AMC PAMPHLET AMC-P 700-4

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LOGISTICS SUPPORT ANALYSIS TECHNIQUES GUIDE

AD-A179 008

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HEADQUARTERS, US ARMY MATERIEL COMMAND
ALEXANDRIA, VIRGINIA 22333-0001

15 MARCH 1985

A0325-85-9-1-MAR

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FOREWORD

Logistics Support Analysis (LSA) is the selective application of scientific and engineering efforts undertaken during the acquisition process, as part of the system engineering and design process, to assist in complying with supportability and other integrated logistics support (ILS) objectives. LSA is a regulatory requirement in accordance with DODD 5000.39 and AR 700-127 and is required in all materiel acquisition programs without exception. The tasks required for performance of LSA are cited in MIL-STD-1388-1A. The US Army Materiel Command (AMC) ILS Study (Sep 82) identified the requirement to strengthen the LSA program in AMC and develop additional capabilities to better conduct LSA on AMC acquisition programs. Also, the study found that even though MIL-STD-1388-1A defines the LSA program requirements, there was no source available to define the procedures/approaches for LSA task accomplishment. This pamphlet has been developed to strengthen the LSA program and assist in the accomplishment of those LSA tasks set forth in MIL-STD-1388-1A.

The USAMC Materiel Readiness Support Activity (MRSA), as AMC executive agent for LSA, has the responsibility for screening and evaluation of LSA techniques for inclusion into this pamphlet. The detailed missions, functions, and planned actions, of the AMC executive agent for LSA are contained in the DARCOM-approved LSA Enhancement and Implementation Plan, 16 Nov 83. The main objective of the executive agent for LSA is to enhance and improve LSA throughout the materiel acquisition process and generally institutionalize the responsibilities for development of LSA procedures and techniques.

Currently, numerous methodologies exist within the DOD and industry which can be used to satisfy many of the LSA task requirements in total or in part. The major problem is lack of an awareness that these techniques exist. The LSA Techniques Guide is a step forward in cataloging these techniques to facilitate cross-fertilization of information and possibly curtail the efforts to perpetually reinvent the wheel.

The views and conclusions stated within this pamphlet are those of AMC and do not necessarily represent the official position of the Department of the Army (HQDA). Inclusion of a technique in this pamphlet is not an endorsement by either HQ DA or AMC of the technique or the technique developer.

The use of trade names in this pamphlet does not constitute an official endorsement or approval of the use of such commercial hardware or software. This pamphlet may not be cited for purpose of advertisement.

The utility of this pamphlet is dependent upon the participation of the logistics community in providing the latest information on techniques which have application to the LSA process. The LSA Technical Working Group (LSA-TWG) was established to provide a formal body/process by which the Army logistics community can provide technical guidance to the executive agent for LSA. This will become most important as procedures/approaches for LSA task accomplishment are defined and adopted by the logistics community. Another major objective of the LSA-TWG is to establish a formal process by which the Army and defense industry can identify LSA techniques/recommend enhancements to those LSA techniques.

QUALITY INSPECTED 3

*AMC-P 700-4

DEPARTMENT OF THE ARMY
HEADQUARTERS US ARMY MATERIEL COMMAND
5001 Eisenhower Avenue, Alexandria, VA 22333-0001

AMC PAMPHLET
No. 700-4 15 March 1985

LOGISTICS SUPPORT ANALYSIS TECHNIQUES GUIDE

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*This pamphlet supersedes DARCOM-P 750-11, Support Model Reference List, Feb 81.

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CHAPTER 1

INTRODUCTION

1.1 Purpose. This pamphlet provides a catalogue of techniques, both manual and automated, currently used within the Department of Defense (DOD) and industry to accomplish the LSA tasks of MIL-STD-1388-1A, LSA, 11 Apr 83.

1.2 Technique qualifications. Techniques for inclusion in this pamphlet, whether manual or automated, must have met the following criteria:

a. Be applicable to at least one of the LSA subtasks delineated in MIL-STD-1388-1A, LSA.

b. Be supported by a proponent who has documentation available which explains the technique methodology. This includes such documentation as a user's guide, executive summary, final report, and programer's guide.

c. Be exportable to other geographical locations. In the case of manual techniques, exportability is mostly a function of the quality of the documentation available. However, when dealing with automated techniques, factors other than documentation must be considered. For example, automated data processing equipment (ADPE) peculiarities do exist; therefore, program modifications cannot always be avoided when installing ADP programs in different locations. This is recognized and not considered a major problem to exportability. However, when a program is dependent on data files, processing programs, or unique hardware/software at a given location, this could preclude its exportation to any other location. Where this is evidenced the techniques will not be included in this pamphlet. This particular problem can sometimes be remedied if an adequate time-share arrangement can be made.

d. Be applicable to more than one system. This criteria are intended to screen out those techniques which were developed for one specific application. This does not imply that techniques so developed are inadequate. However, for the purpose of this guide, only techniques which have some common applications are to be considered. If a technique requires substantial resources in order to be applied to another system, it is not considered applicable to more than one system and will not be included in this guide. This criteria does not eliminate those techniques developed for a single product line (e.g., aircraft, electronics, tracked vehicles, etc.).

e. Have been successfully applied to a weapon system, end item, or major subsystem/component (preferably Army) within the last 5 years.

f. Not be superseded by a more preferred method for accomplishing the same functions. The technique should be a stand-alone technique and not dependent on another technique.

1.2.1 Both proprietary and nonproprietary techniques are considered for inclusion in this pamphlet. If the technique is proprietary and meets all other requirements, criteria 1.2c above may be waived to include the technique in this pamphlet.

1.2.2 Techniques which are/were currently under development at the time of this guide's publication were considered for inclusion into this pamphlet. These type techniques must have satisfied criteria 1.2a with assurance that the rest of the criteria will be satisfied upon their completion before they were included in the guide. The primary reason for including techniques still under development is to preclude duplicative developmental efforts and promote more cross talk in technique development.

1.2.3 Techniques which do not qualify for inclusion into this pamphlet are addressed in appendix A (parts 1 and 2). Part 1 of appendix A contains those techniques that did not meet the requirements stated in paragraph 1.2, the rationale as to why a particular technique was not included in this pamphlet and the qualification criteria the technique failed to meet. This will assist in tracking techniques and prevent reexamination of techniques that were previously rejected for inclusion into this pamphlet. Part 2 of appendix A contains those techniques for which information was not available at the time of publication of this pamphlet, and therefore, an evaluation against the criteria in paragraph 1.2 could not be made. Reconsideration of a rejected technique, in either part 1 or 2 of appendix A, will be undertaken when information is provided which could make the technique a viable candidate for accomplishing LSA. Then the rejected technique will be thoroughly examined for compliance with the established qualification criteria.

1.2.4 Requests for consideration of a technique for inclusion in this pamphlet should be accompanied with all available nonproprietary documentation (e.g., a program listing, programer's guide, user's guide, executive summary, and final report). Any program listings should be provided on 9-track, 1600 BPI magnetic tape or punchcards. If a magnetic tape is sent, it should have a fixed record length of 80 columns, blocked at 10 records per block in ASCII (unlabeled tape). Any tapes submitted will be returned. Also, when submitting new techniques, the LSA techniques information sheet and instructions at appendix B should be used. The maximum information which can be legibly placed on the information sheet should be provided.

1.3 <u>Technique sources</u>. Numerous sources are available which catalogue logistic techniques. These sources range from DOD to local organizations (e.g., plans and analysis or comptroller offices). Two notable sources of logistic techniques are--

a. The Defense Logistics Studies Information Exchange (DLSIE), US Army Logistics Management Center, Fort Lee, VA 23801 (AUTOVON 687-4255, com (804) 734-2240). DLSIE is assigned the mission to collect, organize, store, and disseminate information on all DOD logistics studies and models. As part of this mission DLSIE provides the following services:

(1) Distributes an "Annual DOD Catalogue of Logistics Models" and quarterly update reports.

(2) Provides custom bibliographies upon request.

(3) Provides secondary distribution of reports through the use of microfiche. It should be noted that on many of the LSA techniques information sheets contained in chapter 2, a number (DLSIE LD# XXXXXXX) follows the reference. This number is the DLSIE accession number and indicates that a copy of the reference is available through DLSIE.

b. Defense Technical Information Center for Scientific and Technical Information (DTIC), Cameron Station, Alexandria, VA 22333 (AUTOVON 284-7633, com (202) 694-7633). DTIC provides a service similar to that of DLSIE in that they provide custom bibliographies and secondary distribution of requested reports.

c. Many of the techniques cited in this pamphlet are repetitive of those found in DLSIE or DTIC. The techniques in this pamphlet, however, have been screened against the criteria of paragraph 1.2 to determine their utility for Army applications.

1.4 Recommended changes. Comments are solicited on the utility/benefits of this pamphlet along with any pertinent data which may be of use in improving the pamphlet. Users of this pamphlet are encouraged to forward recommended changes or additions to Commander, US AMC Materiel Readiness Support Activity, ATTN: AMXMD-EL, Lexington, KY 40511-5101, (AUTOVON 745-3985, com (606) 293-3985).

1.5 References.

a. DODD 5000.39, Acquisition and Management of ILS for Systems and Equipment, 17 Jan 80.

b. AR 700-127, ILS, 15 May 83.

c. MIL-STD-1388-1A, LSA, 11 Apr 83.

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CHAPTER 2

LSA TECHNIQUES

2.1 Application guidance. Each technique included in this chapter is a viable candidate for application to one or more LSA tasks during the LSA process. However, care must be taken to assure that a technique is not applied to an LSA task for which it was not designed. This misapplication of techniques can be minimized if, before choosing a specific technique, the user has a thorough understanding of the system under development and has fully defined the LSA program for that system (i.e., selected the MIL-STD-1388-1A LSA tasks tailored to the specific system). The MIL-STD contains specific guidance on the selection and tailoring of LSA tasks. Once the basic requirements are established, the various techniques can be evaluated to determine their applicability. This evaluation will require a review of the available references, interviews/discussions with the developer and proponent of the technique, and a detailed review of the technique methodology (including the computer program if the technique is automated).

2.2. LSA task to technique cross-reference. To assist in determining which techniques may be applicable, table 2-1, LSA task to technique cross-reference, page 2-4, is provided. This table provides a cross-reference of the MIL-STD-1388-1A LSA subtasks to the applicable techniques defined in this pamphlet. It should be noted that just because a technique is applicable to a given task, it does not mean that the technique is applicable to every subtask within the task. In addition, rarely will one technique satisfy all LSA task requirements. Therefore, several techniques will probably be required for each LSA program. Table 2-1 is a quick reference matrix to identify the applicable LSA techniques to each of the LSA subtasks. Simplicity of the matrix dictates the need to elaborate on its organization. The listing of subtask titles along the left side, with their corresponding subtasks numbers, are exactly as listed in MIL-STD-1388-1A. Also, LSA techniques, by acronym title are listed in alphabetical order across the top. The corresponding page number within this pamphlet on which the technique is discussed is contained in parenthesis following the technique acronym. This provides easy access to the detailed information sheets contained on each LSA technique.

2.3 ILS element to technique cross-reference. Table 2-2, ILS elements to technique cross-reference, page 2-10, is provided to identify that the LSA techniques address the elements of ILS (to some degree not yet defined) contained in DODD 5000.39 and AR 700-127. Rarely will one technique satisfy all of the ILS elements. Therefore, several techniques will probably be required to address all elements of ILS. Table 2-2 also contains information on the operational scenario (peace/war), level of detail (system/line replaceable unit) and model type (steady state or dynamic modeling) that each LSA technique provides.

2.4 Technique selection. The determination of which techniques to use requires more than an assessment of which techniques satisfy which LSA tasks or which ILS elements. The entire spectrum of the technique as it relates to the system under analysis and the intended location at which the technique will be used must be evaluated. To aid in this process, the following questions are provided as an example of what should be asked prior to a decision on which technique should be used:

a. What service, commodity, or system peculiar characteristics are inherent in the technique?

b. What are the assumptions and constraints used in the technique?

c. What are the limitations of the technique?

d. If automated, what language is used, ADP equipment used, and software/peripheral equipment support is required?

e. What is the quantity and accurarcy of data required? How sensitive is the model to variations in input data?

f. Has the technique been successfully used by more than one user?

g. Will the developer/proponent provide initial support?

h. How good is the documentation?

i. What in-house training will be required?

j. How much will the technique cost to execute (dollars, people, equipment, etc.)?

k. Is the technique modular, such that only applicable portions need be used?

l. Has the methodology been normalized or validated with operational data?

2.5 Technique adaptation. Due to technique peculiarities and the inherent inability for any technique to cover all possibilities, modifications of techniques in many cases are unavoidable. These modifications should not be taken lightly and should only be undertaken after fully understanding why and how the technique must change. Coordination with the technique proponent/a current user is highly recommended.

2.6 Miscellaneous. Provided at appendix C is an alphabetical index of techniques contained in this pamphlet. THe index is sorted by technique title (not acronym). Provided at appendix D is an acronym listing of ILS terms used throuhout this pamphlet. Appendix D also includes weapon system names, nomenclatures, and abbreviations contained on the LSA techniques information sheets (to the maximum extent possible). Provided at appendix E is an alphabetical index of technique proponents/developers who have contributed to this pamphlet.

2.7 LSA techniques information sheets. The LSA technique information sheets on pages 2-14 through 2-185 document 86 techniques which can be used during the LSA process. These techniques are in alphabetical order by acronym and not title (see app C for listing by title). The LSA technique information sheet on each LSA technique is in two parts. Information contained on part 1 of the LSA technique information sheet includes-- (1) the detailed purpose or objective of the technique; (2) the description of the technique methodology, including key procedural steps, the logic process, and sensitivity/risk analysis capabilities; and (3) the organization who sponsored the development or is the current proponent for the technique and current users of or POC for the technique. Part 2 of the LSA technique information sheet includes-- (1) an outline of the input data required to perform the technique analysis, including constraints, assumptions, goals, etc; (2) an outline of the type of reports and the data information which is a product/output of the technique; (3) automation information that includes language used, hardware on which the technique was used/designed for, and any unique automation requirements if the technique is automated; (4) life cycle phases in which the technique could be applied; (5) LSAR data records the technique interfaces with, either as an input or output of the technique; (6) weapon systems the technique has been applied to within the past 5 years; (7) LSA subtasks which are supported by using the technique, and (8) documentation available on the technique and whether it is proprietary or there are any associated acquisition costs.

X INDICATES THAT A TECHNIQUE IS APPLICABLE TO THE LSA SUBTASK

INDICATES THE PAGE NO. OF A DETAIL TECHNIQUE INFORMATION SHEET

* - INDICATES A FABRICATED ACRONYM FOR PURPOSES OF THIS GUIDE

MIL-STD-1388-1A SUBTASKS		LOGISTIC SUPPORT ANALYSIS TECHNIQUE ACRONYMS																												
		ACCLOGTROM (2-14)	ACIM (2-16)	ACCLEARN (2-18)	ALPOS II (2-20)	AMOS (2-22)	ARLCAP/OVERVIEW (2-24)	ARM (2-26)	ASOAR (2-28)	ATEWORK (2-30)*	AURA (2-32)	CALCUMOD (2-34)*	CAM X (2-36)	COSTPRO (2-38)	COVART/HEVART (2-40)	COVERS (2-42)	DARCOM P 700 11 (2-44)	DARCOM P 750 5 (2-46)	DEFLCC (2-48)*	DIREC (2-50)	DOSE (2-52)	ECONMOD (2-54)	ERAMS (2-56)	FASTALS (2-58)	FMECA (2-60)	FREXPOP (2-62)*	GEMM (2-64)	HARDMAN (2-66)	HM/SE (2-68)	ILSMOD (2-70)*
101.2.1	LSA STRATEGY								X																					
101.2.2	UPDATES								X																					
102.2.1	LSA PLAN								X																					
102.2.2	UPDATES								X																					
103.2.1	ESTABLISH REVIEW PROCEDURES																													
103.2.2	DESIGN REVIEWS								X																					
103.2.3	PROGRAM REVIEWS																													
103.2.4	LSA REVIEWS								X								X													
201.2.1	SUPPORTABILITY FACTORS						X		X		X																X	X		
201.2.2	QUANTITATIVE FACTORS																													
201.2.3	FIELD VISITS																													
201.2.4	USE STUDY REPORTS AND UPDATES																													
202.2.1	SUPPORTABILITY CONSTRAINTS	X							X					X		X							X							
202.2.2	SUPPORTABILITY CHARACTERISTICS	X							X		X					X							X							
202.2.3	RECOMMENDED APPROACHES	X																												
202.2.4	RISKS																													
203.2.1	IDENTIFY COMPARATIVE SYSTEMS																													
203.2.2	BASELINE COMPARISON SYSTEM	X	X		X						X	X		X					X	X		X								X
203.2.3	COMPARATIVE SYSTEM CHARACTERISTICS	X	X		X				X	X				X				X	X	X	X	X				X	X			
203.2.4	QUALITATIVE SUPPORTABILITY PROBLEMS		X		X				X					X													X			
203.2.5	SUPPORTABILITY, COST, AND READINESS DRIVERS	X	X	X	X	X			X	X		X		X					X	X		X					X	X		
203.2.6	UNIQUE SYSTEM DRIVERS	X							X										X	X		X							X	
203.2.7	UPDATES									X										X		X					X			
203.2.8	RISKS AND ASSUMPTIONS																		X	X										
204.2.1	RECOMMENDED DESIGN OBJECTIVES	X							X	X										X		X					X			
204.2.2	UPDATES																													
204.2.3	RISKS								X											X		X								
205.2.1	SUPPORTABILITY CHARACTERISTICS								X	X				X		X				X	X	X					X	X		X
205.2.2	SUPPORTABILITY OBJECTIVES AND ASSOCIATED RISKS								X							X														
205.2.3	SPECIFICATION REQUIREMENTS	X							X	X										X										
205.2.4	NATO CONSTRAINTS																													
205.2.5	SUPPORTABILITY GOALS AND THRESHOLDS	X							X	X				X														X		
301.2.1	FUNCTIONAL REQUIREMENTS																								X			X		
301.2.2	UNIQUE FUNCTIONAL REQUIREMENTS																		X						X					
301.2.3	RISKS																								X					

