALITATIVE AND QUANTITATIVE PERSONNEL/MANPOWER VARIABLES USED AS ESTIMATORS OR PREDICTORS.B. (CER) COST ESTIMATING RELATION - PREDICTORS OR ESTIMATORS OF COST IMPACT OF MANPOWER & PERSONNEL DECISIONS. <p>SOURCE OF DATA: HISTORICAL DATA FILE FOR A LOGISTICALLY SIMILAR SYSTEM/COMPONENT.</p>

Label	Description
PERSONNEL & SKILLS REQUIREMENTS	<p>PURPOSE: SPECIFIC OPERATION & MAINTENANCE PERSONNEL TAILORED TO THE SYSTEM/COMPONENT UNDER ANALYSIS FOR INPUT TO LSAR RECORD D1:</p> <ol style="list-style-type: none">1. SKILL SPECIALTY CODES TO OPERATE, MAINTAIN AND SUPPORT THE ALTERNATE SYSTEM/EQUIPMENT.2. PERSONNEL GRADE STRUCTURE.3. TOTAL MANPOWER REQUIREMENTS. <p>SOURCE OF DATA: 303.2.5.6 (PLAN FOR TRAINING & IDENTIFICATION OF SPECIFIC PERSONNEL REQUIREMENTS).</p>
PHYSICAL & OPERATIONAL SUPPORT CHARACTERIST	<p>PURPOSE: DATA IDENTIFYING PHYSICAL AND OPERATIONAL CHARACTERISTICS OF THE ALTERNATE SYSTEM/EQUIPMENT UNDER ANALYSIS. DATA CONTAINS--</p> <ol style="list-style-type: none">I. PERSONNEL NEEDED TO PHYSICALLY OPERATE EQUIPMENT - EXAMPLE:<ol style="list-style-type: none">1. THE FUNCTIONAL REQUIREMENTS OF A TANK REQUIRES A COMMANDER, GUNNER, LOADER, AND DRIVER TO SUPPORT IT.II. PERSONNEL NEEDED TO SUPPORT THE OPERATION(S) OF THE SYSTEM/EQUIPMENT. EXAMPLE--<ol style="list-style-type: none">1. INDIVIDUALS NEEDED TO PERFORM THE MAINTENANCE TASKS (MECHANIC, MECHINIST, WELDER, ETC.). <p>SOURCE OF DATA: 303.2.5.3 (DEVELOP PHYSICAL/OPERATIONS SUPPORT CHARACTERISTICS).</p>
POLICIES & PROCEDURES	<p>PURPOSE: REGULATIONS TAILORED TO THE SELECTED ALTERNATIVE PRESCRIBING POLICIES AND PROCEDURES FOR DEVELOPING MANPOWER AND/OR PERSONNEL REQUIREMENTS FOR OPERATION & MAINTENANCE SUPPORT OF THE ITEM. POLICIES & PROCEDURES ARE DESCRIBED IN FOLLOWING REGULATIONS--</p> <ul style="list-style-type: none">AR 570-2 (MARC).AR 602-1 (HFEP).AR 602-2 (MANPRINT).AR 700-47AR 611-1 (MOS).AR 611-101 (SSC'S).AR 611-112 (SSC'S).AR 611-201 (SSC'S). <p>SOURCE OF DATA: POLICY FILE(219).</p>
POST PRODUCTIONS SUPPORT	<p>PURPOSE: DATA CONTAINING THE SOURCES OF LOGISTIC SUPPORT RESOURCES AFTER PRODUCTION CEASES.</p> <ol style="list-style-type: none">1. ITEMS SOURCES CONSIDERED:<ul style="list-style-type: none">- MANPOWER & PERSONNEL SKILL LEVELS.- ITEMS AND SUPPORT SYSTEMS- PREPLANNED PRODUCT IMPROVEMENT <p>SOURCE OF DATA: 303.2.5.7A4 (POST PRODUCTION SUPPORT CONSIDERATIONS)</p>

Label Description

QUALITATIVE PURPOSE: DATA DESCRIBING EACH SKILL SPECIALTY REQUIRED TO:
CRITERIA

1. PERFORM OPERATION & MAINTENANCE (A COMPLETE TASK LISTING)
2. SUPPORT EQUIPMENT THE INDIVIDUAL IS REQUIRED TO OPERATE
3. LIST OF TASK TIMES AND FREQUENCIES
4. ANNUAL MANHOUR REQUIREMENTS
5. TASK PROFICIENCY LEVEL.

SOURCE OF DATA: 303.2.5.4 (DEVELOP MANPOWER/PERSONNEL IMPLICATIONS ON SELECTED ALTERNATIVE).

QUALITATIVE PURPOSE: QUALITATIVE DATA INPUTS CONTAINING:
MANPOWER
INPUT DATA

- SKILL SPECIALITY CODES USED BY BASELINE ITEM THAT ARE APPLICABLE TO THE ALTERNATE SYSTEM/EQUIPMENT.
- UNIQUE SPECIALITY CODES DICTATED BY NEW TECHNOLOGY.

SOURCE OF DATA: 303.2.5.4 (DEVELOP MANPOWER/PERSONNEL IMPLICATIONS ON ALTERNATE SYSTEM/EQUIPMENT).

QUANTITATIVE PURPOSE: DATA DESCRIBING THE TOTAL MANPOWER REQUIREMENTS NEEDED TO
CRITERIA OPERATE & SUPPORT THE SELECTED ALTERNATIVE THROUGHOUT ITS INTENDED LIFE-CYCLE.

SOURCE OF DATA: - 303.2.5.4 (DEVELOP MANPOWER & PERSONNEL IMPLICATIONS ON SELECTED ALTERNATIVE).

QUANTITATIVE PURPOSE: QUANTITATIVE MANPOWER DATA INPUTS:
MANPOWER
DATA INPUTS

THIS DATA CONTAINS:

I. OPERATION

- NUMBER OF PERSONS REQUIRED TO OPERATE THE SYSTEM/EQUIPMENT.
- CALCULATED ANNUAL HOURS OF LABOR PER SKILL SPECIALITY

II. MAINTENANCE

- TOTAL PREDICTED HOURS OF LABOR REQUIRED TO SUPPORT EACH ITEM OF EQUIPMENT.

III. OPERATION/MAINTENANCE

- TOTAL PREDICTED HOURS OF LABOR REQUIRED TO SUPPORT THE SYSTEM.

SOURCE OF DATA: 303.2.5.4 (DEVELOP MANPOWER/PERSONNEL IMPLICATIONS FOR THE SELECTED ALTERNATIVE).

Label	Description
RESULTS OF IMPACT EVALUATION	<p>PURPOSE: DATA CONTAINING A DESCRIPTION OF THE ALTERNATE SYSTEM/EQUIPMENT MANPOWER/PERSONNEL IMPACT ON SUPPORT, COSTS, AND READINESS REQUIREMENTS AND ON EXISTING WEAPON, SUPPLY, AND SUPPORT SYSTEMS.</p> <p>I.</p> <ol style="list-style-type: none">1. SUPPORT - THE FIXATION EFFECT OF THE MANPOWER/PERSONNEL PLAN ANALYZED, IN CONJUNCTION WITH MEETING THE IDENTIFIED FUNCTIONAL REQUIREMENTS IN HARMONY WITH DESIGN & OPERATIONAL CONCEPTS OF THE ALTERNATE SYSTEM/EQUIPMENT.2. COSTS - THE DIRECT AND INDIRECT COSTS THAT THE MANPOWER/PERSONNEL PLAN ANALYZED HAS ON MEETING OPERATIONS & SUPPORT REQUIREMENTS OF THE ALTERNATE SYSTEM/EQUIPMENT.3. READINESS - MANPOWER/PERSONNEL EFFECTS ON MEETING IN DUE CONDITIONS FOR IMMEDIATE OPERATION & SUPPORT ACTIONS FOR THE ALTERNATE SYSTEM/EQUIPMENT DURING PEACETIME & WARTIME CONDITIONS. <p>SOURCE OF DATA: - 303.2.5.7A1 (ASSESS IMPACT ON SUPPORT, COST, READINESS).</p> <p>AND/OR</p> <p>- 303.2.5.7A2 (ASSESS IMPACT ON EXISTING WEAPONS, SUPPLY, SUPPORT).</p>
RESULTS OF SENSITIVITY ANALYSES	<p>PURPOSE: DATA CONTAINING MANPOWER & PERSONNEL SKILL PARAMETERS THAT ARE INFLUENCED BY CHANGES IN OPERATIONS AND OR SUPPORT PARAMETERS. THIS DATA ALSO CONTAINS THE RISKS INVOLVED WITH EACH SELECTED ALTERNATIVE.</p> <p>SOURCE OF DATA: - 303.2.5.5A5 (CONDUCT SENSITIVITY ANALYSIS).</p>
RESULTS OF TRADE-OFF ANALYSIS	<p>PURPOSE: DATA CONTAINS OPTIMUM BALANCE BETWEEN THE MANPOWER/PERSONNEL REQUIREMENTS & CHARACTERISTICS OF ALL SYSTEMS/EQUIPMENT UNDER ANALYSIS.</p> <ol style="list-style-type: none">1. DETAILED MANPOWER & PERSONNEL COSTS.2. COMPLETE OPERATIONS & MAINTENANCE MANPOWER STAFFING NEEDS.3. PERSONNEL REQUIREMENTS (SKILL LEVEL, APTITUDE, ETC.). <p>SOURCE OF DATA: 303.2.5.5 (CONDUCTING TRADEOFF ANALYSIS).</p>
SELECTED BEST ALT	<p>PURPOSE: THIS DATA CONTAINS THE MOST COST-EFFECTIVE ALTERNATIVE OF EACH OF THE ALTERNATIVES ANALYZED FOR MEETING THE REQUIREMENTS ESTABLISHED.</p> <p>SOURCE OF DATA: - 303.2.5.5A6 (SELECT BEST ALTERNATIVE).</p>
SKILL SPECIALTY CODES	<p>PURPOSE: DATA CONTAINING JOB TYPE UNIQUELY IDENTIFIED AS A SKILL SPECIALTY USING A FIVE DIGIT NUMBERING SYSTEM. THE SKILL SPECIALTY WILL ENSURE THAT THE PERSON ASSIGNED TO A JOB HAS THE TRAINING AND EXPERIENCE NECESSARY TO ACCOMPLISH TASK REQUIREMENTS. EACH SKILL SPECIALTY OR JOB TYPE HAS IT OWN IDENTIFICATION NUMBER. FOR EXAMPLE, ARMY SSC NO. 63B10 IS FOR A LIGHT-WHEELED VEHICLE MECHANIC.</p> <p>SOURCE OF DATA: - 303.2.5.4A2 (PERSONNEL SPECIALTY SKILL DEVELOPMENT).</p>