TABLE 2-1 LSA TASK TO TECHNIQUE CROSS-REFERENCE

LSA TECHNIQUE ACRONYMS MIL-STD-1388-1A SUBTASKS (CONT'D)		ACCLOGTROM	ACIM	ACQLEARN	ALPOS II	AMOS	ARICAT/OVERVIEW	ARM	ASOAR	ATEWORK *	AURA	CALCUMOD *	CAM-X	COSTPRO	COVART/HEVART	COVERS	DARCOM P 700-11	DARCOM P 750-5	DEFLCC *	DIREC	DOSE	ECONMOD	ERAMS	FASTALS	FMECA	FREXPOP *	GEMM	HARDMAN	HM/SE	ILSMOD *
301.2.4	OPERATIONS AND MAINTENANCE TASKS																								X					
301.2.5	DESIGN ALTERNATIVES	X							X																					
301.2.6	UPDATES																											X		
302.2.1	ALTERNATIVE SUPPORT CONCEPTS	X							X	X	X								X	X							X	X		
302.2.2	SUPPORT CONCEPT UPDATES	X							X										X	X							X	X		
302.2.3	ALTERNATIVE SUPPORT PLANS								X										X								X			
302.2.4	SUPPORT PLAN UPDATES																		X								X	X		
302.2.5	RISKS								X																					
303.2.1	TRADEOFF CRITERIA	X						X		X				X				X		X		X					X			
303.2.2	SUPPORT SYSTEM TRADEOFFS	X	X			X			X										X	X		X					X		X	X
303.2.3	SYSTEM TRADEOFFS	X	X			X		X	X	X		X						X	X			X					X		X	X
303.2.4	READINESS SENSITIVITIES	X	X		X			X	X			X						X	X	X							X			
303.2.5	MANPOWER AND PERSONNEL TRADEOFFS		X			X								X					X	X								X		
303.2.6	TRAINING TRADEOFFS																		X								X	X		
303.2.7	REPAIR LEVEL ANALYSES		X							X									X	X			X				X		X	
303.2.8	DIAGNOSTIC TRADEOFFS		X							X										X										
303.2.9	COMPARATIVE EVALUATIONS	X																X	X	X										
303.2.10	ENERGY TRADEOFFS																		X											
303.2.11	SURVIVABILITY TRADEOFFS										X				X															
303.2.12	TRANSPORTABILITY TRADEOFFS							X					X																	
401.2.1	TASK ANALYSIS																	X										X		
401.2.2	ANALYSIS DOCUMENTATION																													
401.2.3	NEW/CRITICAL SUPPORT RESOURCES								X										X									X		
401.2.4	TRAINING REQUIREMENTS AND RECOMMENDATIONS																											X		
401.2.5	DESIGN IMPROVEMENTS	X							X									X									X			
401.2.6	MANAGEMENT PLANS																													
401.2.7	TRANSPORTABILITY ANALYSIS																													
401.2.8	PROVISIONING REQUIREMENTS	X							X																					
401.2.9	VALIDATION																													
401.2.10	ILS OUTPUT PRODUCTS																	X												
401.2.11	LSAR UPDATES																	X												
402.2.1	NEW SYSTEM IMPACT	X							X	X									X											
402.2.2	SOURCES OF MANPOWER AND PERSONNEL SKILLS																													
402.2.3	IMPACT OF RESOURCE SHORTFALLS	X							X										X				X							
402.2.4	COMBAT RESOURCE REQUIREMENTS						X		X		X				X			X						X						
402.2.5	PLANS FOR PROBLEM RESOLUTION																							X						
403.2	POST PRODUCTION SUPPORT PLAN	X					X											X						X						
501.2.1	TEST AND EVALUATION STRATEGY																													
501.2.2	OBJECTIVES AND CRITERIA								X																					
501.2.3	UPDATES AND CORRECTIVE ACTIONS									X								X												
501.2.4	SUPPORTABILITY ASSESSMENT PLAN																													
501.2.5	SUPPORTABILITY ASSESSMENT									X				X													X			

TABLE 2-1 LSA TASK TO TECHNIQUE CROSS-REFERENCE (CONT'D)

X - INDICATES THAT A TECHNIQUE IS APPLICABLE TO THE LSA SUBTASK

( ) - INDICATES THE PAGE NO. OF A DETAIL TECHNIQUE INFORMATION SHEET

* - INDICATES A FABRICATED ACRONYM FOR PURPOSES OF THIS GUIDE

MIL-STD-1388-1A SUBTASKS (CONT'D)		LOGISTIC SUPPORT ANALYSIS TECHNIQUE ACRONYMS																												
		IREM (2-72)	LADEN (2-74)	LCC-2/2A (2-76)	LCCA (2-78)	LCCAM (2-80)	LCAM (2-82)*	LCOM (2-84)	LEAD (2-86)	LOCAMS (2-88)	LOGAM (2-90)	LOGATAK II (2-92)	LOGOP II (2-94)	LRAM (2-96)	LSAEXTRC (2-98)	MACATAK (2-100)	MARC (2-102)	MCLOR (2-104)	MLCCM (2-106)	MOBSIM (2-108)	MOOHI LOR (2-110)	MULTICONFIG (2-112)*	NRLA (2-114)	NSIA TECH (2-116)*	ONSCOSTS (2-118)	ORACLE-MARC (2-120)	ORLA (2-122)	OSAMM/OATMEAL (2-124)	OSMOD (2-126)	PAGES (2-128)
101.2.1	LSA STRATEGY						X																	X						
101.2.2	UPDATES						X																	X						
102.2.1	LSA PLAN						X																	X						
102.2.2	UPDATES						X																	X						
103.2.1	ESTABLISH REVIEW PROCEDURES						X																							
103.2.2	DESIGN REVIEWS						X																							
103.2.3	PROGRAM REVIEWS						X																							
103.2.4	LSA REVIEWS						X																							
201.2.1	SUPPORTABILITY FACTORS												X				X			X				X				X		
201.2.2	QUANTITATIVE FACTORS																													
201.2.3	FIELD VISITS																													
201.2.4	USE STUDY REPORTS AND UPDATES																													
202.2.1	SUPPORTABILITY CONSTRAINTS												X					X						X	X					
202.2.2	SUPPORTABILITY CHARACTERISTICS	X										X						X												
202.2.3	RECOMMENDED APPROACHES												X											X						
202.2.4	RISKS																							X						
203.2.1	IDENTIFY COMPARATIVE SYSTEMS																													
203.2.2	BASELINE COMPARISON SYSTEM	X		X	X	X		X					X		X					X		X						X		
203.2.3	COMPARATIVE SYSTEM CHARACTERISTICS					X		X	X		X		X		X			X	X		X	X			X			X	X	
203.2.4	QUALITATIVE SUPPORTABILITY PROBLEMS																					X						X		
203.2.5	SUPPORTABILITY, COST, AND READINESS DRIVERS	X		X	X	X		X		X	X		X		X			X		X	X	X	X	X				X		
203.2.6	UNIQUE SYSTEM DRIVERS					X		X		X	X			X				X												
203.2.7	UPDATES					X		X		X	X		X					X			X							X		
203.2.8	RISKS AND ASSUMPTIONS												X																	
204.2.1	RECOMMENDED DESIGN OBJECTIVES					X					X		X					X					X					X		
204.2.2	UPDATES					X																								
204.2.3	RISKS												X										X				X			
205.2.1	SUPPORTABILITY CHARACTERISTICS			X	X	X		X			X		X			X		X			X				X			X	X	
205.2.2	SUPPORTABILITY OBJECTIVES AND ASSOCIATED RISKS			X	X	X		X								X							X				X			
205.2.3	SPECIFICATION REQUIREMENTS												X																	
205.2.4	NATO CONSTRAINTS																													
205.2.5	SUPPORTABILITY GOALS AND THRESHOLDS			X	X	X		X					X								X				X					
301.2.1	FUNCTIONAL REQUIREMENTS																													
301.2.2	UNIQUE FUNCTIONAL REQUIREMENTS							X												X										
301.2.3	RISKS							X																						

TABLE 2-1 LSA TASK TO TECHNIQUE CROSS-REFERENCE (CONT'D)

MIL-STD-1388-1A SUBTASKS (CONT'D) / LSA TECHNIQUE ACRONYMS	IREM	LADEN	LCC-2/2A	LCCA	LCCAM	LCMM	LCOM	LEAD	LOCAMS	LOGAM	LOGATAK II	LOGOP II	LRAM	LSAEXTRC	MACATAK	MARC	MCLOR	MLCCM	MOBSIM	MODIII LOR	MULTICONRG*	NRLA	NSIA TECH*	ONSCOSTS	ORACLE-MARC	ORLA	OSAMM/OATMEAL	OSMOD	PAGES
301.2.4 OPERATIONS AND MAINTENANCE TASKS							X																						
301.2.5 DESIGN ALTERNATIVES																													
301.2.6 UPDATES																													
302.2.1 ALTERNATIVE SUPPORT CONCEPTS							X		X										X			X		X		X	X		
302.2.2 SUPPORT CONCEPT UPDATES							X		X													X				X	X		
302.2.3 ALTERNATIVE SUPPORT PLANS							X		X										X			X				X	X		
302.2.4 SUPPORT PLAN UPDATES							X															X				X	X		
302.2.5 RISKS										X									X			X							
303.2.1 TRADEOFF CRITERIA	X		X	X	X		X		X	X		X	X				X			X		X	X			X	X		
303.2.2 SUPPORT SYSTEM TRADEOFFS							X		X	X		X										X					X		
303.2.3 SYSTEM TRADEOFFS	X				X		X		X	X		X	X		X		X	X		X		X					X		
303.2.4 READINESS SENSITIVITIES	X		X	X	X		X					X		X			X	X									X		
303.2.5 MANPOWER AND PERSONNEL TRADEOFFS	X						X					X				X								X			X		
303.2.6 TRAINING TRADEOFFS																											X		
303.2.7 REPAIR LEVEL ANALYSES	X				X		X		X	X		X	X				X			X		X				X	X		
303.2.8 DIAGNOSTIC TRADEOFFS									X	X							X			X		X				X			
303.2.9 COMPARATIVE EVALUATIONS	X				X		X					X					X			X		X							
303.2.10 ENERGY TRADEOFFS																													
303.2.11 SURVIVABILITY TRADEOFFS	X											X																	
303.2.12 TRANSPORTABILITY TRADEOFFS		X									X																		
401.2.1 TASK ANALYSIS																	X												
401.2.2 ANALYSIS DOCUMENTATION																													
401.2.3 NEW/CRITICAL SUPPORT RESOURCES										X															X				X
401.2.4 TRAINING REQUIREMENTS AND RECOMMENDATIONS																													
401.2.5 DESIGN IMPROVEMENTS																	X										X		
401.2.6 MANAGEMENT PLANS																			X										
401.2.7 TRANSPORTABILITY ANALYSIS		X									X																		
401.2.8 PROVISIONING REQUIREMENTS										X																			
401.2.9 VALIDATION																													
401.2.10 ILS OUTPUT PRODUCTS																													
401.2.11 LSAR UPDATES																													
402.2.1 NEW SYSTEM IMPACT							X																	X					
402.2.2 SOURCES OF MANPOWER AND PERSONNEL SKILLS																													
402.2.3 IMPACT OF RESOURCE SHORTFALLS												X																	
402.2.4 COMBAT RESOURCE REQUIREMENTS	X											X							X										
402.2.5 PLANS FOR PROBLEM RESOLUTION																													
403.2 POST PRODUCTION SUPPORT PLAN					X							X					X				X				X				
501.2.1 TEST AND EVALUATION STRATEGY												X																	
501.2.2 OBJECTIVES AND CRITERIA																													
501.2.3 UPDATES AND CORRECTIVE ACTIONS												X					X			X									
501.2.4 SUPPORTABILITY ASSESSMENT PLAN												X																	
501.2.5 SUPPORTABILITY ASSESSMENT			X	X								X					X			X							X		

TABLE 2-1 LSA TASK TO TECHNIQUE CROSS-REFERENCE (CONT'D)

X - INDICATES THAT A TECHNIQUE IS APPLICABLE TO THE LSA SUBTASK

( ) - INDICATES THE PAGE NO. OF A DETAIL TECHNIQUE INFORMATION SHEET

* - INDICATES A FABRICATED ACRONYM FOR PURPOSES OF THIS GUIDE

	LOGISTIC SUPPORT ANALYSIS TECHNIQUE ACRONYMS																												
MIL-STD-1388-1A SUBTASKS (CONT'D)	PALMAN (2-130)	PERSHINGONS (2-132)*	PRAMOD (2-134)	PRICE (2-136)	RAM HANDBOOK (2-138)*	RCM (2-140)	RELGROWTH (2-142)*	REPSIM (2-144)	RETCOM (2-146)	RIM (2-148)	RISNET (2-150)	RMCM (2-152)	ROLCOM II (2-154)	ROLOG (2-156)	SAM (2-158)	SEDCOM (2-160)	SESAME (2-162)	SPARC (2-164)	TAFAARS (2-166)	TARMS (2-168)	TDM (2-170)	TLM (2-172)	TPS KASIAN (2-174)	TRACE (2-176)	TRACEP (2-178)	TRANATAX (2-180)	USAPRO (2-182)	VERT (2-184)	
101.2.1 LSA STRATEGY											X																	X	
101.2.2 UPDATES											X																	X	
102.2.1 LSA PLAN											X																	X	
102.2.2 UPDATES											X																	X	
103.2.1 ESTABLISH REVIEW PROCEDURES																													
103.2.2 DESIGN REVIEWS																													
103.2.3 PROGRAM REVIEWS																													
103.2.4 LSA REVIEWS																													
201.2.1 SUPPORTABILITY FACTORS																													
201.2.2 QUANTITATIVE FACTORS					X		X	X																			X		
201.2.3 FIELD VISITS																													
201.2.4 USE STUDY REPORTS AND UPDATES																													
202.2.1 SUPPORTABILITY CONSTRAINTS																						X							
202.2.2 SUPPORTABILITY CHARACTERISTICS								X																					
202.2.3 RECOMMENDED APPROACHES								X																					
202.2.4 RISKS											X																	X	
203.2.1 IDENTIFY COMPARATIVE SYSTEMS					X																								
203.2.2 BASELINE COMPARISON SYSTEM					X			X						X						X						X			
203.2.3 COMPARATIVE SYSTEM CHARACTERISTICS		X		X	X		X					X	X	X			X			X									
203.2.4 QUALITATIVE SUPPORTABILITY PROBLEMS					X							X		X															
203.2.5 SUPPORTABILITY, COST, AND READINESS DRIVERS	X			X	X			X				X	X	X			X			X			X						
203.2.6 UNIQUE SYSTEM DRIVERS	X													X	X	X				X	X								
203.2.7 UPDATES	X							X				X	X	X						X			X						
203.2.8 RISKS AND ASSUMPTIONS											X																	X	
204.2.1 RECOMMENDED DESIGN OBJECTIVES																													
204.2.2 UPDATES																													
204.2.3 RISKS											X																	X	
205.2.1 SUPPORTABILITY CHARACTERISTICS	X	X	X	X				X						X				X		X			X						
205.2.2 SUPPORTABILITY OBJECTIVES AND ASSOCIATED RISKS				X				X			X																	X	
205.2.3 SPECIFICATION REQUIREMENTS					X			X																					
205.2.4 NATO CONSTRAINTS																													
205.2.5 SUPPORTABILITY GOALS AND THRESHOLDS					X			X			X							X										X	
301.2.1 FUNCTIONAL REQUIREMENTS																													
301.2.2 UNIQUE FUNCTIONAL REQUIREMENTS																													
301.2.3 RISKS											X																	X	

TABLE 2-1 LSA TASK TO TECHNIQUE CROSS-REFERENCE (CONT'D)

LSA TECHNIQUE ACRONYMS MIL-STD-1388-1A SUBTASKS (CONT'D)	PALMAN	PERSHINGONS*	PRAMOD	PRICE	RAM HANDBOOK	RCM	RELGROWTH*	REPSIM	RETCOM	RIM	RISNET	RMCM	ROLCOM II	ROLOG	SAM	SEDCOM	SESAME	SPARC	TAFAARS	TARMS	TDM	TLM	TPS KASIAN	TRACE	TRACEP	TRANATAK	USAPRO	VERT	
301.2.4 OPERATIONS AND MAINTENANCE TASKS						X														X									
301.2.5 DESIGN ALTERNATIVES																													
301.2.6 UPDATES																													
302.2.1 ALTERNATIVE SUPPORT CONCEPTS												X		X						X									
302.2.2 SUPPORT CONCEPT UPDATES				X								X		X															
302.2.3 ALTERNATIVE SUPPORT PLANS									X			X								X									
302.2.4 SUPPORT PLAN UPDATES				X								X																	
302.2.5 RISKS											X			X														X	
303.2.1 TRADEOFF CRITERIA	X		X	X				X			X	X		X	X	X		X	X	X	X		X					X	
303.2.2 SUPPORT SYSTEM TRADEOFFS				X				X				X		X						X									
303.2.3 SYSTEM TRADEOFFS												X		X	X	X			X	X	X								
303.2.4 READINESS SENSITIVITIES			X						X			X					X		X	X									
303.2.5 MANPOWER AND PERSONNEL TRADEOFFS			X	X								X								X									
303.2.6 TRAINING TRADEOFFS																													
303.2.7 REPAIR LEVEL ANALYSES	X													X	X	X					X		X						
303.2.8 DIAGNOSTIC TRADEOFFS																							X						
303.2.9 COMPARATIVE EVALUATIONS												X	X				X			X			X	X	X				
303.2.10 ENERGY TRADEOFFS												X		X															
303.2.11 SURVIVABILITY TRADEOFFS								X	X	X								X		X									
303.2.12 TRANSPORTABILITY TRADEOFFS																										X			
401.2.1 TASK ANALYSIS			X									X																	
401.2.2 ANALYSIS DOCUMENTATION																													
401.2.3 NEW/CRITICAL SUPPORT RESOURCES			X																										
401.2.4 TRAINING REQUIREMENTS AND RECOMMENDATIONS			X																										
401.2.5 DESIGN IMPROVEMENTS												X																	
401.2.6 MANAGEMENT PLANS																													
401.2.7 TRANSPORTABILITY ANALYSIS																										X			
401.2.8 PROVISIONING REQUIREMENTS																	X												
401.2.9 VALIDATION																													
401.2.10 ILS OUTPUT PRODUCTS																													
401.2.11 LSAR UPDATES																													
402.2.1 NEW SYSTEM IMPACT			X														X			X									
402.2.2 SOURCES OF MANPOWER AND PERSONNEL SKILLS			X																	X									
402.2.3 IMPACT OF RESOURCE SHORTFALLS								X																					
402.2.4 COMBAT RESOURCE REQUIREMENTS								X										X		X									
402.2.5 PLANS FOR PROBLEM RESOLUTION																													
403.2 POST PRODUCTION SUPPORT PLAN								X				X															X		
501.2.1 TEST AND EVALUATION STRATEGY												X																	
501.2.2 OBJECTIVES AND CRITERIA								X																					
501.2.3 UPDATES AND CORRECTIVE ACTIONS								X															X						
501.2.4 SUPPORTABILITY ASSESSMENT PLAN																													
501.2.5 SUPPORTABILITY ASSESSMENT								X																			X		

TABLE 2-1 LSA TASK TO TECHNIQUE CROSS-REFERENCE (CONT'D)

NOTE: X - INDICATES THAT A TECHNIQUE IS APPLICABLE TO THAT AREA

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		LOGISTIC SUPPORT ANALYSIS TECHNIQUES ACRONYMS																					
		ACCLOGTROM (2-14)	ACIM (2-16)	ACQLEARN (2-18)	ALPOS II (2-20)	AMOS (2-22)	ARLCAP/OVERVIEW (2-24)	ARM (2-26)	ASOAR (2-28)	ATEWORK (2-30)*	AURA (2-32)	CALCUMOD (2-34)*	CAM-X (2-36)	COSTPRO (2-38)	COVART/HEVART (2-40)	COVERS (2-42)	DARCOM P 700-11 (2-44)	DARCOM P 750-5 (2-46)	DEFLCC (2-48)*	DIREC (2-50)	DOSE (2-52)	ECONMOD (2-54)	ERAMS (2-56)
MODEL TYPE	DYNAMIC						X	X					X		X	X							X
	STEADY STATE	X	X	X	X	X			X	X	X	X		X				X	X	X	X	X	
OPERATIONAL SCENARIO	PEACE	X	X	X	X	X	X		X	X		X		X			X	X	X	X	X	X	
	WAR			X			X	X	X		X		X	X	X	X	X	X			X		X
LEVEL OF DETAIL	SYSTEM	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X		X		X	X	X
	LINE REPLACEABLE UNIT	X	X		X	X	X			X		X		X	X		X	X	X	X	X		
ILS ELEMENTS	THE MAINTENANCE PLAN				X	X	X			X	X	X		X		X	X	X	X	X	X	X	X
	MANPOWER AND PERSONNEL					X	X			X	X			X		X	X	X	X	X	X	X	X
	SUPPLY SUPPORT	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X	X	X
	SUPPORT AND TEST EQUIPMENT		X		X		X			X				X	X		X	X	X	X		X	
	TRAINING AND TRAINING DEVICES										X			X			X	X	X	X			
	TECHNICAL DATA					X								X			X					X	
	COMPUTER RESOURCES SUPPORT				X					X							X		X				
	PACKAGING, HANDLING, STORAGE, AND TRANSPORTATION				X			X					X	X			X					X	
	FACILITIES													X			X						
	TRANSPORTATION AND TRANSPORTABILITY						X	X								X	X		X				
	STANDARDIZATION AND INTEROPERABILITY																						
	DESIGN INFLUENCE TO INCLUDE LOGISTIC RELATED RAM	X			X				X	X	X						X	X	X	X			

TABLE 2-2 ILS ELEMENTS TO TECHNIQUE CROSS-REFERENCE

NOTE: X - INDICATES THAT A TECHNIQUE IS APPLICABLE TO THAT AREA

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		LOGISTIC SUPPORT ANALYSIS TECHNIQUES ACRONYMS																					
		FASTALS (2-58)	FMECA (2-60)	FREXPOP (2-62)*	GEMM (2-64)	HARDMAN (2-66)	HM/SE (2-68)	ILSMOD (2-70)*	IREM (2-72)	LADEN (2-74)	LCC-2/2A (2-76)	LCCA (2-78)	LCCAM (2-80)	LCMM (2-82)	LCOM (2-84)	LEAD (2-86)	LOCAMS (2-88)	LOGAM (2-90)	LOGATAK II (2-92)	LOGOP II (2-94)	LRAM (2-96)	LSAEXTRC (2-98)	MACATAK (2-100)
MODEL TYPE	DYNAMIC	X						X	X						X	X			X	X			X
	STEADY STATE			X	X	X	X			X	X	X	X	X			X	X			X	X	
OPERATIONAL SCENARIO	PEACE		X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X		X	X	
	WAR	X	X						X	X							X	X	X	X		X	X
LEVEL OF DETAIL	SYSTEM	X	X	X	X	X	X			X	X	X		X	X	X	X	X	X	X		X	X
	LINE REPLACEABLE UNIT		X	X	X		X	X	X		X	X	X			X	X	X		X	X	X	
ILS ELEMENTS	THE MAINTENANCE PLAN	X	X		X			X	X			X	X		X	X	X	X		X			X
	MANPOWER AND PERSONNEL	X			X	X			X		X	X	X		X		X	X		X			X
	SUPPLY SUPPORT	X	X	X	X		X		X		X	X	X		X	X	X	X		X	X	X	X
	SUPPORT AND TEST EQUIPMENT	X			X		X				X	X			X		X	X			X		
	TRAINING AND TRAINING DEVICES	X				X											X	X					
	TECHNICAL DATA	X	X				X				X						X	X			X		
	COMPUTER RESOURCES SUPPORT	X															X	X					
	PACKAGING, HANDLING, STORAGE, AND TRANSPORTATION	X									X	X					X	X					X
	FACILITIES	X															X	X					
	TRANSPORTATION AND TRANSPORTABILITY	X								X	X	X					X	X	X				X
	STANDARDIZATION AND INTEROPERABILITY																						
	DESIGN INFLUENCE TO INCLUDE LOGISTIC RELATED RAM	X	X	X			X	X	X				X		X	X	X	X		X	X		

TABLE 2-2 ILS ELEMENTS TO TECHNIQUE CROSS-REFERENCE (CONT'D)

NOTE: X - INDICATES THAT A TECHNIQUE IS APPLICABLE TO THAT AREA

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		LOGISTIC SUPPORT ANALYSIS TECHNIQUES ACRONYMS																					
		MARC (2-102)	MCLOR (2-104)	MLCCM (2-106)	MOBSIM (2-108)	MODIII LOR (2-110)	MULTICONFIG (2-112)*	NRLA (2-114)	NSIA TECH (2-116)*	ONSCOSTS (2-118)	ORACLE-MARC (2-120)	ORLA (2-122)	OSAMM/OATMEAL (2-124)	OSMOD (2-126)	PAGES (2-128)	PALMAN (2-130)	PERSHINGONS (2-132)*	PRAMOD (2-134)	PRICE (2-136)	RAM HANDBOOK (2-138)*	RCM (2-140)	RELGROWTH (2-142)*	REPSIM (2-144)
MODEL TYPE	DYNAMIC				X																		X
	STEADY STATE		X	X		X	X	X		X	X	X	X	X	X	X	X	X	X			X	
OPERATIONAL SCENARIO	PEACE	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	WAR			X	X		X			X			X	X						X			X
LEVEL OF DETAIL	SYSTEM	X	X		X	X	X	X	X	X			X	X			X	X	X	X	X	X	X
	LINE REPLACEABLE UNIT	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X		X	X	X	X	X
ILS ELEMENTS	THE MAINTENANCE PLAN	X	X			X	X	X	X		X	X	X			X	X		X	X	X		X
	MANPOWER AND PERSONNEL	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X			
	SUPPLY SUPPORT		X	X	X	X	X	X		X	X		X	X		X	X						
	SUPPORT AND TEST EQUIPMENT		X	X		X	X	X				X	X	X		X			X				
	TRAINING AND TRAINING DEVICES		X	X		X	X	X		X			X			X		X					
	TECHNICAL DATA		X	X		X	X	X		X		X			X	X							
	COMPUTER RESOURCES SUPPORT		X			X	X												X				
	PACKAGING, HANDLING, STORAGE, AND TRANSPORTATION		X		X	X	X	X			X	X				X							
	FACILITIES		X		X	X	X	X		X	X	X						X					
	TRANSPORTATION AND TRANSPORTABILITY		X		X	X	X									X							
	STANDARDIZATION AND INTEROPERABILITY																						
	DESIGN INFLUENCE TO INCLUDE LOGISTIC RELATED RAM		X			X	X				X					X				X		X	

TABLE 2-2 ILS ELEMENTS TO TECHNIQUE CROSS-REFERENCE (CONT'D)

NOTE: X - INDICATES THAT A TECHNIQUE IS APPLICABLE TO THAT AREA

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		LOGISTIC SUPPORT ANALYSIS TECHNIQUES ACRONYMS																					
		RETCOM (2-146)	RIM (2-148)	RISNET (2-150)	RMCM (2-152)	ROLCOM II (2-154)	ROLOG (2-156)	SAM (2-158)	SEDCOM (2-160)	SESAME (2-162)	SPARC (2-164)	TAFAARS (2-166)	TARMS (2-168)	TDM (2-170)	TLM (2-172)	TPS KASIAN (2-174)	TRACE (2-176)	TRACEP (2-178)	TRANATAK (2-180)	USAPRO (2-182)	VERT (2-184)		
MODEL TYPE	DYNAMIC	X	X	X							X	X	X		X				X		X		
	STEADY STATE				X	X	X	X	X	X				X		X	X		X	X			
OPERATIONAL SCENARIO	PEACE	X		X	X	X	X	X	X	X			X	X		X	X	X	X	X	X		
	WAR	X	X	X	X		X			X	X	X	X		X				X		X		
LEVEL OF DETAIL	SYSTEM	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X		
	LINE REPLACEABLE UNIT				X		X	X	X	X	X			X		X							
ILS ELEMENTS	THE MAINTENANCE PLAN	X	X			X	X		X		X	X	X			X				X			
	MANPOWER AND PERSONNEL	X			X	X	X				X		X										
	SUPPLY SUPPORT	X	X		X	X	X	X	X	X	X	X	X	X	X	X							
	SUPPORT AND TEST EQUIPMENT	X			X	X	X	X	X				X	X		X							
	TRAINING AND TRAINING DEVICES				X																		
	TECHNICAL DATA				X			X			X			X									
	COMPUTER RESOURCES SUPPORT																						
	PACKAGING, HANDLING, STORAGE, AND TRANSPORTATION																						
	FACILITIES												X										
	TRANSPORTATION AND TRANSPORTABILITY												X						X				
	STANDARDIZATION AND INTEROPERABILITY																						
	DESIGN INFLUENCE TO INCLUDE LOGISTIC RELATED RAM	X			X							X			X								

TABLE 2-2 ILS ELEMENTS TO TECHNIQUE CROSS-REFERENCE (CONT'D)

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Army Communications Command Logistics Tradeoff Model (ACCLOGTROM)

PURPOSE: To provide cost-effective sparing requirements of low density, high reliability equipment characterized to have high operational availability requirements and redundant assemblies within the equipment design or deployment configurations that vary from site-to-site.

DESCRIPTION: ACCLOGTROM can be used to assess the logistic impact of potential equipment designs with redundancies in meeting operational availability goals.

Usage of ACCLOGTROM for multi-echelon provisioning of equipment designed with redundancies or various deployment configurations requires the use of two models; ACCLOGTROM and a supplemental Off-Site Supply Support Model (OSSSM).

The principal objective of ACCLOGTROM is to output the least cost set of LRUs required for sparing at each site which meets the desired operational availability goal. ACCLOGTROM is set up to handle site deployment and the OSSSM supplement is set up to handle LRU stockage off-site. Both models apply the Poisson distribution to handle the small number of demands inherent in low deployment density, high reliability equipment. The OSSSM supplement accounts for the total deployment of LRUs off-site in each area support and worldwide. The ACCLOGTROM model uses a marginal utility analysis to optimize the LRU spares required on-site to meet operational availability goal. Results from the two models are combined when using the same logistics times, maintenance and supply policy, and stockage order-fill rates as common data. Desired order-fill rates are input into the OSSSM supplement and computed order-fill rates and the associated stockage quantity of each LRU are outputed. The computed order-fill rate outputs of the OSSSM supplement become inputs to ACCLOGTROM through bridging.

High reliability systems requiring high operational availability are often designed with redundant configurations. Redundant configurations handled by ACCLOGTROM include parallel redundancy, dual sets, and circular arrays. Various system configuration breakdowns can also be handled by ACCLOGTROM to allow optimal site stockage for each system configuration.

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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Army Communications Command Logistics Tradeoff Model (ACCLOGTROM)

INPUTS:

1. Operational Availability goal.
2. Equipment reliability block diagrams.
3. LRU data consisting of each LRUs cost, failure rate, density, mean time to restore on-site, repair location, washout rates, and production lead time.
4. Supply information consisting of order and ship times from depot and area supports to site and off-site order fill rates desired.

OUTPUTS:

1. Least cost set of LRUs required for sparing at each site which meets the desired operational availability goal.
2. Set of LRU spares required off-site to achieve off-site order fill rates desired.
3. Total cost of LRUs spared per site, at area supports, and depot.

DOCUMENTATION AVAILABLE:

(1) ACCLOGTROM Users Manual, US ACC, 1 Jul 75.
(2) Modification of ACCLOGTROM ltr, 7 Dec 76. (3) An analytical model for optimum site stockage, Log Spectrum, winter 79.
(4) Multi-echelon Provisioning Using ACCLOGTROM by Mr. Price.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN	CDC 6600	D&V FSD P/D	A H

REMARKS: Program consists of approx 4000 line of coding, 3 overlays and several internal files.

APPLICATIONS: Safegard, AN/FSC-78, AN/MSC-61, AN/USC-28, KY-881, SCOTT, AN/GSC-52

LSA TASK INTERFACE

202.2.1-3
203.2.2,3,5,6
204.2.1
205.2.3,5
301.2.5
302.2.1,2
303.2.1-4,9
401.2.5,8
402.2.1,3
403.2

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Availability Centered Inventory Model (ACIM)

PURPOSE: To determine optimum stockage level for all items in an equipment at designated stockage locations in a multi-echelon supply support system.

DESCRIPTION: This model uses an iterative process to calculate stockage levels which will provide the required availability in the most cost-effective manner. The number of parts that can be modeled in an equipment is limited only by the amount of random access memory available on the computer on which the model is being run. This model is similar in scope to SESAME and ACCLOGTROM, but different in method of calculation.

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PROPONENT	**CURRENT USERS/POC**
US Naval Sea Systems Command Code PMS-306 (Mr. Pritchard) Washington, DC 20362 AV 222-3820, com (202)692-3820	Proponent also user. US Army TROSCOM ATTN: AMSTS-TIC (Ms. Baltz) 4300 Goodfellow Blvd St. Louis, MO 63120 AV 693-2750, com (314)263-2750

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Availability Centered Inventory Model (ACIM)

INPUTS: Two main classes of input data: (1) system related such as numbers of equipment supported, number of support locations, lead time for resupply, average repair time; and (2) item related such as unit cost, part number, essentiality code, WBS indenture level.
Input is free format and can be entered through punched cards, direct console entry or translation of other files.

OUTPUTS: Intermediate cost-effectiveness reports are produced throughout the iterative process.
Item summary report for each site which includes item name, cost to stock, mean supply response time (MSRT), and statistical summary report for each site.

DOCUMENTATION AVAILABLE:
ACIM User's Manual, Dec 81.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
PL/1 subset G	Any computer with 64k bytes RAM	D&V FSD P/D	E H

REMARKS:	**APPLICATIONS:**
	UH - 60 Blackhawk

LSA TASK INTERFACE

203.2.2-5
303.2.2-5,7,8

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Acquisition Based on a Learning Curve (ACQLEARN)

PURPOSE: To determine procurable quantity of parts for a given budget and to determine cost for a known procurement.

DESCRIPTION: A computer program using an algorithmic approximation method which takes a given budget and tells how to optimally distribute procurements to best fulfill needs. The procurement plan is to be given by percent of buy for each procurement year. In addition, if procurement buy is known, then the program can be used to give costs by year. Either way the program is used it takes into account the learning curve effect.

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CURRENT USERS/POC
Proponent also user.
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Acquisition Based on a Learning Curve (ACQLEARN)

INPUTS:

1. Learning curve value.
2. Budget allocation or procurement quantity.
3. Procurement percents by year.
4. Unit costs for first unit or average unit cost.

OUTPUTS:

1. Total cost of procurement or total quantity procurable.
2. Unit cost for any buy quantity according to learning.

DOCUMENTATION AVAILABLE:
Tactical Wheeled Vehicle Fleet Study MARS Model
(1980) System and Cost Analysis, AMSTA-V, TACOM.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
PL/1	IBM 360	D&V FSD P/D	H

REMARKS: 220k bytes to run, 600 CPU seconds. User's Guide under development completion in Feb 84.

APPLICATIONS:
Tactical Wheeled Vehicles
LACV-30

LSA TASK INTERFACE

203.2.5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Avionics Laboratory Predictive Operations and Support Cost Model, Version II (ALPOS II)

PURPOSE: To determine reliable estimate of O&S costs for aircraft in the conceptual/early design phases.

DESCRIPTION: ALPOS II is an O&S cost model designed for aircraft equipment. It recognizes three categories of aircraft (cargo, bomber, fighter) and three classes of equipment (communications, navigation, sensory).
ALPOS II relates available LRU design parameters to O&S cost using various cost estimating/parametric relationships. The model is divided into a number of routines, with a main routine to control the flows and subroutines to perform the required calculations and format the output. The system is designed to evaluate navigational equipment, fire control radar systems, communications networks, general avionics, etc. This permits evaluation and prediction of avionics cost-of-ownership for integration of cost factors into the design tradeoff process.

PROPONENT

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CURRENT USERS/POC

Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Avionics Laboratory Predictive Operations and Support Cost Model, Version II (ALPOS II)

INPUTS: 12 system level variables and 15 LRU level variables including unit price, components density, power dissipation, component type, component technology usage factor, a bit/fit factor, volume, weight and components count.

OUTPUTS: The output provides O&S cost descriptions, cost summations on an annual basis and a nonrecurring basis for spares and support equipment.

DOCUMENTATION AVAILABLE:
ALPOS II, Volume I (DLSIE LD# 39578 MA).
ALPOS II, Volume II (DLSIE LD# 39578 ME).
ALPOS II, Volume II, Update, May 81 (AFWAL-TM-81-19).

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
FORTRAN IV	CDC 6600	CONCEPT D&V FSD	A B C E H

REMARKS:

APPLICATIONS:
F-15 Avionics
F-16 Avionics
Numerous Avionics

LSA TASK INTERFACE

203.2.2-5
303.2.4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: AVSCOM Maintenance Operating and Support Cost Model (AMOS)

PURPOSE: To provide a uniform methodology for performing operation and support cost estimates.

DESCRIPTION: AMOS is a computer program that calculates O&S costs for Army helicopters at the organizational level TOE. AMOS emphasizes costs as a function of the reliability, availability, and maintainability (RAM) characteristics of the helicopter. Both direct and indirect costs can be computed. The model is constantly being updated for the latest cost factors, improved methodology, and new output requests.

USERs:

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PM Blackhawk
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PROPONENT
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CURRENT USERS/POC
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: AVSCOM Maintenance Operating and Support Cost Model (AMOS)

INPUTS: Requires technical, operational, and cost data. Includes data such as maintenance manhours per flight hour, MTBR, attrition rate and shaft horsepower. Fleet and deployment information by TOE are needed as operational data. Both aircraft and personnel cost factors are required.