Label	Description
SUPPORT- DESIGN RELATED	<p>PURPOSE: A COMPLETE SET OF DESIGN RELATED SUPPORT AND SUPPORTABILITY CHARACTERISTICS AND OBJECTIVES FOR NEW SYSTEM/EQUIPMENT--</p> <ul style="list-style-type: none">I. SUPPORTABILITY CHARACTERISTICS:<ul style="list-style-type: none">A. SUPPORT CONCEPTSB. RELIABILITY AND MAINTAINABILITY PARAMETERSC. OPERATIONS AND SUPPORT COSTSD. LOGISTIC SUPPORT RESOURCESE. FACILITIES/GROUND SUPPORT.II. SUPPORTABILITY OBJECTIVES: - MEASURED BY MEAN.<ul style="list-style-type: none">A. REPAIR TURNAROUND TIMEB. TIME TO REPAIRC. SUPPORT EQUIPMENT UTILIZATION RATESD. MANPOWER REQUIREMENTS PER MAINTENANCE ACTIONE. PERSONEL REQUIREMENTS <p>SOURCE OF DATA: RESULTS OF (TASK 205).</p>
SUPPORT/ READINESS DRIVERS INPUT	<p>PURPOSE: DATA IDENTIFYING THOSE "HIGH DRIVERS" THAT HAVE A LARGE EFFECT ON SUPPORTABILITY/READINESS OF THE ALTERNATE SYSTEM/EQUIPMENT. THESE "HIGH DRIVERS" ARE NECESSARY REGARDLESS OF ADDED MANPOWER AND/OR SPECIALTY SKILL CODES REQUIREMENTS.</p> <p>SOURCE OF DATA: - 303.2.5.4A4 (UNIQUE SUPPORT/READINESS DRIVERS).</p>
UNIQUE SPECIALTY SKILL SUPPORT PERSONNEL	<p>PURPOSE: DATA CONTAINING MODIFIED AND/OR NEW SPECIALITY SKILL REQUIREMENTS DUE TO NEW TECHNOLOGY OR NEW SUPPORT EQUIPMENT OF THE ALTERNATE SYSTEM EQUIPMENT.</p> <p>SOURCE OF DATA: - 303.2.5.4A2 (SPECIALITY SKILLS DEVELOPMENT).</p>
UNIQUE MANPOWER OPERATIONS & SUPPORT REQUIREMENTS	<p>PURPOSE: DATA CONTAINING MODIFIED AND/OR NEW MANPOWER REQUIREMENTS DICTATED BY NEW TECHNOLOGY OR NEW SUPPORT EQUIPMENT OF THE ALTERNATE SYSTEM/EQUIPMENT.</p> <p>SOURCE OF DATA : - 303.2.5.4A3 (MANPOWER FOR ALTERNATE SYSTEM/EQUIPMENT).</p>
UPDATED DESIGN CONCEPTS	<p>PURPOSE: UPDATED DESIGN CONCEPTS THAT BETTER DEFINE THE ADVANTAGES AND DISADVANTAGES OF EACH ALTERNATIVE CONCEPT AND PROVIDE USABLE INFORMATION TO THE DECISION OF WHICH ALTERNATIVE IS MOST DESIRABLE.</p> <p>SOURCE OF DATA: THE RESULTS OF (TASK 302).</p>
WARTIME ENVIRONMENT	<p>PURPOSE: DATA IDENTIFIES WARTIME ENVIRONMENTS IN WHICH THE SELECTED ALTERNATIVE MUST OPERATE IN ORDER TO ACCOMPLISH ITS INTENDED MISSION(S).</p> <p>DATA INCLUDES CLIMATIC CONDITIONS AS DESCRIBED IN MIL-STD-210C.</p> <p>SOURCE OF DATA: ACQUIRING ACTIVITY FILE.</p>

Name	Label	Description
AAE	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. FUNCTIONAL 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 - OTHERWISE FOUND IN PM FILES)
HIS/FILE	HISTORICAL FILE	PURPOSE: MANPOWER AND PERSONNEL REQUIREMENTS FOR A LOGISTICALLY SIMILAR SYSTEM/EQUIPMENT TO THAT UNDER ANALYSIS. DATA CONTAINS: 1. TOTAL NUMBER OF OPERATORS AND MAINTENANCE PERSONNEL 2. GRADE STRUCTURE 3. SKILL SPECIALTY.
HIS/FUNC	HISTORICAL FILE OF FUNCTIONS	THIS FILE CONTAINS AN HISTORICAL RECORD OF OPERATIONAL, MAINTENANCE AND SUPPORT FUNCTIONS OF ITEMS/EQUIPMENT THAT CAN BE USED AS A BASELINE TO FORECAST OR PREDICT THE FUNCTIONAL REQUIREMENTS AND/OR CHARACTERISTICS OF THE DEVELOPMENTAL ITEM/EQUIPMENT.
HIST/FILE	HISTORICAL DATA FILE	CONTAINS DATA PREVIOUSLY ACQUIRED ON THE ITEM UNDER INVESTIGATION OR SOME SIMILAR SYSTEM, AND MAY ADDRESS THE FOLLOWING AREAS (TO BE TREATED SEPARATELY): 1. RELIABILITY DATA 2. FAILURE RATE DATA 3. SPARES AND SPARE FUNDING DATA
IAD/FILE	INTERNAL AUTHORIZATION	PURPOSE: ARMY INTERNAL AUTHORIZATION DOCUMENT FILES THAT SUPPLY THE GRADE, NUMBER, AND SKILL SPECIALTY OF PERSONNEL TYPES OF AUTHORIZATION DOCUMENTS: (TOE) - TABLE OF ORGANIZATION AND EQUIPMENT FOR UNITS ASSIGNED COMBAT MISSIONS (TDA) - TABLE OF DISTRIBUTION AND ALLOWANCES FOR NON COMBAT UNITS (MOS) - MILITARY OCCUPATIONAL SPECIALTY FOR DEFINING MANPOWER SPECIALTY AND EQUIPMENT REQUIREMENTS.

DATE: 31-JAN-89
TIME: 15:47

APJ PROJECT 966-219
EXTERNAL ENTITIES

PAGE 1
EXCELERATOR 1.8

Name	Label	Description
CON/REQ	CONTRACT REQMNTS	THIS ENTITY REFERS TO THE REQUIREMENTS ESTABLISHED BY THE CONTRACT. IT WILL INCLUDE AT THE MINIMUM THE FOLLOWING PIECES OF DATA FOR THE FMECA: <ol style="list-style-type: none">1. TECHNICAL SPECIFICATIONS AND DEVELOPMENTAL PLANS2. ACQUISITION SCHEDULE3. THREAT MECHANISM DATA4. CONTRACT DATA ITEM REQUIREMENTS LIST (CDRL).
LSAR/D1	LSAR RECORD D1	IN THIS RECORD DESCRIBE PERSONNEL SUPPORT REQUIREMENTS, PERSONNEL, AND SKILL REQUIREMENTS FOR THE ALTERNATE SYSTEM/EQUIPMENT UNDER ANALYSIS.
PM/ILSMT	PM/ILSMT INITIATE REQMNT	THIS EXTERNAL ENTITY IS THE DIRECTIVE, AUTHORITY, OR OTHER DOCUMENTATION THAT INITIATES THE REQUIREMENT FOR THE APPLICATION OF THIS LSA TO A SPECIFIC SYSTEM/EQUIPMENT DEVELOPMENT PROGRAM AT A SPECIFIED POINT IN ITS LIFE CYCLE IN ACCORDANCE WITH AR 700-127.

ANNEX C
STRUCTURED DESIGN

PROCESS 303.2.5
MANPOWER & PERSONNEL TRADE-OFFS

ANNEX C
STRUCTURED DESIGN

PROCESS 303.2.5
MANPOWER & PERSONNEL TRADE-OFFS

PROCESS 303.2.5.1 - Select Alternate System/Equipment Concept to be Analyzed

PURPOSE:

To select alternative approaches for fulfilling the identified need(s). Each potential alternate system/equipment must be evaluated to ensure that it is compatible with alternate operational & support concepts required to fulfill the identified needs.

PROCEDURE:

1. Obtain from the program manager's data file the initiated actions containing:
 - a. System/Equipment Missions & Functions.
 - b. Equipment, Manpower, and Personnel Assessment.
 - c. Engineering Drawings.

Reference: Program Manager/Integrated Logistics Support Management Team.

2. Obtain documented support & supportability characteristics (design related) and updated design concepts that are applicable to the alternate system/equipment concept under analysis.

References: Results from LSA TASKS - 205 (Support-Design Related).
- 302 (Updated Design Concepts).

3. Review the above information for each alternate concept and select all potential candidates.

SYSTEM/EQUIPMENT ALTERNATIVES
(PROCESS 303.2.5.1)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

ALTERNATIVE NAME	MANUFACTURER	REMARKS

PROCESS 303.2.5.2 - Identify System/Equipment Functional Requirements

PURPOSE:

To identify those functions that the selected alternate system/equipment must perform in order to accomplish intended peacetime and wartime missions or tasks.

PROCEDURE:

1. Through an iterative process, select each alternate system/equipment, from process 303.2.5.1., to be evaluated.

Reference: Process 303.2.5.1 (Selected Alternative).

2. Obtain, from the acquiring activity file, documentation listing support functional requirements for the selected alternate system/equipment for both peacetime and wartime environments.

Reference: Acquiring Activity File.

3. Obtain complete documentation, from LSA task 301, which identifies operations and maintenance requirements (data should also include unique functions, risks, design deficiencies).

Reference: LSA task 301 (Functional Requirements Identification).

4. Consolidate the above data and proceed to processes 303.2.5.3 to develop physical/operations & support characteristics and 303.2.5.4A1 to determine the manpower & personnel necessary to support the functional requirements.

PROCESS 303.2.5.3 - Develop Physical/Operational & Support Characteristics

PURPOSE:

To identify other physical/operations & support functions needed to support those functional requirements identified at process 303.2.5.2. For example, specific operators of the system/equipment - Driver, Navigator, Gunman, etc., support personnel - Mechanics, Machinist, Welder, etc.