OUTPUTS: Output is in DA Pam 11-4 format. Costs are shown by appropriation, work breakdown structure, and cost element. Cost per flight hour, per aircraft, per TOE and per fleet on an annual or time phase operating life basis are available. Costs can be shown in constant, escalated, or discounted dollars.

DOCUMENTATION AVAILABLE:
USA AVRADCOM TR-77-5, "AVSCOM Maintenance Operating and Support Cost Model", Feb 77 (DLSIE LD# 38739MA).

AUTOMATION

YES * NO	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
LANGUAGE			
FORTRAN IV	IBM 4341 IBM 360	D&V FSD P/D	A B C

REMARKS:

APPLICATIONS:
AH-64, UH-60, CH-47, ASH Aircraft, Blackhawk, Cobra

LSA TASK INTERFACE

203.2.5
303.2.2,3,5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Army Logistics Capability Assessment (ARLCAP)/ OVERVIEW MODEL

PURPOSE: This model was developed to determine the maximum number of hours per day that Army helicopters can fly under both peacetime and wartime conditions.

DESCRIPTION: The Army Logistics Capability Assessment (ARLCAP) Model is a simulation model designed to estimate the flying hour capability of the Army's helicopters given various inventory levels of spare parts. It is a modified and enhanced version of the Overview/Mission Degradation Model used by the US Air Force to support its budget requests for reparable spares and to perform analyses of mission capability.

REMARKS (CONT'D)
Total run time is about 20 minutes, CPU time is about 20 seconds with 30 reparable items. The program has approximately 2800 lines of coding.

PROPONENT
(Unofficial)
US Army Concepts Analysis Ag.
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CURRENT USERS/POC
Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Army Logistics Capability Assessment (ARLCAP)/ OVERVIEW MODEL

INPUTS: Three data files are used to store required input which include--

1. Flying program file which has 58 inputs which include mission length, daily flying hours per aircraft, etc.
2. Parts data base which has 115 inputs which includes such information as unit cost, administrative lead time, order and ship time, repair costs, etc.
3. Force file which has 7 inputs required which is number of aircraft in a unit, description of unit, etc.

OUTPUTS: There are approximately 18 separate reports which include--

1. Mission success rate.
2. Repair cost.
3. Aircraft availability.
4. Reparable spare maintainability/reliability analysis.
5. One year capability purchase analysis.

DOCUMENTATION AVAILABLE:
ARLCAP User's Manual, 4 Aug 83.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN	UNIVAC	FSD P/D	A B E H

REMARKS:	APPLICATIONS:
Improvements are planned to the model but no dates are available. (See description for cont.)	AH-1S, UH-1H, UH-60, OH-58, CH-47

LSA TASK INTERFACE

201.2.1
402.2.4
403.2

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Ammunition Resupply Model (ARM)

PURPOSE: To assess the capability of a given unit TOE structure to respond to the logistical demands placed upon it by various numbers of ammunition expending weaponry.

DESCRIPTION: ARM was developed to work in parallel with the Jiffy War Game in conducting total force structure Trade-off Analysis of the Division 86 alternatives. ARM provides a method of detailed evaluation of ammunition resupply. The model simulates the time-consuming resupply process that replaces ammunition on individual weapon systems, as well as, the movement of the different units' transportation assets to secure additional ammunition. ARM forces the resupply network to replace rounds on individual weapon systems at unit level and send unit trucks back to designated resupply points to fill up and return. The functions each truck must perform are broken into a series of discrete events (subroutines). The model takes each truck through a series of these event subroutines (with operational availability and interdiction considered) in which actions are completed and times accumulated. Helicopter resupply, interactive command decision, and tactical realism can be incorporated during the game. Requires quality input, limited to five types of ammunition/units, supply trucks carry only one type of ammunition and assumes perfect intelligence.
An estimate of time to become proficient with ARM is as follows:
To acquire data base - 3 to 4 weeks
To structure data in model input format - 2 weeks
Player learning time - 1 day.

PROPONENT	CURRENT USERS/POC
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Ammunition Resupply Model (ARM)

INPUTS: ARM requires the following: 1. Map acquired data such as locations and road distances between units and supply points; 2. Weapon system attritions such as combat modeling results; 3. Ammunition types and demand such as a random sampling of average ammunition expenditure ranges; and 4. Truck data such as the TOE structure being played, and established RAM data.

OUTPUTS: Number of rounds used, on-hand, and rounds short for each unit in the division.

DOCUMENTATION AVAILABLE:
CAORA Technical Report TR 6-83, Ammunition Resupply Model; Vol I, Methodology and User's Manual; Vol II, Programer's Manual; and Vol III, Data Base.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN 77	UNIVAC 1100, DECVAX-11/780	FSD P/D	H

REMARKS: Event sequencing, time stepped model.

APPLICATIONS: M1, 155MM Howitzer, Bradley, AFARV, Firing Port Weapon, CSSMAA

LSA TASK INTERFACE

303.2.1,3,4,12

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Achieving a System Operational Availability Requirement Methodology (ASOAR)

PURPOSE: The ASOAR was developed for cost effectively prorating a required system operational availability to end item operational availability goals. The ability to determine the degree to which a system operational availability is achievable is inherent in the ASOAR.

DESCRIPTION: Application of ASOAR provides the ability to size weapon system secondary item inventories to meet explicit weapon system availability and operating tempo objectives. The usage of just five basic equations with principally end item indenture level data permits the determination of cost effective operational availability goals for each different item serially configured in the system when the system is restored by placing LRUs at the operating level.

Computational adjustment prior to applying these five basic equations permits the handling of other commonly used system configurations and different support variations used to restore the system. These computational adjustments estimate an equivalent baseline where each different type of end item becomes serially configured or where an equivalent system is restored using LRUs at the equivalent system's operating level. The computational adjustment covered permits the handling of common end items, redundant end items, end item spares, organizational preventative maintenance, and not sparing LRUs forward at the operating level.

The ease of applying ASOAR is an important feature. The cost-effective end item operational availability goals can be computable with a calculator. Also, detailed LRU attribute data for the system are not necesary to compute end item operational availability goals. Basically, just system and end item indenture level data are needed together with a knowledge of the operating and support concepts planned. When LRU data of an end item become available, a sparing optimization model (i.e. SESAME) can be used in a timely manner to optimally provision LRU spares to achieve the end item availability goal.

PROPONENT	CURRENT USERS/POC
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Achieving a System Operational Availability Requirement Methodology (ASOAR)

INPUTS:
1. System operational availability requirement.
2. System configuration of end items.
3. System support concepts planned.
4. Mean time to obtain an LRU spare.
5. End item mean calendar time between failures (MCTBF).
6. End item mean restored time.
7. End item cost estimate.

OUTPUTS: 1. Whether the system design and support planned will achieve the system operational availability requirements.
2. Gross estimation of the relative cost for secondary item spares.
3. Operational availability goals for each different type of critical end item.
4. System mean calendar time between failures.
5. System mean restoral time.
6. Effective MCTBF of a redundant network.

DOCUMENTATION AVAILABLE:
Preceedings from SOLE product support seminar, "Meeting System Availability Requirements Optimally," ERADCOM, Apr 84.

AUTOMATION

YES NO * LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
		CONCEPT D&V FSD	A B

REMARKS: ASOAR is a computational methodology.

APPLICATIONS:
Joint Surveillance Target Attack Radar System (JSTARS).

LSA TASK INTERFACE

101.2.1,2
102.2.1,2
103.2.2,4
201.2.1
202.2.1,2
203.2.3-6
204.2.1,3
205.2.1-3,5
301.2.5
302.2.1-3,5
303.2.2-4
401.2.3,5,8
402.2.1,3,4
501.2.2

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: ATE Workload Analysis Model (ATE WORK)*

PURPOSE: The purpose of this model is to determine the quantity of AN/MSM-105s (AN/USM-410s) required to perform quality assurance and fault diagnosis of line replaceable units (LRUs) and printed circuit boards (PCBs) at the general support (GS) maintenance level.

DESCRIPTION: The ATE WORK is used to determine the number of ATE hours per year to support one system (i.e., one tank); that number is then multiplied by the total number of items in the fleet and divided by the number of available hours for an AN/USM-410, to determine the total number of ATE required for one or more weapon systems. Each unit under test (LRU and PCB) is handled separately by the model. The expected number of failures is simply the product of the hours of operating the individual component, the failure rate per million hours and the quality of that component on the system, divided by 10 to the 6 power. The expected number of failures is then multiplied by the estimated test time. This information comprises the data base for that system. The model then uses a processing logic which is intended to represent the likely ways in which a UUT would pass through GS. The model also uses constant values for UUTs hook-up and discount times and can use a default test time for UUTs if none is available.

REFERENCES (CONT'D)

2. Overview of current Army method for determining LOR and for estimating workloads for ATE, AMSAA, report #356, May 82.
3. An analysis of the PM-ATSS workload analysis model for the AN/USM-410 ATE, AMSAA, report #393, May 83.

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PROPONENT
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CURRENT USERS/POC
Proponent also user/developer.
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: ATE Workload Analysis Model (ATE WORK)*

INPUTS: There are three types of input variables--
1. User input from terminal which are operating hours for the system in war and peace time.
2. Default values (which the user can change at the terminal) these include six variables such as hook-up, functional check, discount/tag for repair both for LRUs and PCBs.
3. Data base inputs which have 18 variables associated with each UUT to be input into the model. These variables include failure rate, quantity per system, level of repair, etc.

OUTPUTS: The model prints out input values plus ATE hours per year required to support one system in peace time and then in war time.

DOCUMENTATION AVAILABLE:
1. User's Guide for AN/MSM-105/USM-410 GS Workload Analysis, PM TMDS, May 83.
(See description for cont'd)

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN V	Any computer which has FORTRAN IV	D&V FSD P/D	A B C D E

REMARKS: The model consists of approximately 367 lines of coding.

APPLICATIONS: SINCGARS, PERSHING II

LSA TASK INTERFACE

203.2.3,5,7
204.2.1
205.2.1,3,5
302.2.1
303.2.1,3,7,8
402.2.1
501.2.3,5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Army Unit Readiness/Sustainability Assessor (AURA)

PURPOSE: Provide method of relating Army resource requests to changes in readiness/sustainability.

DESCRIPTION: AURA addresses the projected capability to meet the initial and continuing combat requirements of one or more specific war time scenarios. The war time scenario characteristics include initial condition of units, deployment, attrition, movement rates, consumption rates, maintenance task lengths, resupply volumes and schedules and biannual cycles. Provides systematic measurement of readiness/sustainability with respect to manpower quantity, manpower skills, spares, theater reserve end items and other consumables. The model addresses policy, budget, and operations issues in a consistant frame work, as well as, produce the differential effect on readiness/sustainability by specific operational capability. Applications of AURA include distribution of existing resources, crisis management, system manager effectiveness, budget justification/resource requirements and long-range planning.

PROPONENT	CURRENT USERS/POC
US AMSAA ATTN: AMXSY-LM (Mr. Groves) APG, MD 21005 AV 283-6617, com (301)278-6617	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Army Unit Readiness/Sustainability Assessor (AURA)

INPUTS: AURA requires two types of data-- 1. Battle demand data; specific operational capability (SOC) numbers, mass, SOC types and times, SOC durations, criticality, engine time, POL/AMMO expenditure, battle damage and attrition. 2. Brigade level resources-tanks, APCs, support equipment, TOE crews, maintenance MOS and skills, recovery vehicles, spares/PLL-engine packs and POL/AMMO stocks.

OUTPUTS: Produces brigade output (platoons generated) by mission/day. Status of resources by day to include tanks, APCs used/repaired, damaged/destroyed, number cannibalized, parts used-shipped to repair, munitions/POL used-remaining, MOS used, queues existing, resources ready at end of day.

DOCUMENTATION AVAILABLE:
Contractor AURA 2 Vol User's Manual, N1987-MRAL, and N1988-MRAL.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
FORTRAN IV	VAX/VMS	D&V FSD P/D	A G H

REMARKS: 2.5M bytes CPU memory 3000 CPU seconds-batch mode processing

APPLICATIONS: M60A1, M113, M109, M110

LSA TASK INTERFACE

201.2.1
202.2.2
203.2.2
302.2.1
303.2.11
402.2.4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Programable Calculator Life Cycle Cost Model (CALCUMOD)

PURPOSE: To provide design engineers and logisticians with a quick and inexpensive tool to assess life cycle cost implications on design trades.

DESCRIPTION: The model is as complete as most computer life cycle cost models. However, significant memory capacity is saved by concentrating on a single item such as a line replaceable unit (LRU) or shop replacement unit (SRU). This avoids the aggregation and control coding required in larger system models. This feature is also convenient since this is the level at which the design engineer is making design trade-offs. The model, however, can be used to aggregate costs to the system level where a system involves a small number of LRUs. The model includes the major cost elements contained in a life cycle cost assessment. It does not include cost elements for: (1) training equipment and services; (2) documentation; (3) facilities; (4) war readiness materiel; (5) initial hardware installation; (6) support equipment maintenance; (7) modification costs; or (8) energy requirements. Depending on the analysis required, estimates for these cost elements can be made and added directly to the model results. It is also noted that support equipment LCC or trade studies on support equipment can be calculated using the model and treating the support equipment in the same way as any other piece of hardware. All of the cost elements contained in the model are not directly computed by the model. For example, the development cost estimate, system investment and support equipment costs are "through-puts" to the model. For these cost elements, estimates must be obtained from another source and directly input into the model. Support investment spares and ownership costs are computed by the model and are based on engineering and support characteristics of the item. Applications have ranged from using the model as an aid in making logistics assessments, evaluating organic support and reliability improvement impacts on support cost to performing sensitivity and assessing support equipment alternatives.

PROPONENT	CURRENT USERS/POC
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Programable Calculator Life Cycle Cost Model (CALCUMOD)

INPUTS: A data set of 35 variables must be assembled. Of these, 3 are through-put, 4 are descriptive of the program environment, 20 are descriptive of the item or equipment, and 8 are standard parameter values that are most appropriate for the item being considered. The model calculates support investments spares and ownership costs based on the mean time between demand and the mean time between removal.

OUTPUTS: Costs are printed or displayed, at the user's option by cost element and by cost category (development, procurement, operating and support, and total life cycle costs). If a printer is used the output will be generated on 56 lines which will include a summary of all input data as well as the computed cost.

DOCUMENTATION AVAILABLE:
Programable Calculator Life Cycle Cost Model, User's Handbook, Apr 81, Life Cycle Cost Management Division, Director of Cost Analysis, Comptroller, Aeronautical Sys Div, Wright-Patterson, AFB, OH 45433.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
TI-59 Keystroke	TI-59 calculator with printer.	D&V FSD P/D	A B C

REMARKS:

APPLICATIONS:
ALQ/172; Precision Location Strike System (PLSS)

LSA TASK INTERFACE

203.2.2,5
303.2.3,4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Corps Ammunition Model Expanded (CAM-X)

PURPOSE: CAM-X is designed to furnish information on how ammunition requests may be satisfied under constraints of equipment availability, transportation networks, and enemy attack.

DESCRIPTION: This model may be either stochastic or deterministic. Requirements for ammunition are input into the model from other model outputs or SCORES scenarios. Ammunition vehicles are loaded and move over the given network to users. Vehicles may be attacked when halted. All phases of transportation are considered. CAM-X requires approximately 400 kilobytes of user memory and 2 tape drives to operate.

PROPONENT	CURRENT USERS/POC
US Army Logistics Center ATTN: ATCL-OSS (Mr. Cockrell) Fort Lee, VA 23801 AV 687-5640/3449 com (804)734-5640/3449	US Army Missile Munitions Center and School ATTN: ATSK-CTT (MAJ Price, Ms. Moore, Mr. Demora) Redstone Arsenal, AL 35897 AV 746-8420, com (205)876-8420

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Corps Ammunition Model Expanded (CAM-X)

INPUTS: CAM-X requires data related to the following: 1. Transportation network; 2. Ammunition demands; 3. Destruction probabilities and rebuild times; 4. Unit locations and movements.

OUTPUTS: CAM-X outputs the ammunition delivered, ammunition destroyed, preferred modes and schedules for ammunition.

DOCUMENTATION AVAILABLE:
Contract awarded to change program and develop documentation.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN	CDC, CYBER 176	CONCEPT D&V	H

REMARKS:

APPLICATIONS:
Applications of the new CAM-X are planned.

LSA TASK INTERFACE

303.2.12

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Cost Projection Management Information System for Life Cycle Costs (COSTPRO)

PURPOSE: The COSTPRO Model is used for determining the life cycle supportability costs of equipments in a format compatible with Integrated Logistics Support Plans (ILSP).

DESCRIPTION: COSTPRO computes life cycle logistics resources funding requirements for equipments in accordance with cost categories prescribed for ILSPs. Model output indicates sources of funds and applicable appropriations for detailed elements of a cost breakdown structure which may be tailored by the user for a specific logistics support scenario. COSTPRO uses an equipment installation schedule to pinpoint the time period for which costs will occur for each user site. The model computes user activity and supply system stock.

PROPONENT	**CURRENT USERS/POC**
US Naval Sea Systems Command Code C61432 (Mr. F.X. Criste/Janice Julian) Washington, DC 20362 AV 222-8258, com (202)692-8258	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Cost Projection Management Information System for Life Cycle Costs (COSTPRO)

INPUTS: COSTPRO requires--

1. Support item cost and maintenance codes.
2. Mean time to repair.
3. Mean time between failures.
4. Repair turn around time.
5. Supply and maintenance hierarchy.
6. Indenturing hierarchy.
7. Repair labor costs.
8. Support equipment training and documentation costs.

OUTPUTS:

1. Summary by appropriation.
2. Costs and funding responsibility report.
(all reports producible in base year or inflated dollars).
3. Cost summary report.

DOCUMENTATION AVAILABLE:

(1) Draft Handbook: "COSTPRO: Cost Projection Management Information Systems for Life Cycle Costs," Oct 81.
(2) COSTPRO Product Description, Nov 83.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
PL/1	VAX 11-750	FSD P/D	A B C D G

REMARKS: A proprietary model with GSA Rates: $7000 Buy; $1000 Install; $510 Mo. Rental, $75 Mo. Maint. & Enhancement

APPLICATIONS: Navy: AN/WSN-5, Internal Navigation Set, AN/WSN-2 Stablized Gyrocompass.

LSA TASK INTERFACE

202.2.1
203.2.2-5
205.2.1,5
303.2.1,5
501.2.5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Computations of Vulnerable Areas and Repair Time/ High-Explosive Vulnerable Areas and Repair Time (COVART/HEVART)

PURPOSE: The models compute damage done by physical penetrators or high-explosive impact to equipment along a shotline.

DESCRIPTION: Based on the projectile characteristics (solid penetrator or high-explosive round), conditional defeat probabilities of the proponents, and impact velocity and obliquity, the COVART and HEVART determine which and how many components of a weapon system are damaged.
The COVART program specifically addresses solid penetrators against land weapon systems. The HEVART model was designed specifically to evaluate the vulnerability of the AH-1S versus 20mm to 57mm high explosive incendiary (HEI) rounds.
Both models have been used at BRL to generate vulnerability and combat damage data for use in the TARMS and IREM simulation models. HEVART is designed for airborne weapon systems.

REFERENCES (CONT'D)
COVART-A Simulation Program for Computation of Vulnerable Areas and Repair Times, Volume I, User Manual, and Volume II, Analyst Manual, Aug 75. Update of COVART documentation to be available Jun 84.

PROPONENT	**CURRENT USERS/POC**
US Army Ballistics Research Lab ATTN: AMSMC-BLV-A(A) (Mr. Bently) APG, MD 21010 AV 283-2032, com (301)278-3086	Proponent also user. US Army AMCCOM ATTN: AMSMC-PM(D) (Mr. Stone) Dover, NJ 07801 AV 880-6378, com (201)724-6378

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Computations of Vulnerable Areas and Repair Time/ High-Explosive Vulnerable Areas and Repair Time (COVART/HEVART)

INPUTS:

1. Geometric description of weapon system and components.
2. Angle of fire.
3. Projectile characteristics.

OUTPUTS: Components damaged.

DOCUMENTATION AVAILABLE:
Technical Report ABRL-TR-02467 HEVART, an Interim Simulation Program for the Computation of HEI Vulnerable Areas, and Repair Times (U), Feb 83 (see description for cont'd).

AUTOMATION

YES * NO	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
LANGUAGE FORTRAN IV	CDC 6600	CONCEPT D&V FSD P/D	A B H

REMARKS: A specific application program. These models are also used to support IREM and TARMS Models.

APPLICATIONS: AH-1T (NAVY), UH-1H, COBRA, UH-60, OH-58C, M1E1

LSA TASK INTERFACE

303.2.11
402.2.4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Combat Vehicle RAM Simulation (COVERS)

PURPOSE: To provide information on operational availability of ground elements of combat forces based on losses due to combat damage and system failures and on repair time, and return to combat based on time to repair, maintenance manpower, and parts supply.

DESCRIPTION: The COVERS model was principally designed for use in determining reliability, availability, and maintainability (RAM) requirements for new vehicles and for RAM analysis work; i.e., investigating the effects of various changes in support policy and logistics concepts, etc., on operational availability.

Combat vehicles need repairs to stay operational. Simple repairs are generally done by a company level support team with back-up capability at battalion level (these constitute the organizational level). For tasks beyond the capability of the organizational level, there is a hierarchy of supporting maintenance organizations.

The COVERS model simulates the behavior of a combat vehicle as it operates in a given scenario. As equipment failures occur or as the vehicle suffers combat damage which is consistent with the scenario being considered, the repair system resources are used to restore the equipment to operational condition. Execution of the COVERS model produces as outputs: Failures, Repair Times (printed as requested by inputs); Status Charts (printed prior to each operation phase); Summary Sheets (printed as requested by inputs); and Availability Charts (printed at end of each scenario). The COVERS model incorporates three levels of maintenance.

PROPONENT	**CURRENT USERS/POC**
US Army Logistics Center ATTN: ATCL-MR (Mr. Lindquist) Fort Lee, VA 23801 AV 687-2360, com (804)734-2360	Proponent also user/developer. US Army AMCCOM ATTN: AMSMC-QA(D) (Mr. Mardo) Dover, NJ 07801 AV 880-3008, com (201)724-3008

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Combat Vehicle RAM Simulation (COVERS)

INPUTS:

1. Mean time to repair.
2. Parts information.
3. Maintenance manpower information.
4. Scenario usage rates.
5. Scenario damage rates.
6. Mean time between failures.

OUTPUTS:

1. Parts needed.
2. Down times.
3. Operational Availability.

DOCUMENTATION AVAILABLE:

(1) COVERS User's Manual, Jan 82;
(2) COVERS Programer's Guide, Jan 82.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN	UNIVAC 1182	CONCEPT D&V FSD P/D	B H

REMARKS:

APPLICATIONS:
Bradley, M1 Tank, HELP, MLRS

LSA TASK INTERFACE

202.2.1,2
205.2.1,2

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Logistics Support Analysis (LSA) Review Team Guide (DARCOM-P 700-11)

PURPOSE: A management review technique that assesses a contractors efforts to ensure that all disciplines of logistics are properly addressed during the design of a product.

DESCRIPTION: The review team guide is intended to aid the requiring authority (e.g., Government) in the review of the performing activities (e.g., contractors) LSAR effort taking into account the contractual obligation of the performing activity. The guide contains a list of recommended membership and four sections of questions to be completed during a review relating to the implementation of LSA, the input data records, and the output reports. The DARCOM-P 700-11 is currently being revised to reflect the MIL-STD-1388-1A and -2A requirements for LSA/LSAR.

USERs:

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Fort Belvoir, VA 22060
AV 354-5071, com (703)664-5071

PROPONENT
US AMC MRSA
ATTN: AMXMD-EL
Lexington, KY 40511
AV 745-3985, com (606)293-3985
Proponent also developer.

CURRENT USERS/POC
US Army AMCCOM
ATTN: AMCPM-CW(D) (Mr. Sorbo)
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AV 880-2240, com (201)724-2240

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Logistics Support Analysis (LSA) Review Team Guide (DARCOM-P 700-11)

INPUTS: A Government review team consisting of expertise from the various disciplines of logistics to assess contractor LSA efforts to meet contractual logistics requirements. LSAP and contract form the basis for the review team and the review team process.

OUTPUTS: A documented assessment of the LSA effort to ensure that logistics factors are considered in the design of a product.

DOCUMENTATION AVAILABLE:
DARCOM-P 700-11, Logistics Support Analysis/ Logistics Support Analysis Record Review Team Guide.

AUTOMATION

YES NO * **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
		CONCEPT D&V FSD P/D	A B C D E F G H J

REMARKS:	**APPLICATIONS:**
	All Army Projects

LSA TASK INTERFACE

103.2.4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Objective Determination of Failure Factors (DARCOM-P 750-5)

PURPOSE: To provide a systematic approach to the mathematical calculations involved in the initial estimation procedure for failure factors, to provide a standard method for updating the initial failure factor estimates based on actual data.

DESCRIPTION: This technique consists of two main parts-- a procedure for performing initial estimates of failure factors, and a second procedure for updating failure factors (FF).

The first part involves two manual methods. One performs a quick, inexpensive, and reasonably accurate initial estimation of FF for common attaching hardware and MIL-STD throw-away type components. This method uses entries from a table of MIL-STD FF multipliers. The second method provides a systematic, in-depth procedure for system-peculiar items that considers inherent and induced noninherent failures. This method is reflected in DARCOM Form 2660 (Failure Factor Worksheet) that incorporates the maintenance concept and provides an audit trail.

The second part, called the Automated Failure Factor Update program, provides a standard method for updating the initial FF estimates based on actual demand data. When an actual recurring demand is a certain percent above or below the predicted recurring demand, steps are taken to adjust the estimated FF, so that the predicted demand will equal the actual demand.

PROPONENT
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Lexington, KY 40511
AV 745-3053, com (606)293-3053

CURRENT USERS/POC
US Army MICOM
ATTN: AMSMI-SL (Mr. Tranquill)
Redstone Arsenal, AL 35898
AV 746-6898, com (205)876-6898
User also developer.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Objective Determination of Failure Factors (DARCOM-P 750-5)

INPUTS: Part 1. Initial estimates of FFs require-- Quantity per end item; basic failure rate; failures due to severe usage/operation error, idleness, cyclic operation, preventive maintenance, corrective maintenance, handling and storage; maintenance concept limitations; and secondary failures.
Part 2. FF Update requires: Expected and actual annual recurring demands, nomenclature, national stock number, existing failure factors, spare/repair density per end item, number of end item applications.

OUTPUTS: The output includes part FF for peace time (FF I) and war time (FF II) for a reference deployment area: and a coded multiplier (FF III) used to convert the FF I and FF II estimates for the reference area to FF I and FF II for each geographic deployment area.

DOCUMENTATION AVAILABLE:
DARCOM-P 750-5, Objective Determination of Failure Factors, 1 Apr 83.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
FORTRAN IV	IBM 4341, HP 3000	CONCEPT D&V FSD P/D	B C H

REMARKS: Part 1 is manual. Part 2 has a bridging program (written in COBOL)that retrieves and conditions input data.

APPLICATIONS:
Improved HAWK,REDEYE, PERSHING, TOW,LANCE,CHAPARRAL, LCSS,FAAR, AH/GSA-77,TSQ-73,NQM-33A TGT, XM-158 RKT

LSA TASK INTERFACE

203.2.3	501.2.3
303.2.1,3,4,9	
401.2.1,5,10,11	
402.2.4	
403.2	

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Defense Materiel System Life Cycle Cost Model (DEFLCC)*

PURPOSE: The model was specifically designed to support cost analysis of complex systems in the joint service acquisition arena.

DESCRIPTION: DEFLCC is a deterministic model of R&D and production costs as collected and reported according to the summary work breakdown structures contained in MIL-STD-881A. The R&D and production costs for contractor-furnished hardware and software are computed based on design and production activities recorded in the work breakdown structure data base. The analyst may enter these activity costs at any level appropriate to available data. The model distinguishes between contractor and Government-furnished equipments. System costs for R&D and production (e.g., data, training, facilities, program management) may be entered at the summary level of the work breakdown structure, depending upon the availability of data. The basic report structures have been approved by the DOD Cost Analysis Improvement Group (CAIG), Comptroller of the Army (DA Pam 11-5 formats), and the fiscal director of the Marine Corps. These cost reports, with supporting documentation, are appropriate for presentation to all service system acquisition review councils through the DSARC.

The DEFLCC also known as "MODEL" is a very detailed program requiring large amounts of input. Complex systems require approximately 8 to 12 hours to input the data in an interactive mode.

USERs:
HQ US Marine Corps
ATTN: RPE-3 (MAJ Koelln)
Washington, DC 20380
AV 224-1998, com (202)694-1998

PROPONENT	**CURRENT USERS/POC**
HQ Marine Corps Code LMA-1 (Ms. Cox) Washington, DC 20380 AV 224-1630, com (202)694-3185	PM TACMIS ATTN: STOP-C-150 (Mr. Cohen) Building 601 Fort Belvoir, VA 22060 AV 354-5261, com (703)664-5261

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Defense Materiel System Life Cycle Cost Model (DEF' CC)*

INPUTS: Inp are made via the data collection workbook which requires an extensive number of data elements in the following areas:
1) Production.
2) R&D.
3) O&S.
4) WBS.

OUTPUTS: (1) Budget reports; (2) R & D costs; (3) Production costs; (4) Supply costs; (5) Personnel support costs; (6) Life cycle cost by phase and year; (7) Comparison of inflated vs constant dollars; (8) Changes on sensitivity runs; (9) Analyst created warnings for each output; (10) Unit production costs; (11) Operations and maintenance costs; (12) Materiel consumption costs; (13) Energy consumption costs; (14) Operator/crew costs; (15)Operational transportation costs; (16) Software maintenance costs (operational software); (17) Equipment maintenance costs.

DOCUMENTATION AVAILABLE:
Mil-Handbook 276-2, Operating Instructions, 3 Feb 84. Mil-Handbook 276-1, Data Collection Workbook, 3 Feb 84.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN	DEC 20	CONCEPT D&V FSD P/D	A B C D

REMARKS: DEFLCC is available only through a time sharing network.	**APPLICATIONS:** TACCS; Light Armored Vehicle

LSA TASK INTERFACE

203.2.2,3,5,6,8
301.2.2
302.2.1-4
303.2.2-7,9,10
401.2.3
402.2.1,3

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Discard/Repair Cost Model (DIREC)

PURPOSE: To provide a model for evaluating the cost of throw-away versus repair of a LRU or module/circuit card.

DESCRIPTION: The DIREC is used to develop an equal cost curve wherein a repair cost evaluation is made to determine an optimum decision. The model is based on computing the discard penalty equal to or less than the repair penalty. When cost of acquisition exceeds cost of repair, repair is indicated. Where cost of repair exceeds cost of acquisition, throw-away is indicated.

Note: DIREC is being phased out in favor of the PALMAN model contained on page 2-130 of this pamphlet. Therefore, future updates to this pamphlet will not contain DIREC.

PROPONENT	CURRENT USERS/POC
US Army MICOM ATTN: AMSMI-DS (Mr. Dotson) Redstone Arsenal, AL 35898 AV 746-3555, com (205)876-3555	Proponent also user/developer. PM PATRIOT ATTN: AMCPM-MD-S (Mr. Kapolis) Redstone Arsenal, AL 35898 AV 742-3150, com (205)895-3150

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Discard/Repair Cost Model (DIREC)

INPUTS: There are three types of inputs into the DIREC--

1. Repair costs (7 inputs) per LRU/SRU.
2. Fixed costs (5 inputs).
3. Failure factors (3 inputs).

OUTPUTS: The break-even costs of repairing an item used to determine the throw-away versus repair decision.

DOCUMENTATION AVAILABLE:
(1) Discard/Repair Cost Model Report, D-SR-84-5, Jun 84. (2) Discard/Repair Cost Model Paper (MICOM), DA-SR-73-1. (3) AN/TSQ-73 Report, DA-TR-75-2, Oct 75.

AUTOMATION

YES NO * **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
		CONCEPT D&V FSD P/D	A B C D E H

REMARKS:	**APPLICATIONS:**
	Patriot, BTE-77(Battery Test Equipment), Land Combat Support System(LCSS), AN/TSQ-73.

LSA TASK INTERFACE

203.2.2,3,5-8
204.2.1,3
205.2.1,3
302.2.1,2
303.2.1,2,4,5,7-9

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Detailed Operating and Support Cost Estimate (DOSE) Computer Model

PURPOSE: DOSE provides the user with a means of doing a detailed evaluation of the materiel, labor and transportation costs associated with unscheduled maintenance actions, and time-related scheduled maintenance actions incurred during the operating and support phase of a weapon system's life.

DESCRIPTION: The model is designed to use large amounts of individual LRU and SRU logistics data in generating system(s) level materiel and manpower costs. An outputed maintenance allocation chart (MAC) and individual line replaceable unit (LRU)/shop replaceable unit (SRU) manpower, repair, and spare costs permit extensive system level analysis of logistics requirements. A key feature is the ranking of the major LRU/SRU cost drivers within the reviewed system. Numerous cost and reliability growth options can be incorporated within DOSE to provide more flexibility in accommodating several systems at once. DOSE determines materiel, and O&S costs by system, subsystem, LRU or SRU.

PROPONENT	CURRENT USERS/POC
US Army AVSCOM ATTN: AMSAV-BA (Mr. Laughlin) 4300 Goodfellow Blvd St. Louis, MO 63120 AV 693-1179, com (314)263-1179	Proponent also user. US Army BRADC ATTN: STRBE-DL (Ms. Woodsinger) Fort Belvoir, VA 22060 AV 354-5071, com (703)664-5726

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Detailed Operating and Support Cost Estimate (DOSE) Computer Model

INPUTS: Individual LRU and SRU maintenance and cost data, system level adjustment factors, MOS and depot labor rates, operating hours, and reliability and cost growth options.

OUTPUTS: All inputed LRU/SRU and option data, a system level MAC, individual LRU/SHU operating and support costs, and yearly displays by level of maintenance of scrap and repair costs, and manhours/manpower costs.

DOCUMENTATION AVAILABLE:
Final Report, AVSCOM Report #TM 82-F-4(DLSIE LD# 52069 MA), Jun 82.

AUTOMATION

YES * NO	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
LANGUAGE FORTRAN IV	IBM 4341	D&V FSD P/D	A B C D H

REMARKS: Distribution limited to US Government agencies only.

APPLICATIONS:
AAH, TADS, AHIP, AVRADA, LACV-30

LSA TASK INTERFACE

203.2.3
205.2.1

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Economic Analysis Model (ECONMOD)

PURPOSE: To compare alternative equipments relative to cost and to assess the impact of operating and support cost variability.

DESCRIPTION: The model does a sensitivity analysis on each of the alternative operating and support cost variables to measure their impact on savings versus investment ratios.

The model computes the ratio mentioned with and without discount and inflationary indices estimating their effect. Also, uncertainty in savings and investment cost is evaluated.

PROPONENT	**CURRENT USERS/POC**
US Army TACOM ATTN: AMSTA-HC (Dr. Brierly) Warren, MI 48090 AV 786-8155, com (313)574-8155	Proponent also user/developer.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Economic Analysis Model (ECONMOD)

INPUTS:

1. Nonrecurring investment cost.
2. Usage/Year.
3. Economic life of equipment.
4. Operating and support costs of alternatives.
5. Replacement costs.
6. Procurement quantity.
7. Unit costs.

OUTPUTS:

1. Savings to investment ratio.
2. Uncertainty analysis.
3. Costs by year matrix.
4. Sensitivity analysis results on significant input variables.

DOCUMENTATION AVAILABLE:

(1) Economic Analysis (2 1/2 ton truck PIP, XM963 series), by TACOM, May 79. (2) AR 11-28. (3) DA Pam 11-3.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
PL/1	IBM 360	CONCEPT D&V FSD P/D	A E H

REMARKS:	APPLICATIONS:
User's/Programer's Guide is being developed by proponent, Apr 83, available. Approx 318 lines of coding.	XM963 series 2 1/2-ton truck.

LSA TASK INTERFACE

203.2.2,3,5-7
204.2.1,3
205.2.1
303.2.1-3

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Electronic RAM Simulation (ERAMS)

PURPOSE: To provide an analytical tool for assessing the operational availability of communications and electronic equipment in light of failure rates for those systems.

DESCRIPTION: ERAMS is a stochastic simulation model that represents the operation of a single type of electronics system in any type scenario (peace or war). ERAMS views each system as composed of a number of mission essential subsystems with a value of ten subsystems under the present model configuration. These systems are deployed in a force with a variable number of using units with a maximum total force allocation of ten. As the systems operate during the scenario, subsystems malfunctions occur in accordance with reliability characteristics. These malfunctions either require immediate repair or can be repaired when the present mission has been completed. In either case a demand on the maintenance system is generated.
Only maintenance personnel are explicitly represented in ERAMS. Delays in obtaining the other resources are either not included or are represented by a probability distribution. Thus repairs do compete for maintenance personnel and queues can develop based on this competition. In addition to actually performing the repair, the maintenance personnel can be called on to do a significant amount of traveling. This is the case if the maintenance concept for the electronics system requires that most of the repairs be done on-site. Contact teams are sent from the appropriate level to perform the initial assessment or repair. The model requires approximately 30k bytes of user available memory to execute.