SYSTEM/EQUIPMENT
FUNCTIONAL REQUIREMENT IDENTIFICATION
(PROCESS 303.2.5.2)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

RELATED INFORMATION

DOCUMENT TITLE*: _____
LOCATION: _____
PREPARED BY: _____
COMMAND/OFFICE SYMBOL: _____
DATE: _____
VERSION: _____

*LSA Task 301 Report

**PHYSICAL, OPERATIONAL, & SUPPORT
CHARACTERISTICS IDENTIFICATION
(PROCESS 303.2.5.3)**

END ITEM NAME: _____
 NOMENCLATURE: _____
 PART NUMBER: _____

1. IDENTIFY OPERATIONAL PERSONNEL REQUIRED:

PERSONNEL TYPE	QUANTITY	TASK	FUNCTION PERFORMED

2. IDENTIFY MAINTENANCE PERSONNEL REQUIRED:

PERSONNEL TYPE	QUANTITY	MAINTENANCE LEVEL	TASK/SUPPORT FUNCTION PERFORMED

PROCEDURE:

1. Select each alternate system/equipment concept, from process 303.2.5.1, to be evaluated.

Reference: Process 303.2.5.1 (Selected Alternative).
2. Obtain functional requirements, from process 303.2.5.2, and other support & technical information, for the selected system/equipment under evaluation, from LSA task 301.

References: - Process 303.2.5.2 (identified functional requirements).
- LSA task 301 (Other Support Functions).
3. Consolidate the above information and identify --
 - a. The personnel needed to physically operate the alternate system/equipment (for example, Commander, Gunner, Driver, etc.).
 - b. The personnel needed for maintenance support (for example, Mechanic, Machinist, Welder, etc.).
4. Proceed to process 303.2.5.4A1.

PROCESS 303.2.5.4
MANPOWER/PERSONNEL IMPLICATIONS FOR
SELECTED ALTERNATIVE

PROCESS 303.2.5.4A1 - Consolidate Functional, Physical & Operational Support Requirements

PURPOSE:

To consolidate the identified functional, physical & operational support requirements for each selected system/equipment alternative, generated from processes 303.2.5.2 and 303.2.5.3. This data will be used in determining the manpower/personnel needed to operate & support the alternate system/equipment.

FUNCTIONAL, PHYSICAL, & OPERATIONAL
SUPPORT REQUIREMENTS CONSOLIDATION
(PROCESS 303.2.5.4A1)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

TASKS REQUIRED	TASK FREQUENCY	PREDICTED TASK TIME

PROCEDURE:

1. Obtain functional requirements from process 303.2.5.2 and physical/operations requirements from process 303.2.5.3 for each selected system/equipment alternative. This data should contain all tasks that must be accomplished, the predicted frequency that the task must be performed, and the predicted time required to perform the task.
2. Obtain a copy of the Personnel Utilization Report (DI-F-1213) and Personnel and Training Requirement Report (DI-H-1300) developed for the system/equipment under analysis.

Reference: Manpower & Personnel Contract Data
Requirements List.

3. Review the above requirements and use them to assist in determining personnel & manpower requirements at processes 303.2.5.4A2 and 303.2.5.4A3 respectively.

PROCESS 303.2.5.4A2 - Personnel Specialty Skills Development

PURPOSE:

To assign personnel skill specialty codes (SSCs) that will meet all identified operation and/or maintenance task requirements.

PROCEDURE:

1. Obtain, from process 303.2.5.4A1, a list of tasks that must be accomplished for the selected alternative and the predicted times required to perform them.

References: 303.2.5.4A1 - (Consolidate Functional
Physical & Operational
Requirements).

2. Develop manpower & personnel requirements, in accordance with AR 611-1 (MOS) using AR's 611-101, 611-112, 611-201, 700-4 and any other appropriate documentation. Obtain these documents from the MANPRINT element manager and proceed as follows:
 - a. Identify existing personnel resources of a logistically similar system/equipment, from the

PERSONNEL SPECIALTY SKILLS DEVELOPMENT
(PROCESS 303.2.5.4A2-1)

END ITEM NAME: _____
 NOMENCLATURE: _____
 PART NUMBER: _____

TASK	SSC	NEW/EXISTING SSC REQUIRED (N/E)	SIMILAR TO EXISTING TASKS (Y/N)	JUSTIFICATION

PERSONNEL SPECIALTY SKILLS DEVELOPMENT
(PROCESS 303.2.5.4A2-2)

END ITEM NAME: _____

NOMENCLATURE: _____

PART NUMBER: _____

SSC TYPE	MAINT. LEVEL	TOT. LABOR HOURS	NO. SYSTEMS SUPPORTED	FAILURES PER YEAR	ANNUAL MANHOURS

manpower/personnel of the baseline system and/or internal manpower authorization documents (ROC, JMSNS, etc.).

b. Sort out which MOS, by SSC, is to perform what tasks and standardize operation & maintenance tasks with the existing personnel available to support the alternate system/equipment obtained from steps #1 & #2.

c. Categorize operation & maintenance tasks as follows:

(1) Tasks similar to those related to existing SSCs.

(2) Tasks not covered by existing SSCs, dictated by new technology and/or new support equipment.

(3) Use this data (from 1 & 2 above) to justify using existing SSCs, modifying SSCs, or creating new SSCs.

3. Based on the results of Step 2 above, list each SSC by Maintenance Level (note: if the same SSC is used at two Maintenance Levels, list it twice). Using the task, task frequencies, and predicted task times, generate the total labor hours expended by each SSC at each level of maintenance.

4. Multiply the total expended labor hours by the number of systems to be fielded, and the expected number of failed items to be returned to a particular Maintenance Level each year (i.e., {failures per year} x {percentage required designated Maintenance Level support.} Data may also be obtained from the repair level analysis.) The resulting figure is the Annual Maintenance Manhours required by each SSC.

Reference: LSA Task 303.2.7 (Level Of Repair Analysis).

5. Use above results to determine manpower requirements at process 303.2.5.4A3 and submit as input data for trade-off study at process 303.2.5.5A1.

PROCESS 303.2.5.4A3 - Manpower for System/Equipment Development

PURPOSE:

To determine the total manpower required to physically operate and support the alternate system/equipment.

PROCEDURE:

1. Obtain identified operations & support requirements for the alternate system/equipment from task 303.2.5.4A1.

Reference: Process 303.2.5.4A1 (Consolidated Functional & Physical/Operations Support Data).

2. Obtain manpower data (manhours per maintenance task, task frequency, task times, number of systems supported, etc.) for a logistically similar system/equipment.

References: Historical Manpower/Personnel Data File.
Internal Authorization Documents File.
LSA Task 303.2.7 (Level of Repair Analysis).

3. Obtain skill specialty data from process 303.2.5.5A2.
4. Use the appropriate information above, and predict the total manpower requirements needed to operate and maintain the alternate system/equipment. Proceed as follows:
 - a. Using AR 570-2 "MANPOWER REQUIREMENTS CRITERIA (MARC)" and other applicable documents, develop a formula that will predict the annual hours of labor to support each operation and/or maintenance task.
 - b. Using results of step "a" above, repeat this calculation for each operation and maintenance task and sum the results. The total predicted operation and/or maintenance hours to support one item of equipment is determined.
 - c. Multiply the results of step "b" above by the number of items to be supported to predict the total operations and/or maintenance hours of labor required for the selected alternate system/equipment.

MANPOWER FOR SYSTEM/EQUIPMENT DEVELOPMENT
(PROCESS 303.2.5.4A3-1)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

OPERATION/MAINTENANCE TASK	ANNUAL MANHOURS
TOTAL PER END ITEM	
TOTAL FOR ALL SYSTEMS	

PROCESS 303.2.5.4A4 - Unique Support/Readiness Drivers

PURPOSE:

To identify manpower & personnel specialties that uniquely affect the selected alternate system/equipment's support and readiness values. The effects are related to identified risks involved due to new technology or new support equipment used.

PROCEDURE:

1. Identify from processes 303.2.5.4A2 & 303.2.5.4A3 those manpower & personnel requirements that are unique to the system/equipment under analysis, but are required to meet readiness and support requirements. The driving factor in this process is new technology or new support equipment used.

References: 303.2.5.4A2 (Personnel Specialty Skills Development).
303.2.5.4A3 (Manpower For System/Equipment Development).

2. Proceed to process 303.2.5.5 (Trade-Off Analysis) and use data from step #1 above.

PROCESS 303.2.5.4A5 - Unique Cost Drivers

PURPOSE:

To identify those manpower & personnel specialties that uniquely affect operations & support cost of the alternate system/equipment throughout its intended life-cycle. The added costs are due to identified risk factors related to new technology or new support equipment.

PROCEDURE:

1. From the data developed in Processes 303.2.5.4A2 and 303.2.5.4A3, determine manpower and personnel requirements that generate additional costs due to operational and support requirements for the alternate system/equipment.
2. Determine the cost associated with introducing a new SSC into the force structure. Aspects to consider are: training cost, facility costs, overhead costs (maintaining the schoolhouse personnel, etc.), wages, etc.

UNIQUE SUPPORT/READINESS DRIVERS
(PROCESS 303.2.5.4A4)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

UNIQUE MANPOWER AND PERSONNEL REQUIREMENT	SSC	ANNUAL MANHOURS	DRIVING FACTOR

UNIQUE COST DRIVER IDENTIFICATION
(PROCESS 303.2.5.4A5)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

UNIQUE COST DRIVER	DESCRIPTION

Reference: The Concept Formulation Package, COEA, CTEA, and other Combat Developer Documentation.

3. Determine the cost to modify a SSC, based on increased training requirements, facilities, need for additional support/test equipment, etc.
4. From the estimated Annual Maintenance Manhours and System Operational Requirements, determine the number of men required. If additional manpower is required, determine additional costs associated with wages and training.

References: 303.2.5.2 (Personnel Specialty Skills development).
303.2.5.3 (Manpower For System/Equipment development).

5. Proceed to process 303.2.5.5 and use data from step #1 above as input into the trade-off analysis.

PROCESS 303.2.5.5
CONDUCT TRADE-OFF ANALYSIS/RELATIONS EVALUATION

PROCESS 303.2.5.5A1 - Identify Qualitative Criteria

PURPOSE:

To identify the qualitative criteria which are related to supportability, cost, and readiness requirements.

PROCEDURE:

1. Based on the analytical model being used, obtain a listing of qualitative data related to each skill specialty, including but not limited to:
 - a. Required operation & maintenance tasks (A COMPLETE TASK LISTING).
 - b. Equipment the individual is required to operate.
 - c. Task times and frequencies.
 - d. Annual manhour requirements.
 - e. Task proficiency level.

Reference: 303.2.5.4A2 - Personnel Specialty Skills Development.

QUALITATIVE CRITERIA IDENTIFICATION
(PROCESS 303.2.5.5A1)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

MANPOWER & PERSONNEL MODEL SELECTED: _____

QUALITATIVE PARAMETER	DESCRIPTION

2. Using the above listing, proceed to process 303.2.5.5A3 to construct an analytical model.

PROCESS 303.2.5.5A2 - Identify Quantitative Criteria

PURPOSE:

To identify the quantitative criteria related to supportability, cost, and readiness requirements.

PROCEDURES:

1. Obtain listing of quantitative data describing and identify the following:
 - a. The number of persons required to operate the alternate system/equipment.
 - b. The predicted hours of labor required to support each item of equipment.
 - c. The total predicted hours of labor required to support the alternate system/equipment.