PROPONENT	CURRENT USERS/POC
US Army Logistics Center ATTN: ACTL-MR (Mr. Burnett) Fort Lee, VA 23801 AV 687-2360/3659 com (804)734-2360	Proponent also user. US Army Logistics Center ATTN: ACTL-OMM (Mr. Hopkinson) Fort Lee, VA 23801 AV 687-1845, com (804)734-1845 User also developer.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Electronic RAM Simulation (ERAMS)

INPUTS:

1. Failure rates.
2. Repair times.
3. Maintenance manpower availability.
4. Parts availability.
5. Usage rates.

OUTPUTS:

1. Manpower requirements.
2. Parts requirements.
3. Down times.
4. Operational availability.

DOCUMENTATION AVAILABLE:

(1) ERAM User's Guide, LOGC Pam 18-16, 1 Mar 83.
(2) ERAM Programer's Manual, LOGC Pam 18-15, 1 Mar 83.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN	UNIVAC 1182	CONCEPT D&V FSD P/D	B C H

REMARKS:	APPLICATIONS:
	ERAM is newly developed and expected to be applied to several systems in near future.

LSA TASK INTERFACE

202.2.1,2
303.2.7
402.2.3

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Force Analysis Simulation of Theater Administrative and Logistics Support (FASTALS) Model

PURPOSE: The FASTALS model will compute administrative and logistical workloads and generate the theater level support force in a postulated confrontation.

DESCRIPTION: FASTALS is a table-driven model, using factoring techniques for the majority of its computations. It is a one-sided and requirements oriented model. It is designed to estimate logistical and administrative workloads in a theater of operations under combat overtime. Model inputs include a description of the theater, the lines of communication, existing infrastructure and other potential engineer construction workload offsets, programed levels of prepositioned war reserve materiel, specific data on applicable medical, supply, maintenance, construction and movement plans and policies, combat unit employment and war fighting results, as well as, considerable data on the many types of units which may be required in the force. In addition to producing time-phased, geographically distributed, support force requirements, FASTALS provides summary level detail on the numerous workloads generated over time, supply consumption and stockage, and noncombat (support) personnel loss estimates.

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US Army LEA Simulation Team
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PROPONENT
US Army Concepts Analysis Agcy.
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Force Analysis Simulation of Theater Administrative and Logistics Support (FASTALS) Model

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INPUTS: Extensive input is required such as--

1. Postulated failures.
2. Equipment deployment.
3. Unit TOE.
4. Transportation plan.
5. Maintenance tasks and times.

OUTPUTS:

1. Consumption.
2. Construction requirements.
3. Workload summary.
4. Nondivisional personnel losses.
5. Time-phased troop deployment list.
6. Transportation analysis.
7. Branch summary.
8. Unit tonnage report and stock status.

DOCUMENTATION AVAILABLE:

CAA-D-84-4, User's Manual for Force Analysis Simulation of Theater Administrative and Logistics Support (FASTALS) Model, Nov 83.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN V	VAX, UNIVAC	FSD P/D	A C D E F H

REMARKS: Execution requires access to Concepts Analysis Agency (CAA) ADP Facilities	**APPLICATIONS:** Support Force Analysis for omnibus study done annually.

LSA TASK INTERFACE

402.2.4,5
403.2

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Failure Mode, Effects and Criticality Analysis (FMECA), MIL-STD-1629A

PURPOSE: To systematically evaluate and document, by item failure mode analysis, the potential impact of each functional or hardware failure on mission success, personnel and system safety, system performance, maintainability, and maintenance requirements.

DESCRIPTION: FMECA is an essential function in design from concept through development. To be effective, the FMECA must be iterative to correspond with the nature of the design process itself. The extent of the effort and sophistication of approach used in the FMECA will be dependent upon the nature and requirements of the individual program. This makes it necessary to tailor the requirements for a FMECA to each individual program. A properly performed FMECA is invaluable to those who are responsible for making program decision regarding the feasibility and adequacy of a design approach. FMECA should be initiated as soon as preliminary design information is available at the higher system levels and extend to the lower levels as more information becomes available on the items in question.

The FMECA serves to verify design integrity, identify and quantify sources of undesirable failure modes, and document the reliability risk. FMECA results can be used to provide the rationale for changes in operating procedures for improving the effects or for detecting the beginning of the undesirable failure modes. The FMECA also supplements and supports other engineering tasks through identification of areas in which effort should be concentrated. The FMECA results are not only used to provide design guidance, but they are used advantageously in and for maintenance planning design analysis, logistics support analysis, survivability and vulnerability assessment, safety and hazards analyses, and for fault detection and isolation design.

PROPONENT	CURRENT USERS/POC
Commanding Officer, Engineering Specifications and Standards Department Code 93 Naval Air Engineering Center Lakehurst, NJ 08733	All project managers should have addressed the use of MIL-STD-1629A.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Failure Mode, Effects and Criticality Analysis (FMECA), MIL-STD-1629A

INPUTS: FMECA requires input such as--

1. Identification of hardware, item function and mission phases.
2. Part failure rate, operating time, and failure mode ratio.

OUTPUTS: FMECA provides several items such as--

1. Failure modes, effects, detection method, and severity classification.
2. Failure mode criticality number and item criticality number.
3. What maintenance is done when a failure occurs.

DOCUMENTATION AVAILABLE:
Procedures for Performing FMECA, MIL-STD-1629A.
24 Nov 80.

AUTOMATION

YES NO * LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
		CONCEPT D&V FSD P/D	B

REMARKS:

APPLICATIONS:
FMECA is applicable to all types of Army weapon systems.

LSA TASK INTERFACE

301.2.1-4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Failure Rate Determination for Exponential Populations when Failure Times are Unknown (FREXPOP)*

PURPOSE: A procedure for estimating the relationship between the reliability of a single shot device (e.g., munitions and missiles) and its age.

DESCRIPTION: This procedure uses a maximum likelihood unbiased estimator for exponential populations to derive a point estimate for the population failure rate. It is used for single shot devices (e.g., munitions and missiles) which are destructively tested. A sample is chosen at various intervals of time and tested to destruction. The number that fail before destruction are recorded and used as input to the model. The result is an estimate for the failure rate of the population.

PROPONENT	**CURRENT USERS/POC**
US Army MICOM ATTN: AMSMI-SL (Mr. Strickland, Mr. Lawler) Redstone Arsenal, AL 35898 AV 746-6898, com (205)876-6898	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Failure Rate Determination for Exponential Populations when Failure Times are Unknown (FREXPOP)*

INPUTS:
1. Age at time of destruction.
2. Number tested in each observation.
3. Number of failures in each observation.
4. Number of observations.

OUTPUTS: Failure factor estimate.

DOCUMENTATION AVAILABLE:
Failure rate determination for exponential populations when failure times are unknown, 14 Dec 79.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
BASIC	HP 9830A HP 9845B, HP 9866A Printer	D&V	B

REMARKS:

APPLICATIONS:
Improved Hawk, MLRS

LSA TASK INTERFACE

203.2.3

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Generalized Electronics Maintenance Model (GEMM)

PURPOSE: In the advanced development phase, the model facilitates the evaluation of alternative design approaches based on life cycle support costs and operational availability. During engineering development phase it serves as an objective method for arriving at a lower cost maintenance policy.

DESCRIPTION: The basic approach used in the model is to start with the fundamental processes and synthesize for best maintenance support structure. The model provides for the description of four indentured hardware levels and four maintenance levels. Beginning with the lowest level of maintenance the best location to repair/discard each hardware item is determined, subject to maintenance policy limitations defined by input data. The level of repair/discard decision is based on support cost criteria including manpower, support equipment, transportation, and stockage considerations. The model performs life cycle support cost and operational availability calculations for any maintenance allocation specified by appropriate input data. Two key features are sensitivity analysis capability and the maintenance policy cost minimization process.

Note: GEMM is being phased out in favor of the OSAMM model contained on page 2-124 of this pamphlet. Therefore, GEMM will not be contained in future updates to this pamphlet.

HARDWARE (CONT'D)
CDC 6500/6600, VAX 750, UNIVAC 1108, Harris 800, PRIME, Burroughs 6600, IBM 360/370.

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PROPONENT

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CURRENT USERS/POC

Proponent also developer/user.
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Generalized Electronics Maintenance Model (GEMM)

INPUTS: Moderate to extensive description of the hardware and support structure is required. Data necessary are repair times, failure rates, support equipment, manpower by type, economic life, inventory and supply factors, hardware and support costs, and force structure.

OUTPUTS: Element of life cycle support cost is calculated including manpower, test equipment, stockage, inventory management, publications, transportation, overhaul costs, optimum maintenance allocation, stockage requirements, support and manpower requirements by type.

DOCUMENTATION AVAILABLE:
Generalized Electronics Maintenance Model (GEMM), CECOM Technical Report No. 3502, Sep 71, with supplemental input data instructions (DLSIE LD# 27248MA).

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN IV	See description for HARDWARE.	CONCEPT D&V FSD P/D	A B C D H

REMARKS:	APPLICATIONS:
	On contract on over 50 CECOM development programs. RPV, XM21 XM18, XM22, DIVADS, PIRANNA, SLUFAE, etc.

LSA TASK INTERFACE

201.2.1
203.2.3-5,7
204.2.1
205.2.1
302.2.1-4
303.2.1-4,6,7
401.2.5
501.2.5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Military Manpower Versus Hardware Procurement Methodology (HARDMAN)(also known as MPT)

PURPOSE: To identify the critical manpower, personnel, and training (MPT) requirements generated by an emerging system design during the early phases of its development. To determine and document MPT requirements as specified by the Defense System Acquisition Review Council (DSARC) process.

DESCRIPTION: The HARDMAN methodology consists of six interrelated steps encompassing advanced analytic tools and data management techniques for the assessment of weapon system human resource requirements and their impact on the Army's personnel and training systems. It is designed for interactive use throughout the system design process, but particularly in its earliest phases. The steps of the HARDMAN methodology are--

Step 1 - Establish a consolidated data base (CDB).
Step 2 - Determine manpower requirements.
Step 3 - Determine training resource requirements.
Step 4 - Determine personnel requirements.
Step 5 - Conduct impact analysis.
Step 6 - Perform tradeoff analysis.

The Army is adapting this model and calling it the Army HARDMAN Comparability Analysis (MPT). The US Army Research Institute, is doing the actual revisions to the Navy HARDMAN. The proponent for the Army version is the US Army Soldier Support Center.

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PROPONENT

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Washington, DC 20350
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CURRENT USERS/POC

Proponent also user.

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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Military Manpower Versus Hardware Procurement Methodology (HARDMAN)(also known as MPT)

INPUTS: Inputs are program documents which include--acquisition policy statements; the statement of work; program and study requirements; system mission performance requirements; and system development constraints/guidelines.

OUTPUTS: System-specific qualitative and quantitative manpower, personnel, and training (curricula and resources) requirements.

DOCUMENTATION AVAILABLE:
HARDMAN Training Requirement Determination Handbook Series Volume 1-5, Jun 81. Application of the HARDMAN Methodology to DSWS, Volume I, Summary, Sep 82.

AUTOMATION

YES NO * LANGUAGE	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
		CONCEPT D&V FSD P/D	B C D E G

REMARKS:

APPLICATIONS:
Division Support Weapon System (DSWS), SINCGARS, CSWS, RPV

LSA TASK INTERFACE

201.2.1
203.2.5
205.2.1,5
301.2.1,6
302.2.1,2,4
303.2.5,6
401.2.1,3,4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Military Manpower vs. Hardware Procurement (HARDWARE) Cost Model System for Shipboard Electronics (HM/SE)

PURPOSE: The HM/SE is a tool intended to help engineers design cost-effective shipboard electronics systems for the Navy. The models are, however, designed to be easily modified to accommodate different types of equipment and operating environments.

DESCRIPTION: The HM/SE consists of a system of interactive life cycle cost (LCC) models implemented on programable calculators (level I) and microcomputers (level II). These models are used during the early design phases, when tradeoff analysis has the maximum impact on design, hence cost. Level of repair analysis at the assembly level is incorporated in each of the models. Level I, the Slide Rule Model System (SRS), consists of three linked cost models, each appropriate to a different design phase. The three SRS models are-- (1) The Top Down Model (TDM) which estimates the life cycle cost of a system by making simplifying assumptions about its assemblies; (2) the Least Replaceable Assembly Model (LRAM) which is used for assembly design; and (3) the System Aggregate Model (SAM) which estimates system or subsystem costs by aggregating the costs of its assemblies, computed in the LRAM. The Shipboard Electronics Design Cost Model (SEDCOM), the level II model, is a bottom-up model which can both deal with individual LRAs and aggregate LRAs to construct systems and subsystems. Refer to the individual descriptions contained in this guide for more detailed information on the various models which comprise HM/SE. There is also a similar modeling group for Aircraft Electronics (HM/AE). HM/AE uses the same models as HM/SE with the exception of SEDCOM.

PROPONENT	**CURRENT USERS/POC**
HARDMAN Development Office Chief of Naval Operations Code OP-112C (Cdr Council) Washington, DC 20350 AV 224-4910, com (202)694-4910	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Military Manpower vs. Hardware Procurement (HARDWARE) Cost Model System for Shipboard Electronics (HM/SE)

INPUTS: Model input requirements are predicted on data availability. Simple, rough estimates are used early in system design; these are succeeded by more detailed values as they are generated by the design process. Input data sets in the SRS are stored on magnetic cards and data sets for SEDCOM are stored on floppy disks.

For more details on input and output see the individual models which comprise HM/SE.

OUTPUTS: All of the models produce hardcopy cost summaries. In the SRS, model results are also stored on magnetic cards. Output values are LCC by logistics element and production cost for each support policy. Level II models provide much greater detail.

DOCUMENTATION AVAILABLE:
HARDMAN Cost Model System: (1) HM/SE, Volume 1-3, (DLSIE LD# 54912A, B, and C), Aug 81. (2) HM/AE, Volume 1-3, (DLSIE LD# 54889A, B, and C), Nov 82. (3) LCC Handbook Avionics (DLSIE LD# 54910A), Nov 82.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
Keystroke, BASIC	HP41C Cal; IMS 8000 minicomputer.	CONCEPT D&V FSD P/D	A B C D E G H

REMARKS:	**APPLICATIONS:**
SEDCOM is written in Basic for the IMS 8000 minicomputer. LRAM, TDM and SAM use the HP41C in Keystroke.	REMBASS, AMTESS, VTXRTS (Army) CAT (TRISERVICE) VTXTS, NCCS, SEAFIRE (Navy)

LSA TASK INTERFACE

203.2.6
303.2.2,3,7

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Integrated Logistics Support Model (ILSMOD)*

PURPOSE: The ILS simulation model was developed to analyze the integration of logistics support with the aircraft plan for use in the preliminary design stage of a system. This model primarily addresses maintenance planning considerations.

DESCRIPTION: The model simulates aircraft flight operations and related support functions which correspond to particular maintenance and supply policies for a specific operating environment. It treats each aircraft as a group of subsystems each of which has its own reliability and maintainability characteristics. Input data representing mission requirements, aircraft subsystem reliability/maintainability factors and logistics support levels are transformed through simulation of operations into certain resulting aircraft operating characteristics. The model is capable of simulating the operation of an entire squadron of aircraft and will report consequent operating statistics. Statistical information on all phases of aircraft operations and requisite support systems is available. The information may be categorized as either squadron, aircraft, or logistics support system related.
Effectiveness of this model can be increased when used with a life cycle cost model.

PROPONENT	**CURRENT USERS/POC**
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Integrated Logistics Support Model (ILSMOD)*

INPUTS: System definitions, resource definitions and capacities, squadron operating scenario, operating characteristics, inspection dependent probabilities, inventory information, inspection time lines, and maintenance time lines.

OUTPUTS: Percent of missions completed, operational ready rate, flight bound month/aircraft, maintenance turn around time, maintenance hours/flight hour, maintenance man-hours/flight hour, total air aborts, total aircraft lost, total aircraft completing mission. Statistics are generated for each aircraft system/subsystem.

DOCUMENTATION AVAILABLE:
Integrated Logistics Support Simulation Model, Functional Description Model (DLSIE LD# 40436MA).

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
GPSS,FORTRAN IV	IBM, CDC, Burroughs	CONCEPT D&V FSD	A B

REMARKS:	**APPLICATIONS:**
	F/A-18A (Hornet) Navy fighter/ attack plane

LSA TASK INTERFACE

203.2.2
205.2.1
303.2.2,3

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Incorporation of Readiness Into Effectiveness (IREM)

PURPOSE: To evaluate the effect of missions and combat on scheduled and unscheduled maintenance.

DESCRIPTION: Through effectiveness and maintenance routines of the model, IREM examines the effects of damaged aircraft and the return of repaired aircraft. The mission types which are examined are resupply, battalion movement, platoon extraction, and lateral movement of two companies. The model simulates both scheduled and unscheduled maintenance for normal failures and combat damage. The level of repair examined are organizational and direct support. Also included are optional DS contact teams. IREM is in the process of being updated/enhanced and should be documented by Sep 84. Proposed changes include a faster cannibalization routine, controlled exchange routine and faster, cleaner manpower routines.

PROPONENT	CURRENT USERS/POC
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Incorporation of Readiness Into Effectiveness (IREM)

INPUTS: Current peace time ASL/PLL, mean order/ship time from CONUS, maintenance personnel, percentage of missions engaged by threats, cannibalization criteria, and individual threats.

OUTPUTS: Include, but are not limited to, part requirements, float requirements, manhours and skill requirements, elapse time, percent aircraft available, workload/queues at each level.

DOCUMENTATION AVAILABLE:
To be documented starting Sep 84. Interim Note A-170, SPARC on UH-60A using IREM, Apr 81, by AMSAA.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN IV	CDC	D&V FSD	A B C D H

REMARKS: Batch mode processing which requires 1.5m bytes CPU and 1000 CPU seconds to execute.

APPLICATIONS: AH-1S, OH-58C, UH-1H

LSA TASK INTERFACE

202.2.2
203.2.2,5
303.2.1,3-5,7,9,11
402.2.4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Load Plan Automation in a DAMMS Environment (LADEN)

PURPOSE: To determine estimated quantities by vehicle type required to move user-given quantities of people and goods under a set of user-given assumptions.

DESCRIPTION: LADEN is a deterministic model which applies simplistic three dimensional/geometric/spacial analysis and accounting logics to the problem of determining how many vehicles by type (with user defined vehicle capacities) will be required to move a user-given quantity of people or goods. Many loading assumptions and rules make more sophisticated estimates under a complex set of transportation load planning logic. LADEN should only be considered a planning tool and not necessarily a load plan generator (e.g., LADEN can make aircraft requirements estimates using the simplistic three dimensional algorithms, but the temporary load plans generated do not reflect any center of balance or tie down planning that would be essential for actual load plan implementation).

LADEN will become a part of the DA Movement Management System - Movement Planning Module (DAMMS-MPM) which will be a standard Army system supported by Computer Systems Command. The current version of LADEN is coded totally in FORTRAN 77 for virtual memory operating system implementation. Strict adherence to FORTRAN 77 standards (no extention) allows the model to be implemented in a minimum amount of time on other computer systems with a virtual memory operating system and a FORTRAN 77 compiler.

PROPONENT	**CURRENT USERS/POC**
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Load Plan Automation in a DAMMS Environment (LADEN)

INPUTS: LADEN has extensive input requirements which include the following:

1. Movement requirements stating number of people, POL, goods with 3-dimensional attributes (bulk supplies).
2. Vehicle declarations with attributes; 20 unique types of vehicles may be defined for each of 5 categories of transportation (air, rail, barge, mil/civ truck).
3. Cargo to vehicle preference rules.
4. Load mixing parameters.

OUTPUTS: Recommended loading program for a given scenario. Also, estimated vehicle quantities by vehicle type required to move the user-given quantities of people and goods.

DOCUMENTATION AVAILABLE:
Software Self-documenting, DA STD Documentation expected under contract NLT Jan 85.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN 77	VAX 780	FSD P/D	H J

REMARKS:

APPLICATIONS:
US Army Europe 4th Trans Cmd

LSA TASK INTERFACE

303.2.12
401.2.7

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Life Cycle Cost Model (LCC-2 and LCC-2A)

PURPOSE: To compute the life cycle costs associated with procuring and maintaining avionics equipment.

DESCRIPTION: LCC-2 is a life cycle cost model developed to evaluate the cost of acquiring an avionics system and supporting it over its operational life. It is an accounting type of model and is useful in comparing support concepts (two versus three-level maintenance), evaluating reliability improvement warranty (RIW), performing sensitivity analysis, and identifying important cost driving parameters in a system acquisition program. Calculations are performed down to the Shop Replaceable Unit (SRU) level and a variety of output products are available.
The LCC-2A is an enhanced version of the LCC-2 model. The model permits centralized intermediate (I) level maintenance, computes required intermediate level support equipment based on demand, allows a change from two-level to three-level maintenance, and offers additional output products.

NOTE: LCC-2/2A is an earlier and nonproprietary version of LCCA. LCCA has some extra features and is a menu-driven program.

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CURRENT USERS/POC
Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Life Cycle Cost Model (LCC-2 and LCC-2A)

INPUTS: There are four input parameter files:

1. Standard cost factors file.
2. Logistics factors file.
3. Hardware definition file.
4. Support equipment file.

OUTPUTS: Outputs data from the four input parameter files plus total cost summary (by category and year), spares requirements, manpower requirements, and sensitivity analysis.

DOCUMENTATION AVAILABLE:
User Documentation for LCC-2 and LCC-2A Models (28 Apr 76), Aeronautical Systems Division (AFSC), United States Air Force, Wright-Patterson Air Force Base, OH 45433.

AUTOMATION

YES * NO	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
LANGUAGE FORTRAN IV	Timesharing Systems	CONCEPT D&V FSD P/D	A B C D E H J

REMARKS:	APPLICATIONS:
LCC-2/2A can be accessed through either the Mark III or AFLC create timesharing systems.	H8-60D Helicopter, Black box avionics programs.

LSA TASK INTERFACE

203.2.2,5
205.2.1,2,5
303.2.1,4
501.2.5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Life Cycle Cost Analyzer (LCCA) Model

PURPOSE: LCCA is used to prepare life cycle cost (LCC) estimates in response to requests for proposal, evaluating alternative proposals, studying maintenance and logistics support options, and evaluating new or modified designs.

DESCRIPTION: LCCA is a set of programs for life cycle cost studies of electronic equipment and systems. The LCCA system is a design-oriented life cycle cost analyzer. The main program, LCCA10, has a user interface design to help obtain results easily. A file management system is included to assist in organizing inputs and related outputs. A second program, DATAIN10, contains a built-in input data manager which makes it easy to describe system usage and maintenance plans. LCCA contains Government-approved life cycle cost analysis equations and produces a variety of user-selected reports to show design and support options influences on total program cost. The software is designed to perform sensitivity analysis automatically and when used with the IBM-PC and the LOTUS 1-2-3 software program gives graphical analysis of the results of LCCA runs. LCCA has been used to model systems with over 2000 repairable elements and for systems with as few as seven elements.

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PROPONENT
Private contractor also developer.

CURRENT USERS/POC
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Life Cycle Cost Analyzer (LCCA) Model

INPUTS: System elements are described in terms of their cost, reliability and weight. DATAIN10 or the IBM-PC can be used to develop the complete maintenance plan. The use scenario is also set up using DATAIN10 to display schedules and other required assumptions. Many standard life cycle cost analysis inputs are automatically set up by DATAIN10 for review. An editor is provided to make it easier to tailor inputs as desired.

OUTPUTS: User selectable outputs include total program costs and costs by year organized by work breakdown structure which can be tailored to match program requirements. Additional outputs provide detailed or summarized spares requirements, hardness assurance costs, support equipment and manpower requirements, and a detailed corrective maintenance analysis report.

DOCUMENTATION AVAILABLE:
EM-2081-6 Life Cycle Cost Analysis Program User's Guide, 16 Jul 79, from proponent.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN, BASIC	1) Time-share 2) IBM-PC w/ modem	CONCEPT D&V FSD P/D	A B C D E H J

REMARKS: LCCA10, DATAIN10 and related utilities are available for access at GSA rates through a contractor time-share network.

APPLICATIONS: Scott Radio; JRSVC Radio; GPS Man Pack; and many more USAF/USN Avionics ground electronics and test support equipment.

LSA TASK INTERFACE

203.2.2,5
205.2.1,2,5
303.2.1,4
501.2.5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Night Vision and Electro-Optics Laboratory Life Cycle Cost Analysis Model (LCCAM)

PURPOSE: To provide assistance to the costs analyst in estimating the cost of development, investment, operations and support for a variety of electro-optic and electronic systems.

DESCRIPTION: LCCAM, when provided with suitable input data, will calculate and accumulate costs by fiscal year for the various categories contained in research and development (R&D), investment, and operation and support (O&S) phases of a program. In its present configuration, R&D cost categories are throughputs, but most investment categories (hardware, maintenance floats, provisioning, initial training, etc.) and O&S categories (depot and field labor, depot materiel, consumables, replacement training, transportation, and overhaul, etc.) are calculated internal to the model.

Costs are calculated at the "module" level, i.e., the system consists of one or more modules, and the modules are assumed to be the maintainable item at the depot. Ancillary equipment may also be included in an analysis as a follow-on to the basic systems analysis, and a combined output will result.

Calculations are made in base year constant dollars, and results are displayed in constant and current dollars. Present value is also available as an output.

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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Night Vision and Electro-Optics Laboratory Life Cycle Cost Analysis Model (LCCAM)

INPUTS: Beginning and ending fiscal years; economic life; inflation factors for R&D, investment, O&S; average unit cost for module learning curves, MTBF, MTTR, percent repairability, and weight; system production, delivery, deployment and overhaul schedules; annual operating hours, turnaround time for each repair level; module and systems competition factors; multi-year procurement flags, attrition rates; training course costs; field and depot maintenance, salaries; replacement training rate; scale factors for sensitivity; transportation rates; (e.g. support equipment, etc.); all above inputs for ancillary equipment also.

OUTPUTS: 1. Input data.

2. Calculated value for each module's first unit costs, maintenance float factor, average unit cost by FY, total quantity purchased by FY, and training manpower.

3. Costs summaries by category (hardware, provisioning, initial training, etc.) and FY in constant dollars for R&D, investment, and O&S, total systems procured, average unit cost, and life cycle cost. This is produced for the primary system and for each ancillary system as desired.

DOCUMENTATION AVAILABLE:

NVEOL (1) LCCAM, Part I: System Description; Part 2 Mathematical Model. (2)Software Manual, Part I: General; Part 2 Program Listing. (3)User's Manual. Each of these are dated Aug 83.

AUTOMATION

YES * NO	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
LANGUAGE FORTRAN IV	CDC 6600/ CYBER 170; IBM 4341	D&V FSD	A B C E H J

REMARKS: Revision of IBM version near completion. Revision compatible with DA Pam 11-2,3 and 4 formats.

APPLICATIONS: AN/TAS-4,5,6; AN/TAM-4,6; RPV; AN/PAQ-4; AN/PAS-7; Thermal Weapon Sight; AN/PVS-7; TADS/PNVS; AN/VSG-2; and others.

LSA TASK INTERFACE

203.2.2,3,5-7
204.2.1,2
205.2.1,2,5
303.2.1,3,4,7,9
403.2

LSA TECHNIQUE INFORMATION SHEET
PART 1

TECHNIQUE: Automated Life Cycle Management Model (LCMM)

PURPOSE: LCMM was developed to more efficiently/effectively schedule, plan and control the myriad of activities in the RDT&E materiel acquisition process.

DESCRIPTION: The LCMM is a program developed as a management tool which serves as a road guide for planning and scheduling of projects in the materiel acquisition process. The basis for the model is DA Pamphlet 11-25. The model illustrates in sequential order the activities involved in the materiel acquisition process from concept initiation to delivery of the system. The system originally used two software programs: NASA PERT and EZPERT. VISION software, acquired in Dec 80, provides a complete on-line, stand-alone interactive project system. Activity listings and reports are produced as desired by the user. In addition, the LCMM serves as the ILS management tool, showing interrelationship between the materiel acquisition and the application/execution of ILS requirements. Eacn LCMM is tailored to the individual command. However, there are efforts underway to develop a standard LCMM for the Army. When LCMM is fully implemented it will relate cost to schedule. INFO software (which is proprietary) is used for data base management and interface with the VISION software. Both VISION and INFO software should be purchased together.

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PROPONENT

Private contractor proponent also developer.

CURRENT USERS/POC

Proponent also user.
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Automated Life Cycle Management Model (LCMM)

INPUTS: A classical or standard model is built into the system. The only input required is by the manager or PM to modify the model by tailoring; i.e., adding, changing, or deleting via a terminal.

OUTPUTS: Varied management reports. Graphic outputs in the form of gantt charts, network plots, and XY graphs. Also, video screen displays and critical paths of the activities are available.

DOCUMENTATION AVAILABLE:
(1) DARCOM-R 11-27. (2) DA Pam 11-25.
(3) Proprietery Vision Software User's Guide for LCMM, NOV 81.
(4) Several user's handbooks within different commands tailored to commands and different acquisition processes.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
VISION and INFO	PRIME, DEC VAX	CONCEPT D&V FSD P/D	NONE APPLY

REMARKS:

APPLICATIONS:
All projects at BRADC, LACV-30, Heavy & Light Assault Bridges, FAASV, FIST, SUSV, M9, LAV, MTT, M1E1, AFARV, CUCV, HMMV.

LSA TASK INTERFACE

101.2.1,2
102.2.1,2
103.2.1-4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Logistics Composite Modeling (LCOM)

PURPOSE: To determine initial maintenance manpower requirements for emerging weapons systems, determine sortie generation capabilities, perform trade-off studies, and assess the impact of spares.

DESCRIPTION: The LCOM system consists of the Common Data Extraction Programs (CDEP) and the LCOM Simulation Software. The CDEP is a series of programs which process Maintenance Data Collection (MDC) system information on existing weapons systems. A comparability analysis can be performed to modify maintenance data on existing equipment to reflect the new systems. Once the LSAR interface is established, this need for comparability analysis will be eliminated.

A maintenance model of the new weapons system is then able to be developed. This model consists of a series of task networks describing failure rates, task sequence, task times and resources required to perform maintenance on every system in the aircraft. An operations schedule is also developed for a squadron or wing of new aircraft. This is a daily flying schedule that describes the mission type, takeoff time, mission length, cancel time, etc. for every airplane in the squadron or wing. This flying schedule actually drives the simulation model. If the simulation program finds an airplane is unavailable, the sortie is canceled. At user defined points in the network, the aircraft is checked for failures. If failures are found, corrective maintenance tasks are performed if resources are available. Schedule maintenance tasks can also be included in the model. Aeronautical Systems Division (ASD) uses LCOM during the acquisition phase of new weapon systems. AFTEC updates the model with flight test information during operational test and evaluation (OT&E). TAC, MAC, SAC, USAFE, and PACAF use LCOM to determine maintenance manpower standards for operational aircraft.

An effort is underway to convert LCOM to an Air Force standard data system designated Automated Data Processing System 14 (ADPS-14).

PROPONENT	**CURRENT USERS/POC**
Air Force Maint, Munitions and	Aeronautical Sys Div Systems
Supply Mgmt Engr Team	Capability Branch
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Proponent also developer.	com (513) 255-8065

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Logistics Composite Modeling (LCOM)

INPUTS: Extensive inputs are required which include--

1. Task sequence information.
2. Task type and probability of occurrence.
3. Task time, crew size and resources required.
4. Maintenance policy information.
5. Aircraft mission data.
6. Frequency of maintenance actions.

OUTPUTS:

1. Maintenance manpower usage information.
2. Shop repair information.
3. Supply information.
4. Support equipment utilization information.
5. Aircraft mission accomplishment information.

DOCUMENTATION AVAILABLE:
Information and references cited herein are for the simulation portion of LCOM only. (1) LCOM Student Trng Guide, AFMSMMET Rpt 81-2. (2) LCOM User's Guide, Version 4.1, Mar 82. (3) LCOM User's Guide, Version 83.1, under development.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
COBOL,FORTRAN	Honeywell, CDC or IBM	CONCEPT D&V FSD P/D	A B C D E G H

REMARKS:	APPLICATIONS:
Some of the 30 programs are written in SIMSCRIPT. Update in process, no completion date.	USAF; F-111,15,16,4;C-130,141,5;B-1,52,U-2,T-46A;NAVY: SH-2,60 Helicopters; Army: M1

LSA TASK INTERFACE

203.2.2,3,5-7	402.2.1
205.2.1,2,5	
301.2.2-4	
302.2.1-4	
303.2.1-5,7,9	

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Logistics Engineering Analysis of Design (LEAD)

PURPOSE: To provide an easy method of predicting system reliability and availability.

DESCRIPTION: LEAD is a combination deterministic/simulation model designed to predict system logistics parameters. The program is interactive. There are eight reliability block configurations which are allowed by the program. Each block input must be coded as one of these configurations (see documentation available section).

PROPONENT	CURRENT USERS/POC
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Logistics Engineering Analysis of Design (LEAD)

INPUTS: Reliability block diagram with each block's failure rate(s), MTTR, preventive maintenance policy, and the number of hours per day the system operates.

OUTPUTS: System, subsystem, and block reliability predictions for user specified time intervals, system MTBF, system MTBUM, and availability.

DOCUMENTATION AVAILABLE:
Logistics Engineering Analysis of Designs (LEAD)
User's Guide, 11 Apr 83.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
HP Enhance BASIC	HP 9845B	CONCEPT D&V FSD	A B E H

REMARKS:	APPLICATIONS:
	Pershing II

LSA TASK INTERFACE

203.2.3

LSA TECHNIQUE INFORMATION SHEET
PART I

TECHNIQUE: Logistics Cost Analysis Model Version 5 (LOCAM 5)

PURPOSE: To provide a means of analyzing and optimizing a support system.

DESCRIPTION: LOCAM 5 is a deterministic simulator with sensitivity features which allow a wide variety of O&S related analyses, including level of repair (LOR), sparing to availability and support manpower and equipment demand. LOCAM 5 is being considered for revision to provide a less complex program for LOR analysis. This is under consideration to provide systems that do not require the full analysis capabilities of LOGAM. Potential users of LOCAM 5 should use LOGAM until revision of LOCAM 5. LOCAM 5 is the predecessor of LOGAM.

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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Logistics Cost Analysis Model Version 5 (LOCAM 5)

INPUTS: Approximately 325 LRU, deployment, and common standard cost factors.

OUTPUTS: The output includes-- life cycle cost of ownership for individual LRUs; cost totals for operating and maintenance; inherent and operational availability at both LRU and system levels; manpower requirements; provisioning requirements; and test equipment requirements.

DOCUMENTATION AVAILABLE:
(1) LOCAM 5 Executive Summary, Volume I (DLSIE LD# 39576MA). (2) LOCAM 5 Programer's/User's Manual, Volume II (DLSIE LD# 39576MB).

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN IV	PRIME,Harris, IBM 4341, CDC 6500/6600	D&V FSD P/D	A B C D E F G H J

REMARKS:

APPLICATIONS:
TOW, FVS, PERSHING II, MLRS, PATRIOT, RPV, M1, DIVAD Gun, AN/USM-410, AN/TSQ-73

LSA TASK INTERFACE

203.2.5-7
302.2.1-3
303.2.1-3,7,8

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Logistics Analysis Model (LOGAM)

PURPOSE: To provide a versatile means of analyzing and optimizing a support system.

DESCRIPTION: LOGAM is a deterministic model with sensitivity features which allow a wide variety of support related analyses, including level of repair (LOR), life cycle cost of ownership for individual LRUs and systems, O&S costs, sparing to availability, etc. The model provides a means of evaluating O&S functions and cost on a life cycle basis and evaluation of alternative maintenance concepts to reduce overall costs. TRADOC has another version of LOGAM which calculates personnel demand by MOS and LCC by cost item and year.

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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Logistics Analysis Model (LOGAM)

INPUTS: Appproximately 325 LRU, deployment, and common variables. Also, up to 200 TOE related variables depending on application may be input to obtain O&S costs.
Inputs include repair time, failure rate, false failure, attrition rate, manpower by type and rates, supply factors and support costs.

OUTPUTS: The output covers the life cycle cost for the system and individual LRUs. In addition, O&M costs, O&S costs, availability, manpower requirements, provisioning requirements and support equipment usage are provided in the outputs.

DOCUMENTATION AVAILABLE:
(1) SR D82-2, LOGAM Executive Summmary, Volume I, Feb 80, AD-A136 800. (2) SR 82-2 User's Guide, Volume II, Aug 82, AD-A136801. (3) SR D84-2 Technical/Programer's Manual, Volume III, rev, Feb 84.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN IV	CDC 6500/6600 PRIME,IBM 360	CONCEPT D&V FSD P/D	A B C D E F G H J

REMARKS:

APPLICATIONS:
Numerous systems such as: MCF, FVS,M1,TOW,PERSHING II,MLRS DIVAD, AAH, Patriot, MAPS,HELP, Dragon, Vulcan,Space Shuttle

LSA TASK INTERFACE

203.2.3,5-7
204.2.1
205.2.1
302.2.5
303.2.1-3,7,8

401.2.3,8

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Logistics Attack II Model (LOGATAK II)

PURPOSE: LOGATAK II is a simulation model to measure workloads in a transportation system, analyze vehicle and carrier requirements in a logistics system, and analyze operations of a distribution system.