Reference: Process 303.2.5.4A2 - Manpower for System/Equipment Development.

2. Using the above listing, proceed to process 303.2.5.5A3 to construct an analytical model.

PROCESS 303.2.5.5A3 - Construct Analytical Models

PURPOSE:

To construct the analytical relationships concerning supportability, design, and operations parameters.

PROCEDURE:

1. Obtain qualitative/quantitative data, support/readiness & cost drivers, evaluation parameters, PER and/or CER inputs for the alternate system/equipment, and modeling data from logistically similar system/equipment (use the following references).

References: - 303.2.5.5A1 (Qualitative Criteria).
- 303.2.5.5A2 (Quantitative Criteria).

QUANTITATIVE CRITERIA IDENTIFICATION
(PROCESS 303.2.5.5A2)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

MANPOWER & PERSONNEL MODEL SELECTED: _____

QUANTITATIVE PARAMETER	VALUE

CONSTRUCT ANALYTICAL MODEL
(PROCESS 303.2.5.5A3)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

1. DESCRIBE ANALYTICAL MODEL BEING USED, ALONG WITH
SUPPORTING ASSUMPTIONS:

2. HOST LOCATION:

- 303.2.5.4A4 (Unique Support/Readiness Drivers).
- 303.2.5.4A5 (Unique Cost Drivers).
- Historical Data File.

2. Using the above data and any other resources that may be applicable, select the appropriate manpower & personnel modeling technique(s) found in AMC-P 700-4 (Logistic Support Analysis Techniques Guide) or develop a model technique to address specific situations related to manpower & personnel to predict manpower & personnel impact on the selected alternative.

If a new model is being constructed, reference Materiel Acquisition Handbook AMC-P-70-2, chapter 11.17 System MANPRINT Management Plan (SMMP) Format.

3. Use the resulting predictions and proceed to process 303.2.5.5A4 to conduct trade-off evaluation for each selected alternative.
4. Proceed to process 303.2.5.5A5 to document high risk variables and assumptions used in trade-off evaluation.

PROCESS 303.2.5.5A4 - Conduct Trade-Off or Evaluation of Each Selected Alternative

PURPOSE:

To conduct trade-off analysis of the selected alternatives under consideration, using modeling predictions for selecting the most appropriate alternative based on qualitative, quantitative and historical inputs.

PROCEDURE:

1. Obtain modeling predictions for each selected alternative evaluated by process 303.2.5.5A3.

Reference: Process 303.2.5.5A3 (Construct Analytical Models).

**TRADE-OFF EVALUATION OF ALTERNATIVES
(PROCESS 303.2.5.5A4)**

SYSTEM CATEGORY ALTERN.	PERSONNEL REQUIRED	JOB CLASS.	SKILL LEVELS	YRS. EXP. REQ'D.	AVAIL. OF MANPOWER	NEW/EXIST. SSC	PERSONNEL UTILIZATION	COSTS

2. a. Using the above data, group inputs into eight (8) categories:
 1. Total number of personnel required (Manpower).
 2. Job classifications.
 3. Skill levels.
 4. Experience required.
 5. Availability of people.
 6. Availability in current MOS structure.
 7. Personnel utilization (Hours).
 8. Costs (MPA, Training, etc.).
 - b. For each alternate system/equipment selected, write predictions under each of the appropriate categories listed above.
 - c. Carefully, compare the listed manpower & personnel characteristics for each selected alternative (example, in matrix format).
3. Consolidate and document the above comparative data at process 303.2.5.5A7 (Document Trade-off Results).
 4. Use the above results to conduct sensitivity analysis at process 303.2.5.5A5 and for selecting the best alternative at process 303.2.5.5A6.

PROCESS 303.2.5.5A5 - Conduct Sensitivity Analysis

PURPOSE:

To identify those operations & support parameters which are the major drivers of manpower & personnel readiness.

PROCEDURE:

1. Obtain listing of high risk variables (e.g., those where assumptions were used) in trade-off and those parameters that drive supportability.

Reference: 303.2.5.5A3 (Construct Analytical Models).

2. Obtain results of trade-off analysis.

Reference: 303.2.5.5A4 (Conduct Trade-Off or Evaluation of Each Selected Alternative).

SENSITIVITY ANALYSIS
(PROCESS 303.2.5.5A5)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

ALTERNATIVE SYSTEM: _____

VARIABLE PARAMETER	ORIGINAL VALUE	NEW VALUE	% CHANGE	EFFECT

3. Conduct a multi variate analysis (or other type of sensitivity analyses) to identify the degree to which each potential parameter influences the outcome in terms of manpower and personnel requirements.
4. Using the information above, identify those manpower & personnel parameters that can be influenced by variations in either design, operations, or support parameters of the selected alternative.
5. Identify those areas where changes in design, operations, or support parameters can increase manpower & personnel readiness.
6. Proceed to process 303.2.5.5A6.

PROCESS 303.2.5.5A6 - Select Best Alternative

PURPOSE:

To select the most appropriate alternate system/equipment as a result of manpower & personnel trade-off and sensitivity evaluations.

PROCEDURE:

1. Obtain results of trade-off and sensitivity analysis.

References: - 303.2.5.5A4 (Conduct Trade-Off or Evaluation of Each Alternate System).
- 303.2.5.5A5 (Conduct Sensitivity Analysis).
2. Using the above data, select the best alternate system/equipment having the minimum impact on manpower & personnel requirements and is least sensitive to changes in design, operation and/or support functions.
3. Proceed to process 303.2.5.5A7 to document results.

PROCESS 303.2.5.5A7 - Document Evaluation of Trade-Off Results

PURPOSE:

To document results of trade-off analysis and supporting information.

SELECTION OF BEST ALTERNATIVE
(PROCESS 303.2.5.5A6)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

SYSTEM/EQUIPMENT ALTERNATIVE	RATING (BEST = 1 WORST = ?)

EVALUATION RESULTS
(PROCESS 303.2.5.5A7)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

RELATED INFORMATION

DOCUMENT TITLE: _____
LOCATION: _____
PREPARED BY: _____
DATE: _____
VERSION: _____

PROCEDURE:

1. Obtain listing of high risk variables and assumptions used in trade-off analysis from process 303.2.5.5A3, complete results of trade-off analysis from process 303.2.5.5A4, and the selected alternative from process 303.2.5.5A6.
2. Document the above data in a narrative format.
3. Proceed to processes 303.2.5.6 and 303.2.5.7.

PROCESS 303.2.5.6
PLAN FOR TRAINING & IDENTIFYING
OPERATIONS/MAINTENANCE PERSONNEL

PROCESS 303.2.5.6A1 - Identify Specific Operations/Maintenance Personnel

PURPOSE:

To identify each specific operation & maintenance specialty skill code for the selected alternative and record in the LSAR.

PROCEDURE:

1. Identify the specific specialty skill codes (SSC's), job classifications, and skill levels for the selected alternative from process 303.2.5.5A7.

Reference: 303.2.5.5A7 (Documented Trade-Off Results).

2. Record this data into MIL-STD-1388-2A (Logistic Support Analysis Record) - LSAR record D1.
3. Proceed to process 303.2.5.6A2.

PROCESS 303.2.5.6A2 - Plan for Necessary Training in Operations & Maintenance

PURPOSE:

To identify optimum training methods required to implement specialty skill codes for the selected alternative.

IDENTIFICATION OF OPTIMUM TRAINING RESULTS
(PROCESS 303.2.5.6A2)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

RELATED INFORMATION

DOCUMENT TITLE: _____
LOCATION: _____
PREPARED BY: _____
COMMAND/OFFICE SYMBOL: _____
DATE: _____
VERSION: _____

PROCEDURE:

1. Identify the personnel & skills information from process 303.2.5.6A1.

Reference: 303.2.5.6A1 (Specific Operations/Maintenance Personnel).

2. Using the above information and MIL-STD 1379C as a guideline, identify optimum training methods required to implement each specialty skill code.

Training methods should contain the following:

- a. How training requirements will be developed.
- b. Personnel and resources required to support training.
- c. Training equipment.
- d. Schedule for the training program.

Reference: MIL-STD 1379C (Military Training Programs).

3. Submit draft plan for training program to program manager or to the integrated logistics support management team (ILSMT).

PROCESS 303.2.5.7
LIFE-CYCLE ASSESSMENT

PROCESS 303.2.5.7A1 - Assess Impact on Support, Cost, Readiness Requirements

PURPOSE:

To determine those manpower & personnel requirements for the alternate system/equipment that have a unique impact on support, cost, and readiness requirements for the alternate system/equipment.

PROCEDURE:

1. Obtain results of trade-off analysis from process 303.2.5.5A7 and select those manpower & personnel requirements that are unique to the selected alternative.
2. Identify their impact on support, cost, and readiness requirements on the selected alternative.
3. Proceed to process 303.2.5.7A3.

LIFE CYCLE ASSESSMENT
(PROCESS 303.2.5.7)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

ALTERNATIVE SYSTEM: _____

UNIQUE MANPOWER AND PERSONNEL REQUIREMENT	IMPACT ON SUPPORT, COST AND/OR READINESS

PROCESS 303.2.5.7A2 - Assess Impact on Existing Weapons, Supply, etc.

PURPOSE:

To determine those current manpower & personnel resources used with the alternate system/equipment and identify their impact on existing weapons, supply, etc.

PROCEDURE:

1. Obtain results of trade-off analysis from process 303.2.5.5A7 and select those current available manpower & personnel resources used with selected alternative.
2. Describe the impact the above manpower & personnel resources have on existing weapons, supply, support systems etc.
3. Proceed to process 303.2.5.7A3.

PROCESS 303.2.5.7A3 - Life-Cycle Support Implications

PURPOSE:

To identify all required manpower & personnel support resources (specialties & quantities) for every operation & maintenance task required and to identify all resulting conditions towards supporting the alternate system/equipment throughout the intended life-cycle.

PROCEDURE:

1. Obtain results of manpower & personnel impact on support, cost, and readiness from process 303.2.5.7A1 and results of manpower & personnel impact on existing systems from process 303.2.5.7A2.

References: 303.2.5.7A1 (Assess Impact on Support, Cost, Readiness).
303.2.5.7A2 (Assess Impact On Existing Weapons, Supply, Support Systems).

2. List a range of sensitive parameters, variables and combinations of other factors, e.g., design, that would be the major drivers affecting the available manpower & personnel resources required to operate and support the selected alternative system/equipment throughout its intended life cycle.

IMPACT ON EXISTING WEAPON, SUPPLY,
OR SUPPORT SYSTEMS
(PROCESS 303.2.5.7A2)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

ALTERNATIVE SYSTEM: _____

MANPOWER & PERSONNEL RESOURCE	IMPACTED AREA OR SYSTEM	DESCRIPTION OF IMPACT

LIFE CYCLE SUPPORT IMPLICATIONS
(PROCESS 303.2.5.7A3)

END ITEM NAME: _____
 NOMENCLATURE: _____
 PART NUMBER: _____
 USEFUL LIFE: _____

FACTOR OR VARIABLE	VALUE	CHANGED VALUE	% CHANGE	IMPACT			
				COST		READINESS	
				OLD	NEW	OLD	NEW

3. Using the above information, identify all manpower & personnel predictions required to operate and support the alternative system/equipment throughout its intended life cycle at its full mission capability.
4. Use a Manpower & Personnel Model to determine the cost, readiness, and supportability impacts for the selected alternative system/equipment that will occur if the manpower and personnel requirements are not met or changed.
5. Proceed to Process 303.2.5.7A4.

PROCESS 303.2.5.7A4 - Post Production Support Considerations

PURPOSE:

To identify the sources of manpower & personnel resources that will be available after production of the alternate system/equipment ceases. This is the time between the end of production and disposal of the alternate system/equipment.

PROCEDURE:

1. Obtain life-cycle data from process 303.2.5.7A3.
2. Using the above predictions, considerations, and research, identify all sources for obtaining manpower & personnel resources (e.g., training aids/materials, devices, facilities) during the period between the end of production of the alternate system/equipment and its disposal.
3. Proceed to process 303.2.5.8 and document results.

PROCESS 303.2.5.8
DOCUMENT RESULTS

PURPOSE:

To document results of manpower & personnel life-cycle assessment for the alternate system/equipment.

PROCEDURE:

1. Obtain life-cycle assessment results from process 303.2.5.7
2. Record results in a narrative format. Results should include estimates of total manpower & personnel requirements and recommendations for the alternate system/equipment selected.

DOCUMENT RESULTS
(PROCESS 303.2.5.8)

END ITEM NAME: _____
NOMENCLATURE: _____
PART NUMBER: _____

RELATED INFORMATION

DOCUMENT TITLE: _____
LOCATION: _____
PREPARED BY: _____
COMMAND/OFFICE SYMBOL: _____
DATE: _____
VERSION: _____

ANNEX D

**VERT BATCH INPUT FILES
FOR
LSA SUBTASK 303.2.5**

NOTE:

Our presentation of VERT methodology, naming conventions and default settings are reproduced verbatim in each report to facilitate the use of VERT batch input files, which are specifically designed to the given task or subtask.

VERT APPLICATION METHODOLOGY

BACKGROUND:

Venture Evaluation and Review Technique (VERT) was developed as a network analysis technique to facilitate management decision making. It allows a systematic [REDACTED] and [REDACTED] 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 of 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 these 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 types 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, cost, 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 individual 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 in the present data flow diagram.
- A** - The nodes in each subsequent explosion are allotted an alphabetical suffix indicating 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 the 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 such 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 lower 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 iterations 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 Satellite
- (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	20.0
COST	10.0	100.0
PERFORMANCE	10.0	50.0

Node Records:

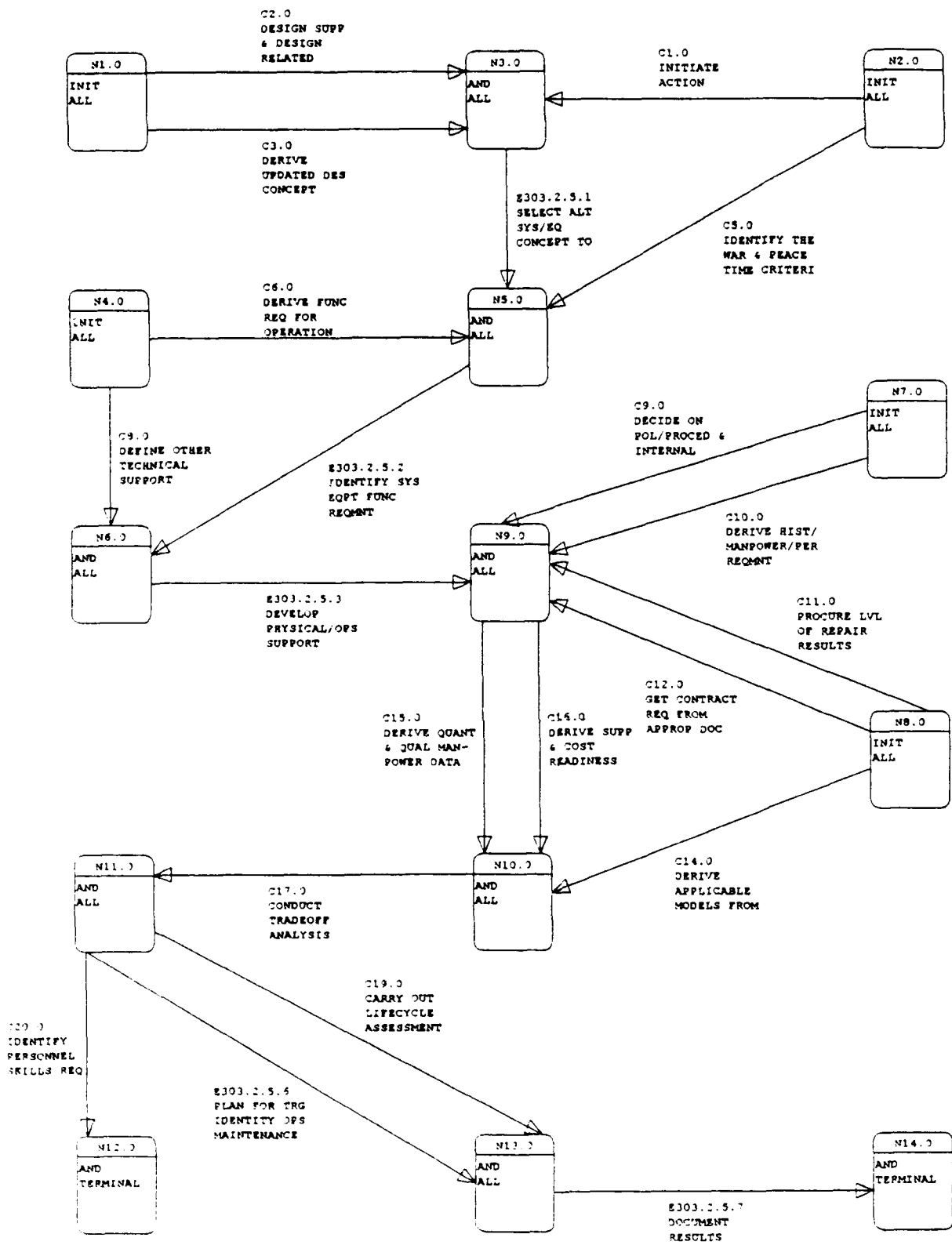
- (i) Input Logic - The input logic for the nodes are either "INITIAL" or "AND".
- (ii) Output Logic - The output logic has been defaulted to "AND" or "TERMINAL".
- (iii) The output option indicator and the storage option indicator are defaulted to read "0".
- (iv) The node description has also been left blank.

(It is again noted that the user can change 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.

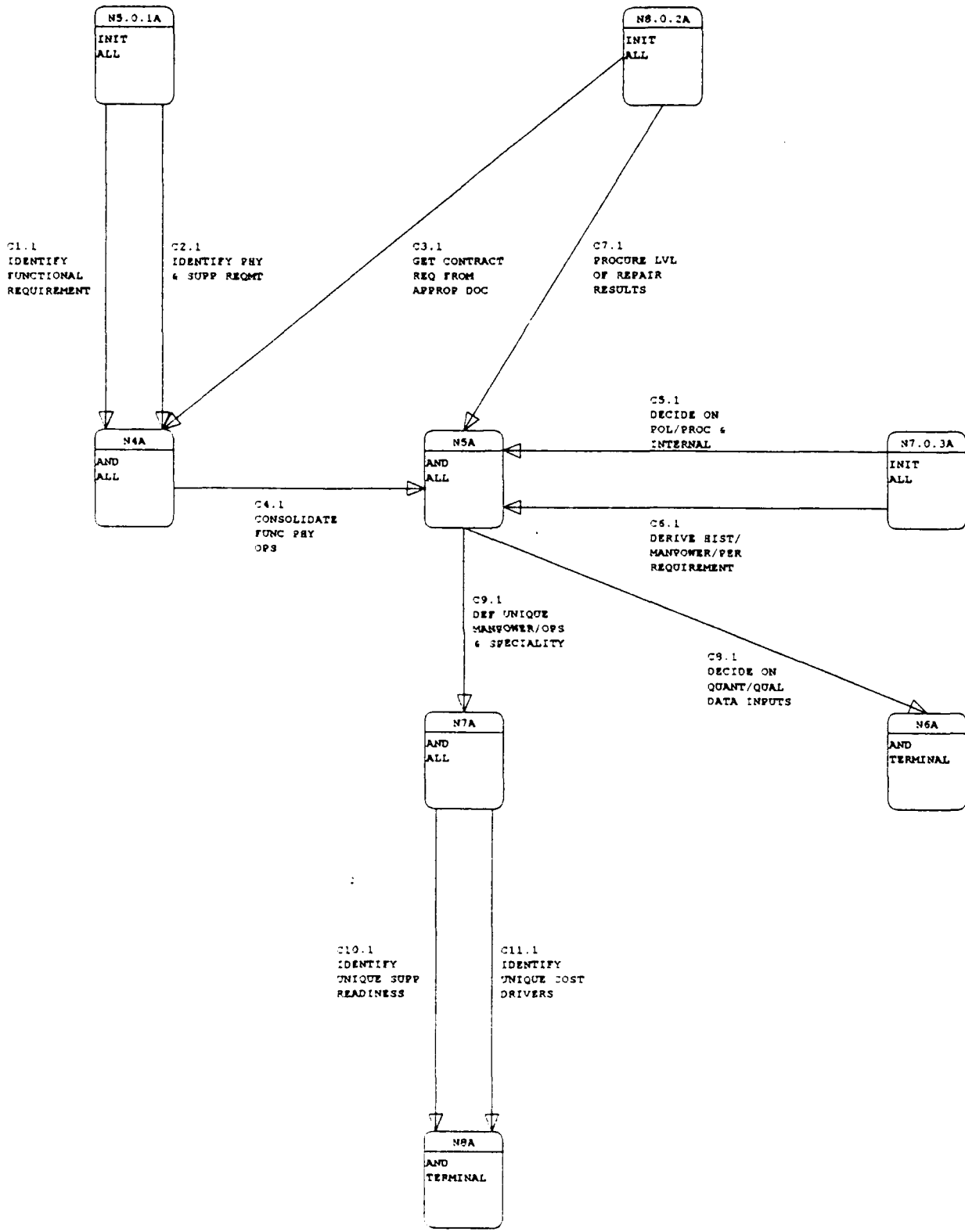


E303.2.5 TOP LEVEL VERT
 Created by: CHAU
 Revised by: CHAU
 Date changed: 22-SEP-79

	1	2	3	4	5	6	7
	12345678901234567890123456789012345678901234567890123456789012	12345678901234567890123456789012345678901234567890123456789012	12345678901234567890123456789012345678901234567890123456789012	12345678901234567890123456789012345678901234567890123456789012	12345678901234567890123456789012345678901234567890123456789012	12345678901234567890123456789012345678901234567890123456789012	12345678901234567890123456789012345678901234567890123456789012
1. 0016 10							
	+	+	+	+	+	+	+
2. C1.0	N2.0	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	N1.0	N3.0	1.0	DESIGN SUPPORT AND DESIGN RELATED			
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	N1.0	N3.0	1.0	DERIVE UPDATED DESIGN CONCEPT			
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. E303251	N3.0	N5.0	1.0	SELECT ALTERNATE NEW SYS/EQPT CONCEPTS FOR			
15. E303251	DTIME 1		2	10.0	20.0		
16. E303251	DCOST 1		2	10.0	100.0		
17. E303251	DPERF 1		2	10.0	50.0		
	+	+	+	+	+	+	+
18. C5.0	N2.0	N5.0	1.0	IDENTIFY THE WARTIME AND PEACETIME CRITERIA			
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	DERIVE FUNCTIONAL REQUIREMENT FOR OPERATION			
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. E303252	N5.0	N6.0	1.0	IDENTIFY SYSTEM/EQUIPMENT FUNCTIONAL REQUIR			
27. E303252	DTIME 1		2	10.0	20.0		
28. E303252	DCOST 1		2	10.0	100.0		
29. E303252	DPERF 1		2	10.0	50.0		
	+	+	+	+	+	+	+
30. C8.0	N4.0	N6.0	1.0	DEFINE OTHER TECHNICAL SUPPORT			
31. C8.0	DTIME 1		2	10.0	20.0		
32. C8.0	DCOST 1		2	10.0	100.0		
33. C8.0	DPERF 1		2	10.0	50.0		
	+	+	+	+	+	+	+
34. C9.0	N7.0	N9.0	1.0	DECIDE POL/PROC & INTERNAL AUTHORIZATION DO			
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	N7.0	N9.0	1.0	DERIVE HISTORICAL/MANPOWER/PERSONNEL REQUIR			
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. C11.0	N8.0	N9.0	1.0	PROCURE LEVEL OF REPAIR RESULTS			
43. C11.0	DTIME 1		2	10.0	20.0		
44. C11.0	DCOST 1		2	10.0	100.0		
45. C11.0	DPERF 1		2	10.0	50.0		
	+	+	+	+	+	+	+

	1	2	3	4	5	6	7
1	123456789012345678901234567890123456789012345678901234567890123456789012						
	NEW	NETWORK		PAGE	2		
	1	2	3	4	5	6	7
	123456789012345678901234567890123456789012345678901234567890123456789012						
46.	C12.0	N8.0	N9.0	1.0	GET CONTRACT REQUIREMENT FROM APPROPRIATE D		
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.	E303253	N6.0	N9.0	1.0	DEVELOP PHYSICAL/OPERATIONAL SUPPORT REQUIR		
51.	E303253	DTIME 1		2	10.0	20.0	
52.	E303253	DCOST 1		2	10.0	100.0	
53.	E303253	DPERF 1		2	10.0	50.0	
		+			+		+
54.	C14.0	N8.0	N10.0	1.0	DERIVE APPLICABLE MODELS FROM AMC-P-700-4		
55.	C14.0	DTIME 1		2	10.0	20.0	
56.	C14.0	DCOST 1		2	10.0	100.0	
57.	C14.0	DPERF 1		2	10.0	50.0	
		+			+		+
58.	C15.0	N9.0	N10.0	1.0	DERIVE QUANTITATIVE AND QUALITATIVE MANPCWE		
59.	C15.0	DTIME 1		2	10.0	20.0	
60.	C15.0	DCOST 1		2	10.0	100.0	
61.	C15.0	DPERF 1		2	10.0	50.0	
		+			+		+
62.	C16.0	N9.0	N10.0	1.0	DERIVE SUPPORT AND COST READINESS FACTORS		
63.	C16.0	DTIME 1		2	10.0	20.0	
64.	C16.0	DCOST 1		2	10.0	100.0	
65.	C16.0	DPERF 1		2	10.0	50.0	
		+			+		+
66.	C17.0	N10.0	N11.0	1.0	CONDUCT TRADEOFF ANALYSIS		
67.	C17.0	DTIME 1		2	10.0	20.0	
68.	C17.0	DCOST 1		2	10.0	100.0	
69.	C17.0	DPERF 1		2	10.0	50.0	
		+			+		+
70.	E303256	N11.0	N13.0	1.0	PLAN FOR TRAINING IDENTITY OPERATIONS MAINT		
71.	E303256	DTIME 1		2	10.0	20.0	
72.	E303256	DCOST 1		2	10.0	100.0	
73.	E303256	DPERF 1		2	10.0	50.0	
		+			+		+
74.	C19.0	N11.0	N13.0	1.0	CARRYOUT LIFECYCLE ASSESSMENT		
75.	C19.0	DTIME 1		2	10.0	20.0	
76.	C19.0	DCOST 1		2	10.0	100.0	
77.	C19.0	DPERF 1		2	10.0	50.0	
		+			+		+
79.	C20.0	N11.0	N12.0	1.0	IDENTIFY PERSONNEL SKILLS REQUIREMENT		
79.	C20.0	DTIME 1		2	10.0	20.0	
80.	C20.0	DCOST 1		2	10.0	100.0	
81.	C20.0	DPERF 1		2	10.0	50.0	
		+			+		+
82.	E303257	N13.0	N14.0	1.0	DOCUMENT RESULTS		
83.	E303257	DTIME 1		2	10.0	20.0	
84.	E303257	DCOST 1		2	10.0	100.0	
85.	E303257	DPERF 1		2	10.0	50.0	
		+			+		+
86.	ENDARC						
		+			+		+
87.	N3.0	2 2 0 0					
		+			+		+
88.	N1.0	1 2 0 0					

	+	+	+	+	+	+	+
	1	2	3	4	5	6	7
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NEW NETWORK							
	1	2	3	4	5	6	7
12345678901234567890123456789012345678901234567890123456789012							
89. N5.0	2	2	0	0			
	+		+		+		+
90. N2.0	1	2	0	0			
	+		+		+		+
91. N4.0	1	2	0	0			
	+		+		+		+
92. N6.0	2	2	0	0			
	+		+		+		+
93. N7.0	1	2	0	0			
	+		+		+		+
94. N9.0	2	2	0	0			
	+		+		+		+
95. N8.0	1	2	0	0			
	+		+		+		+
96. N10.0	2	2	0	0			
	+		+		+		+
97. N11.0	2	2	0	0			
	+		+		+		+
98. N13.0	2	2	0	0			
	+		+		+		+
99. N12.0	2	1	0	0			
	+		+		+		+
100. N14.0	2	1	0	0			
	+		+		+		+
101. ENDNODE							
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12345678901234567890123456789012345678901234567890123456789012							



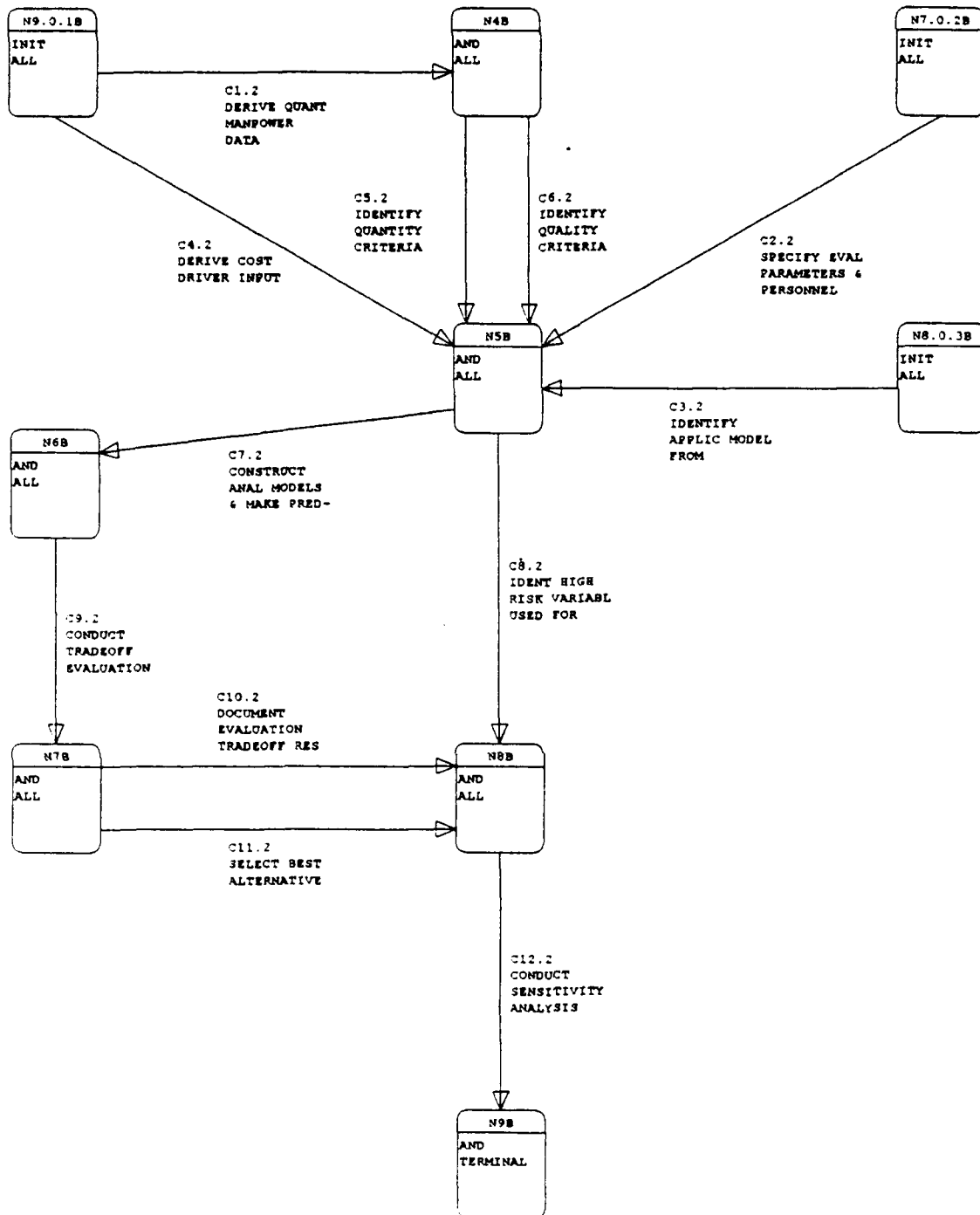
303.2.5.4A VEPT
 Created by: CHAU
 Revised by: CHAU
 Date changed: 22-SEP-99

	1	2	3	4	5	6	7	
	123456789012345678901234567890123456789012345678901234567890123456789012							
1.	0016	10						
			MANPOWER/PERSONNEL IMPLICATIONS FOR SELECTED ALT					
2.	C1.1	N5.0.1A N4A	1.0	IDENTIFY FUNCTIONAL REQUIREMENTS				
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	N5.0.1A N4A	1.0	IDENTIFY PHYSICAL AND SUPPORT REQUIREMENTS				
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	N8.0.2A N4A	1.0	GET CONTRACT REQUIREMENT FROM APPROPRIATE D				
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	CONSOLIDATE FUNCTIONAL PHYSICAL OPERATIONS				
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	N7.0.3A N5A	1.0	DECIDE POL/PROC & INTERNAL AUTHORIZATION DO				
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	N7.0.3A N5A	1.0	DERIVE HIST/MANPOWER/PERSONNEL REQUIREMENTS				
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	N8.0.2A N5A	1.0	PROCURE LEVEL OF REPAIR RESULTS				
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	N5A N6A	1.0	DECIDE ON QUANTITATIVE/QUALITATIVE DATA INP				
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 N7A	1.0	DEFINE UNIQUE MANPOWER/OPERATIONAL SPECIALI				
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	N7A N8A	1.0	IDENTIFY UNIQUE SUPPORT READINESS DRIVERS				
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	N7A N8A	1.0	IDENTIFY UNIQUE COST DRIVERS				
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
      1          2          3          4          5          6          7
12345678901234567890123456789012345678901234567890123456789012
  N E W      N E T W O R K                P A G E      2
      1          2          3          4          5          6          7
12345678901234567890123456789012345678901234567890123456789012
46. ENDARC
      +          +          +          +          +          +          +
47. N5.0.1A 1 2 0 0
      +          +          +          +          +          +          +
48. N4A      2 2 0 0
      +          +          +          +          +          +          +
49. N8.0.2A 1 2 0 0
      +          +          +          +          +          +          +
50. N5A      2 2 0 0
      +          +          +          +          +          +          +
51. N7.0.3A 1 2 0 0
      +          +          +          +          +          +          +
52. N6A      2 1 0 0
      +          +          +          +          +          +          +
53. N7A      2 2 0 0
      +          +          +          +          +          +          +
54. N8A      2 1 0 0
      +          +          +          +          +          +          +
55. ENDNODE
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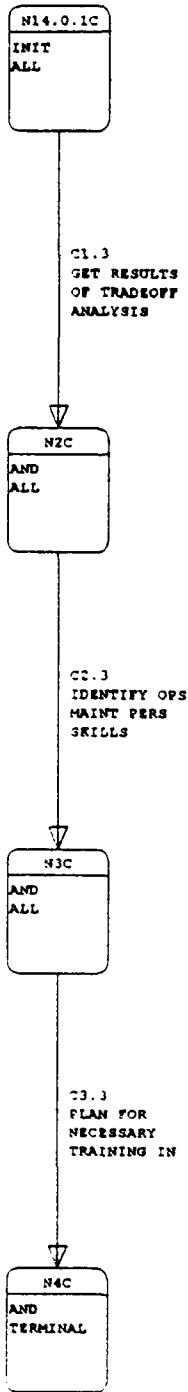
103.2.5.5A VERT
 Created by: CRAU
 Revised by: CRAU
 Date changed: 12-SEP-89

	1	2	3	4	5	6	7
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1.	0016	10					
2.	C1.2	N9.0.1B	N4B	1.0	DERIVE QUANTITATIVE MANPOWER DATA		
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	N7.0.2B	N5B	1.0	SPECIFY EVALUATION PARAMETERS AND PERS FOR		
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	N8.0.3B	N5B	1.0	IDENTIFY APPLICABLE MODEL FROM AMC-P-700-4		
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	N9.0.1B	N5B	1.0	DERIVE COST DRIVER INPUTS		
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	N4B	N5B	1.0	IDENTIFY QUANTITY CRITERIA		
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	N4B	N5B	1.0	IDENTIFY QUALITY CRITERIA		
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	N6B	1.0	CONSTRUCT ANALYSIS MODELS AND MAKE PREDICTI		
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	N8B	1.0	IDENTIFY HIGH RISK VARIABLES USED IN TRADEO		
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.	C9.2	N6B	N7B	1.0	CONDUCT TRADEOFF EVALUATION		
35.	C9.2	DTIME	1	2	10.0	20.0	
36.	C9.2	DCOST	1	2	10.0	100.0	
37.	C9.2	DPERF	1	2	10.0	50.0	
38.	C10.2	N7B	N8B	1.0	DOCUMENT EVALUATION TRADEOFF RESULTS		
39.	C10.2	DTIME	1	2	10.0	20.0	
40.	C10.2	DCOST	1	2	10.0	100.0	
41.	C10.2	DPERF	1	2	10.0	50.0	
42.	C11.2	N7B	N8B	1.0	SELECT BEST ALTERNATIVE		
43.	C11.2	DTIME	1	2	10.0	20.0	
44.	C11.2	DCOST	1	2	10.0	100.0	
45.	C11.2	DPERF	1	2	10.0	50.0	


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123456789012345678901234567890123456789012345678901234567890123456789012
NEW NETWORK PAGE 2
12345678901234567890123456789012345678901234567890123456789012
46. C12.2 N8B N9B 1.0 CONDUCT SENSITIVITY ANALYSIS
47. C12.2 DTIME 1 2 10.0 20.0
48. C12.2 DCOST 1 2 10.0 100.0
49. C12.2 DPERF 1 2 10.0 50.0
50. ENDARC + + + + + + +
51. N9.0.1B 1 2 0 0 + + + + + + +
52. N4B 2 2 0 0 + + + + + + +
53. N7.0.2B 1 2 0 0 + + + + + + +
54. N5B 2 2 0 0 + + + + + + +
55. N8.0.3B 1 2 0 0 + + + + + + +
56. N6B 2 2 0 0 + + + + + + +
57. N8B 2 2 0 0 + + + + + + +
58. N7B 2 2 0 0 + + + + + + +
59. N9B 2 1 0 0 + + + + + + +
60. ENDNODE
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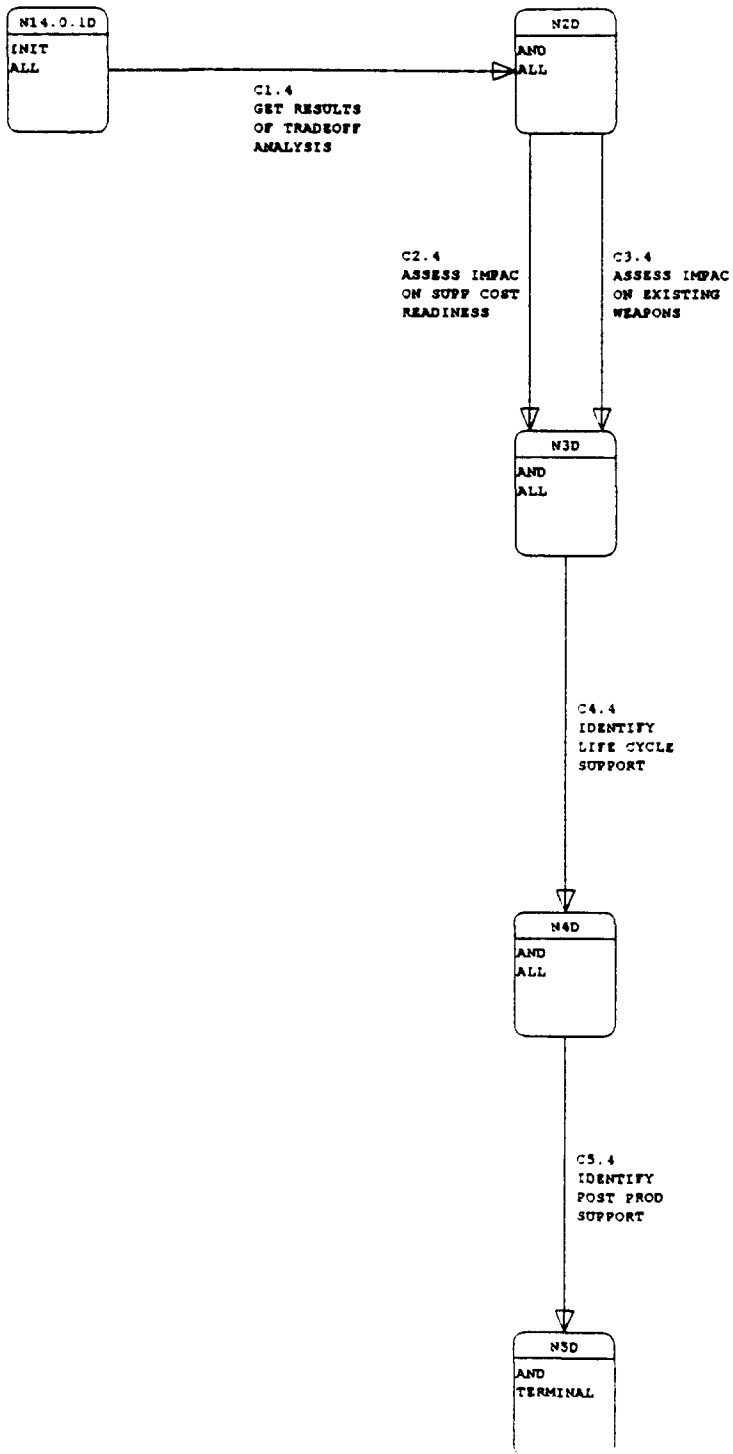
303.2.5.5A VEPT
Created by: CBAU
Revised by: CBAU
Date changed: 22-SEP-99

1

NEW NETWORK

PAGE 1

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1.	0016	10					
2.	C1.3	N14.0.1CN2C	1.0	GET RESULTS OF TRADEOFF ANALYSIS			
3.	C1.3	DTIME 1	2	10.0	20.0		
4.	C1.3	DCOST 1	2	10.0	100.0		
5.	C1.3	DPERF 1	2	10.0	50.0		
6.	C2.3	N2C N3C	1.0	IDENTIFY OPERATIONS/MAINTENANCE PERSONNEL S			
7.	C2.3	DTIME 1	2	10.0	20.0		
8.	C2.3	DCOST 1	2	10.0	100.0		
9.	C2.3	DPERF 1	2	10.0	50.0		
10.	C3.3	N3C N4C	1.0	PLAN FOR NECESSARY TRAINING IN OPS AND MAIN			
11.	C3.3	DTIME 1	2	10.0	20.0		
12.	C3.3	DCOST 1	2	10.0	100.0		
13.	C3.3	DPERF 1	2	10.0	50.0		
14.	ENDARC						
15.	N14.0.1C1	2 0 0					
16.	N2C	2 2 0 0					
17.	N3C	2 2 0 0					
18.	N4C	2 1 0 0					
19.	ENDNODE						



203.2.5.7A VERT
 Created by: CRAU
 Revised by: CRAU
 Date changed: 22-SEP-99

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1.	0016 10	LIFE CYCLE ASSESSMENT							
2.	C1.4 N14.0.1DN2D		+	+					
3.	C1.4 DTIME 1			2	10.0	20.0			
4.	C1.4 DCOST 1			2	10.0	100.0			
5.	C1.4 DPERF 1			2	10.0	50.0			
6.	C2.4 N2D N3D		+	+					
7.	C2.4 DTIME 1			2	10.0	20.0			
8.	C2.4 DCOST 1			2	10.0	100.0			
9.	C2.4 DPERF 1			2	10.0	50.0			
10.	C3.4 N2D N3D		+	+					
11.	C3.4 DTIME 1			2	10.0	20.0			
12.	C3.4 DCOST 1			2	10.0	100.0			
13.	C3.4 DPERF 1			2	10.0	50.0			
14.	C4.4 N3D N4D		+	+					
15.	C4.4 DTIME 1			2	10.0	20.0			
16.	C4.4 DCOST 1			2	10.0	100.0			
17.	C4.4 DPERF 1			2	10.0	50.0			
18.	C5.4 N4D N5D		+	+					
19.	C5.4 DTIME 1			2	10.0	20.0			
20.	C5.4 DCOST 1			2	10.0	100.0			
21.	C5.4 DPERF 1			2	10.0	50.0			
22.	ENDARC		+	+					
23.	N14.0.1D1 2 0 0		+	+					
24.	N2D 2 2 0 0		+	+					
25.	N3D 2 2 0 0		+	+					
26.	N4D 2 2 0 0		+	+					
27.	N5D 2 1 0 0		+	+					
28.	ENDNODE		+	+					
		1	2	3	4	5	6	7	
		123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012							

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.

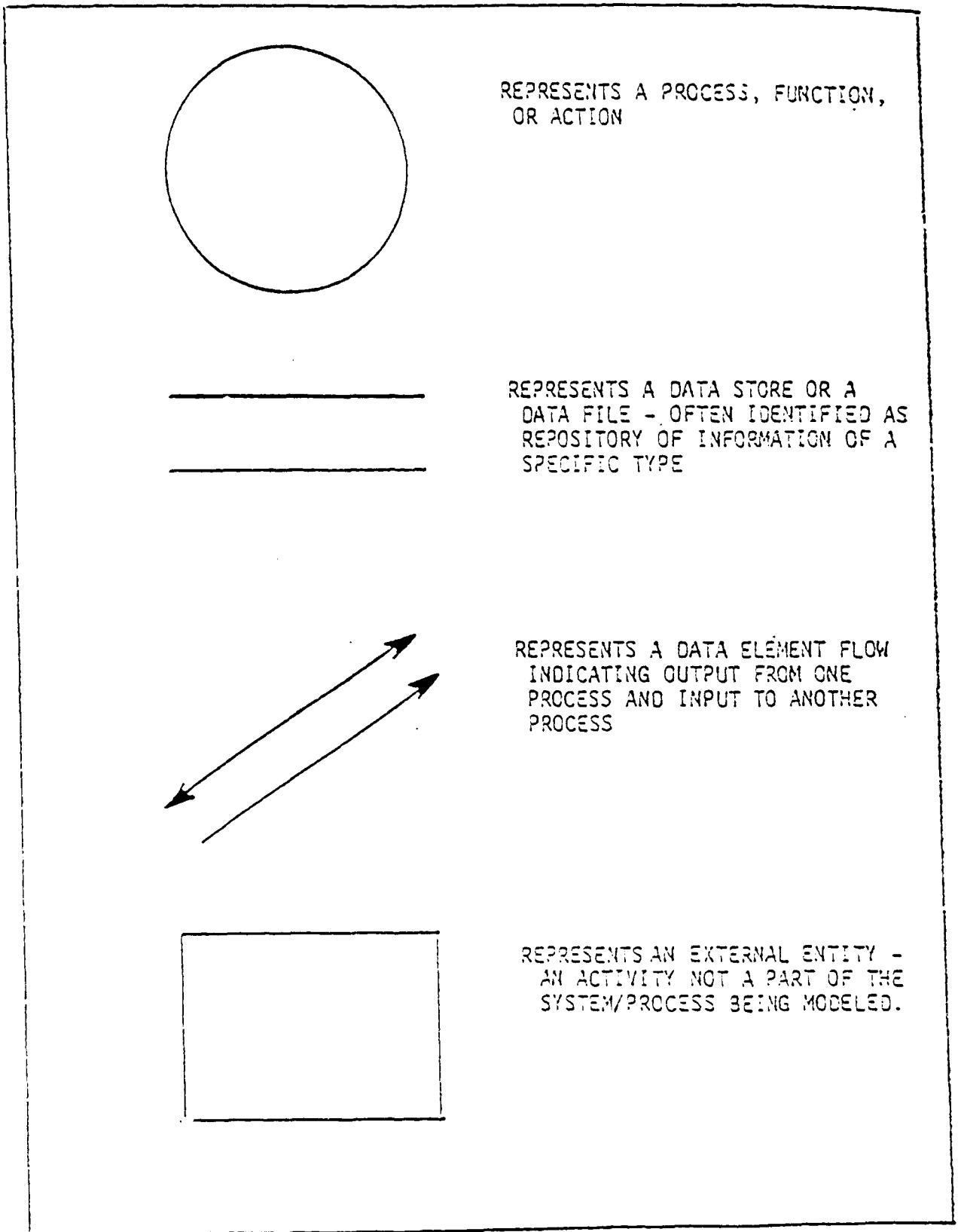


Figure 1. Standard DFD Symbol Definitions

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-step what 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.

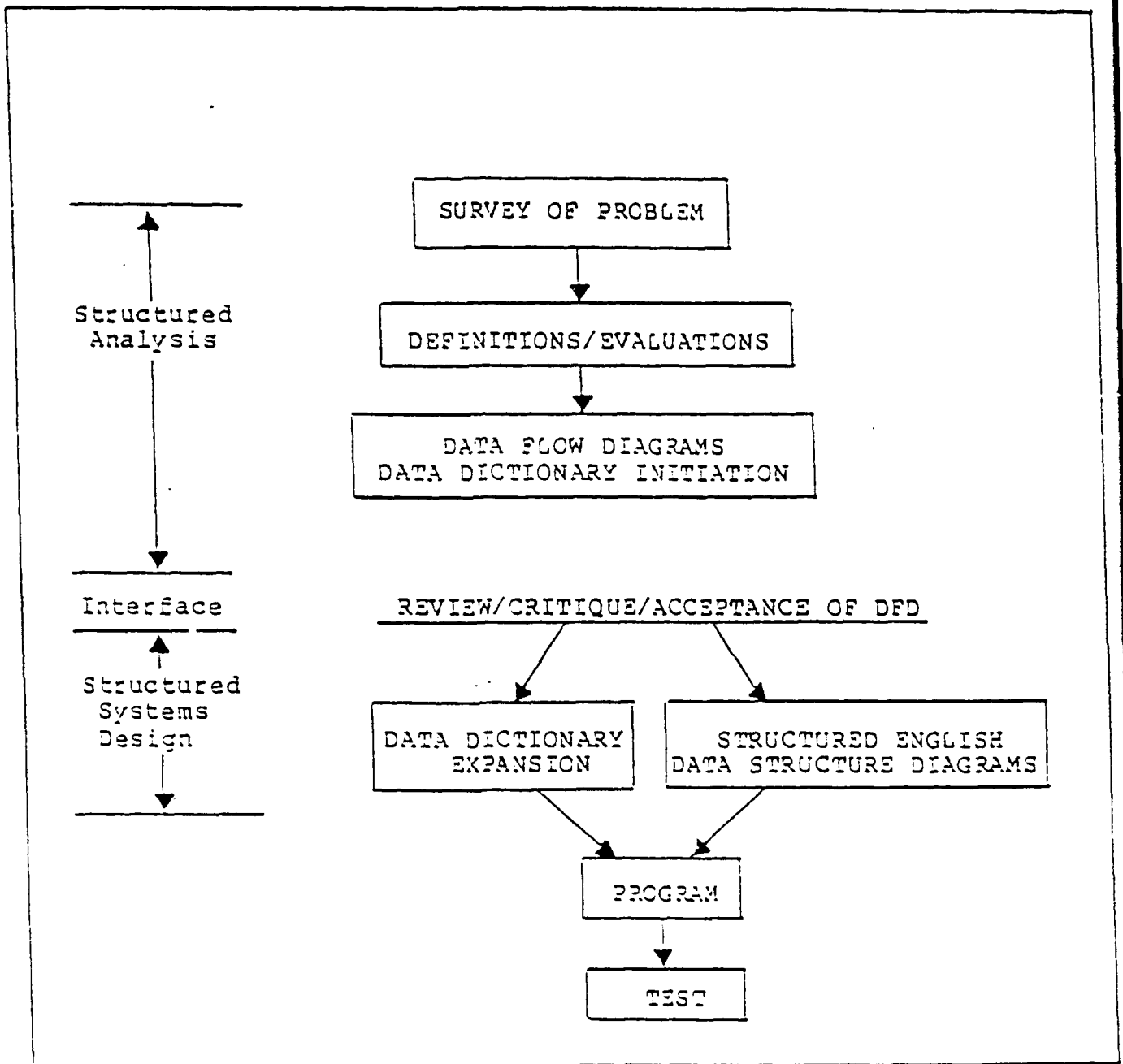


Figure 2. Structured Analysis and Structured Systems Design Organization

GLOSSARY

AMSDL	Acquisition Management Systems and Data Requirements Control List
APJ	American Power Jet Company
AR	Army Regulation
DFD	Data Flow Diagram
DID	Data Item Description
FMECA	Failure Mode, Effects, and Criticality Analysis
ILS	Integrated Logistic Support
LSA	Logistic Support Analysis
LSAR	Logistic Support Analysis Report
PAM	Pamphlet
MIL-STD	Military Standard
RCM	Reliability Centered Maintenance
SSAD	Structured Systems Analysis and Design