DESCRIPTION: The model represents a four-echelon supply system connected by a multi-mode transportation network. Shipments in the system are consolidated into vehicle loads and vehicles are allocated for movement of the shipments after a loading operation. The movement of vehicles throughout the network is simulated over time to permit the analysis of traffic flows and overloads. The model uses the available transportation capability to move all vehicles and chooses alternative routes if overloads or attacks reduce network capability. Individual shipments are off-loaded from vehicles based on the routing, priority, and vehicle capability, and are possibly loaded onto other carriers to reach the shipment destination. LOGATAK II requires approximately 200k bytes of user memory to execute.

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CURRENT USERS/POC
Proponent also user.
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Logistics Attack II Model (LOGATAK II)

INPUTS: A. Network Description: (1) Link and terminal specifications; (2) Mode; (3) Length; (4) Rate of travel; (5) Capacity; (6) Number of loading docks; (7) Time to rebuild; (8) Number of vehicles; (9) Location of vehicles. B. Scenario: (1) Time-phased demands; (2) Location of units; (3) Priority of units. C. Initial Stockage at Supply Points. D. Attacks: (1) Where; (2) When; (3) What.

OUTPUTS: A. Supply Status by Node/Class: (1) Quantity ordered; (2) Quantity received; (3) Quantity due in; (4) Duration of due-ins. B. Transportation Status: (1) Network characteristics; (2) Network workloads for each link/terminal; (3) Average load; (4) Peak load; (5) Total thruput; (6) Queue buildups; (7) Vehicle usage; (8) Vehicle losses. C. Attack results.

DOCUMENTATION AVAILABLE:
(1) A Programer's Guide for LOGATAK II, 17 Apr 79.
(2) A User's Manual for LOGATAK II, 6 Apr 79.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN	CDC 6000/6600 CYBER 176,175 CYBER 76	P/D	H

REMARKS: Even though the model is exportable, analysis on all of the projects so far has been done by a contractor.

APPLICATIONS: Corps Support Weapon System; ESPAWS;Future Munitions Support Concept Analysis

LSA TASK INTERFACE

202.2.2
303.2.12
401.2.7

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Logistics Optimization Model (LOGOP II)

PURPOSE: LOGOP II was developed to study alternative logistics concepts for support of systems and provide input to defense materiel systems life cycle cost model.

DESCRIPTION: This model simulates the operation and maintenance of one or more systems .' a defined environment and an operational scenario that stress and reduce the effectiveness of the system. LOGOP II is employed to study alternative arrangements of the controllable resources within that environment in an attempt to determine how to attain maximal utility of the deployed fleet of systems. In contrast to deterministic models designed to accomplish the same task, LOGOP II, by its stochastic nature, provides the specific and more realistic stresses that can be placed upon the studied alternative logistics systems, as well as results expected from the deterministic model.
LOGOP II is capable of simultaneously accommodating alternative mission profiles of operational units, system configurations, and maintenance/supply support organizations and capabilities. It is an event-oriented, stochastic simulation using GASP IV simulation.

PROPONENT	**CURRENT USERS/POC**
US Army CECOM ATTN: AMSEL-TCS-ED-3 (Mr. Howard) Fort Monmouth, NJ 07703 AV 992-2090, com (201)544-2090	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Logistics Optimization Model (LOGOP II)

INPUTS: The principal classes of input data for LOGOP II are the following:

1. Operational (scenario related), which includes organizational structure of operational units and maintenance facilities; geographical factors (distance); administrative factors (time to process requests); equipment sites; and operational profiles and maintenance policy.
2. System equipment and LRU parameters, which include work breakdown structure; repairable/consumable class of LRUs; reliability and maintainability of LRUs, and maintenance concept.

OUTPUTS: Full use of output capability of LOGOP II will produce the following data:

1. Operational (scenario related), which includes three availability figures; up-time, down-time, standby, etc.
2. Resource usage (by LRU, maintenance unit and overall) which includes maintenance man-hours; item expenditure; items causing not-mission-capable (NMC), and duration of NMC.
3. Supply data.
4. Periodic snapshots of status.

DOCUMENTATION AVAILABLE:
LOGOP II Military Computer Family Executive Summary Sep 83. LOGOP II User's Manual under development; available May 84.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORT IV, GASP IV	VAX 11/780; Honeywell DPS-8	CONCEPT D&V FSD P/D	A B C D E

REMARKS: Requires 128k words of memory. Model is in development phase. Access through Dartmouth time-sharing system.

APPLICATIONS: Military computer family.

LSA TASK INTERFACE

201.2.1
202.2.1,3
203.2.2,3,5,7,8
204.2.1,3
205.2.1,3,5
303.2.1-5,7,9,11
402.2.3,4
403.2
501.2.1,3-5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Slide Rule Model System: Least Removable Assembly Model (LRAM)

PURPOSE: To perform assembly level design/cost trade-off via level of repair analysis during the earliest phases of the design process.

DESCRIPTION: LRAM is one of three models which make up the Slide Rule Model System (SRS). It is used in conjunction with the other two SRS models (TDM and SAM) to conduct front end design/cost trade-off analyses. The model produces LCC estimates for individual Line Replaceable Assemblies (LRAs). The LRAM is implemented on the HP-41CV programable calculator. The model computes life cycle costs for three different repair postures: discard, local repair, and depot repair. All data inputs are couched in engineering terms and are easily entered and changed. Each input element has been assigned to a key on the calculator, i.e., pushing a key will display the current value and allow the user to change it by entering a new value. The user can compute the costs associated with different design alternatives using LRAM. When the user has decided on a preliminary design, it must be recorded on a magnetic card. Cards representing all assemblies of a system can then be run through the SAM model for estimation of system cost.

PROPONENT	**CURRENT USERS/POC**
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Slide Rule Model System: Least Removable Assembly Model (LRAM)

INPUTS: Twenty-five equipment level data elements provided by the Top Down Model (TDM) data base. Another 12 data elements are required to describe the proposed assembly design including duty cycle, unit cost, lot size, MTTR, MTBF, MTRR, repair costs, pages of documentation, support and test hardware cost, and confidence level for having spares on hand.

OUTPUTS: Life cycle cost estimates for indiviual LRAs.

DOCUMENTATION AVAILABLE:
HARDMAN Cost Model System Shipboard Electronics,
Volume II-Slide Rule Model System, Aug 81 (DLSIE LD# 54912B).

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
HP41C keystsroke	HP 41C programable calculator.	CONCEPT D&V	A B C

REMARKS: This model is part of the HARDMAN for shipboard Electronics Model (HM/SE).

APPLICATIONS:
AMTESS (ARMY), SEAFIRE (NAVY), NCCS (NAVY)

LSA TASK INTERFACE

203.2.6
303.2.1,3,7

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Logistic Support Analysis Extract (LSAEXTRC)

PURPOSE: To extract data from the LSAR data base for direct input into the Selected Essential Item Stockage for Availability Method (SESAME).

DESCRIPTION: The LSAEXTRC program extracts parts data from the LSAR Parts Master file for SESAME. Data extracted are part numbers, PLISN, maintenance factors, RTD, MTD, SMR code, unit price, unit price next higher assembly and item name. Part selection is by LSA control number, item category codes and essentiality codes. Edits are performed on the input data and valid/reject/warning reports generated to give the user detailed information on the validity of the extracted data.

USERs:
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PROPONENT	CURRENT USERS/POC
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Logistic Support Analysis Extract (LSAEXTRC)

INPUTS: Inputs are the LSAR parts master record and a selection card which specifies the LCN, item category codes, and essentiality codes for the parts.

OUTPUTS: The outputs are either an 80-column punchcard, a 159-character tape, or disc file. Extracted data are RTD, MTD, PLISN, part number, failure factor, washout rate and turnaround times.

DOCUMENTATION AVAILABLE:
LSAR Optional Systems Functional and ADP Guide, Sep 81.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
COBOL	IBM 360/370	D&V FSD P/D	H

REMARKS:

APPLICATIONS:
Provisioning on low density weapon system that use the LSAR for data source.

LSA TASK INTERFACE

203.2.2,3,5
303.2.4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Maintenance Capabilities Attack Model (MACATAK)

PURPOSE: MACATAK measures the survivability/vulnerability of division level maintenance elements in conventional, chemical, and nuclear environments. The model assesses the effectiveness of the maintenance system as it experiences both attacks on the fleet of end items it supports and on the system itself.

DESCRIPTION: MACATAK is a one-sided stochastic model which deals with land forces. It was designed for division level. This model uses discrete event simulation as a method of solution.

The model requires 170 kilobytes of user workspace to execute.

PROPONENT	CURRENT USERS/POC
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Maintenance Capabilities Attack Model (MACATAK)

INPUTS: Number and type equipment in each of three brigades and division. Number and MOS of maintenance personnel. Inventory of DX components in the division. Equipment usages rates and failure rates. Maintenance action information: time to repair; MOS skills required; recommended level of repair; frequency of occurrence, and contact team. Time to wait for part and travel. Overall scenario.

OUTPUTS: Tabular and graphic printouts of probable equipment availability. Tabular listing of equipment maintenance turnaround time (TAT). Tabular listing of TAT broken into function segments. Tabular and graphic printouts of queue sizes for parts, skills, and equipments as a function of time.

DOCUMENTATION AVAILABLE:
Maintenance Support Study for TNFS, Mar 80.
User's Manual for MACATAK, Mar 80. Programer's Guide for MACATAK, Mar 80.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
FORTRAN/GASP	UNIVAC 1182	P/D	C D G H

REMARKS:	**APPLICATIONS:**
	MACATAK was used in the DA DSLOG Mission Essential Maintenance Only Study, Jun 82.

LSA TASK INTERFACE

205.2.1,2
303.2.3

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Manpower Requirements Criteria (MARC), AR 570-2.

PURPOSE: MARC is a developmental tool for determining the required various MOSs necessary to support a specified unit of equipment.

DESCRIPTION: MARC documentation (AR 570-2 plus appropriate appendixes and supplements) provide the necessary data definitions, equations, and considerations to estimate number and type of MOSs that are required for combat support (CS) and combat service support (CSS) in tables of organization and equipment (TOE) and modification tables of organization and equipment (MTOE). AR 570-2 is structured to various categories of MOSs and inputs are dependent on the type of system under consideration.

PROPONENT	CURRENT USERS/POC
US Army Logistics Center ATTN: ATCL-OMM (Mr. Hopkinson) Fort Lee, VA 23801 AV 687-1845, com (804)734-1845	All project managers should have addressed the use of AR 570-2.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Manpower Requirements Criteria (MARC), AR 570-2.

INPUTS: Equipment deployment and task requirements.

OUTPUTS: Manpower requirements for CS and CSS positions in TOE/MTOE.

DOCUMENTATION AVAILABLE:
(1) Draft AR 570-2 Manpower and Equipment Control Organizational and Equipments Requirements Tables Personnel, Nov 83. (2) Draft DARCOM/TRADOC Supplement to AR 570-2.

AUTOMATION

YES NO * LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
		D&V FSD P/D	C D G

REMARKS:	APPLICATIONS:
	Required use for manpower determinations throughout the Army Mission Estl Maint Only (MEMO) Study for DA DSLOG, Jun 82.

LSA TASK INTERFACE

201.2.1
303.2.5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Marine Corps Level of Repair Analysis (MCLOR)

PURPOSE: The Marine Corps LOR model provides a technique for determining the lowest life cycle cost alternative for maintaining a failed hardware item, i.e., whether it should be discarded (wash out) or repaired, and at what maintenance level the work should be performed.

DESCRIPTION: Produces life cycle maintenance costs for three equipment indentures; unit, assembly, and lowest replacement item (LRI). For each indenture level, derives maintenance costs in six cost categories covering a total of 12 cost elements. MCLOR divides these costs into two major categories: (1) Variable costs are directly proportional to the number of repairs of an item (includes inventory, inventory storage space, transportation, materiel, labor, and training). Item entry and retention costs are independent of the number of repairs, but are included within the variable cost category; (2) Fixed costs are incurred if even one item that uses a fixed cost asset is repaired (includes repair work space, support equipment, support equipment space, and support equipment support). MCLOR performs two types of LOR analyses: (1) Life Cycle cost of maintaining a system using specified set of maintenance levels, (2) Least cost solution when the system repair points are not specified.

INPUTS (CONT'D)
This data include repair path, MTBF, item cost, inventory costs, man-hours required, labor rate (approximetely 40 data elements for each item input up to a maximum of 350 items).

USERs:
US Army BRADC
ATTN: STRBE-DL (Ms. Woodsinger)
Ft. Belvoir, VA 22060
AV 354-5071, com (703)664-5071

PROPONENT	**CURRENT USERS/POC**
HQ, Marine Corps Code LMA-2/ME (Mr. Ferris) Washington, DC 20380 AV 224-2606, com (202)694-2606	US Army TACOM ATTN: AMSTA-HP (Mr. Moron) Warren, MI 48090 AV 786-8155, com (313)574-8155

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Marine Corps Level of Repair Analysis (MCLOR)

INPUTS: Input data are of two types: (1) System Input provides all requisite system-level input data (i.e., data common to the system being analyzed). This includes number of systems deployed, operating hours, expected life, support equipment costs, days of stock, work space required and cost, and repair cycle time (approx 43 data items in all). (2) Item input furnishes data necessary to describe items which comprise the system. A separate item input is required for each unique item (i.e., unit, assembly and LRI in the system (see description, part 1, for continuation of inputs).

OUTPUTS: At the system or item level, 11 cost areas are printed with variable, fixed, and total costs. Also included are the system repair path, support equipment usage and sensitivity analysis. The 11 cost areas are inventory, storage space, transportation, materiel, labor, training, item entry, repair work space, support equipment, support equipment space, and support equipment support.

DOCUMENTATION AVAILABLE:
(1) MIL-STD-1390B,(NAVY) LOR, Appendix D; (2) MCLOR 1A, System User's Manual; (3) MCLOR 2A, Program Maint Manual; (4) MCLOR 3A, Computer Operation Manual, and (5) MCLOR 4B, Installation Manual.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN IV G	HP 1000/3000; UNIVAC;VAX 11 /780;IBM 360	CONCEPT D&V FSD P/D	A B D E H

REMARKS: Highly documented and widely used. Core size required is 256k bytes. Approx 3100 lines coding, 1 minute to execute.

APPLICATIONS:
All current Marine Corps Sys. HMMWV,LAV,CUCV,AN/TTC-42, SB-3865, PRC-68, AN/TPS-59

LSA TASK INTERFACE

202.2.1,2
203.2.3,5-7
204.2.1
205.2.1
303.2.1,3,4,7-9
401.2.1,5
403.2
501.2.3,5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Modular Life Cycle Cost Model (MLCCM)

PURPOSE: The MLCCM Master Control Program II is a design-oriented methodology for calculating the life cycle costs of advanced aircraft during the conceptual and engineering development phase of a system development program.

DESCRIPTION: The program provides engineers and designers with a tool for determining design alternatives, resulting in the most effective tradeoffs between costs and performance.

The MLCCM Master Control Program II predicts total costs for the RDT&E, Production, Support Investment, and the Operations and Support phases at the subsystem level of an aircraft. The cost visibility provided by this tool can be used in making long-range decisions to reduce life cycle costs.

The MLCCM program offers the user a matrix of life cycle costs for various aircraft subsystems.

The life cycle cost is divided into four phases: RDT&E; Production; Support Investment, and Operations and Support.

PROPONENT	**CURRENT USERS/POC**
Air Force Aeronautical Lab ATTN: AFWAL/FIA (N. Sternberger, Lt. Rusch) Wright-Patterson AFB, OH 45433 AV 785-5888, com (513)255-5888	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Modular Life Cycle Cost Model (MLCCM)

INPUTS: Number of months in life cycle, reference year dollar inflation cost factor, G & A percentage, profit percentage. A series of inputs to identify the aircraft and request the desired subsystem and life cycle phase.
Materiel weight distribution for seven materiels on four sections of the aircraft (wing, fuselage, tail, nacelle)

OUTPUTS: LCC subtotals divided into phases and LCC subtotals by subsystem. These phases are--

1. RDT&E.
2. Production.
3. Support Investment.
4. Operations and Support.

DOCUMENTATION AVAILABLE:
MLCCM for Advanced Aircraft Systems, Phase III-
Vol V: Methodology, AFWAL-TR 78-40, Jan 84; Vol VI: User's Manual, AFWA-TR 78-40, Jan 84.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN	CYBER 750,CDC 6500, CDC CYBER 74	CONCEPT	B C D E H

REMARKS: Distribution limited to US Government agencies only. Model is peculiar to avionics.

APPLICATIONS: F-16, F-15, A-10

LSA TASK INTERFACE

203.2.3
303.2.3,4

LSA TECHNIQUE INFORMATION SHEET
PART 1

TECHNIQUE: Mobilization Simulation Model (MOBSIM)

PURPOSE: The model provides an analytic method for HQ AMC and individual readiness commands to assess the capability of each mode in the central supply system to process its workload as a function of time and personnel, as well as, to describe the magnitude of the requisition workload.

DESCRIPTION: The model is a simulation of AMC's central supply system. The modeled elements include those which are directly affected by the flow of requisitions to support the field force. The requisitions (the system driver) flow into the system from the Defense Automatic Addressing System (DAAS), or are pre-positioned for mobilization or wartime. The model is designed to uncover choke points or nodes in the system which require manpower increases, facility expansion, policy changes or asset measures to provide the peace time or mobilization support expected of AMC or the MSC being evaluated.

PROPONENT	**CURRENT USERS/POC**
US AMSAA ATTN: AMXSY-FM (Mr. Schwartz) APG, MD 21005 AV 283-6617, com (301)278-6617	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Mobilization Simulation Model (MOBSIM)

INPUTS: Data groups in: (1) DAAS requisition; (2) prepositioned requisition; (3) CCSS processing cycles; (4) asset levels; (5) item manager labor availability, requisition processing time and labor requirement; (6) backorder, MRO distribution; (7) high and low dollar volume splits; (8) procurement labor availability; (9) production weight distribution; (10) delivery, procurement and administrative lead time; (11) depot receipt distribution and issuance capabilities, and (12) containerization, break bulk, motor, and rail distribution.

OUTPUTS: Outputs include, but are not limited to, (1) total weight shipped; (2) capability usage; (3) queue statistics; and (4) an output editor which can be written to streamline the output to the user's specifications.

DOCUMENTATION AVAILABLE:
MOBSIM Executive Summary (Vol I); MOBSIM User's Guide (Vol II).

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
GPSS level 1	IBM 4300 series, Look alike	CONCEPT D&V FSD P/D	H

REMARKS: 350k bytes and 420 CPU seconds to run as Batch process.

APPLICATIONS: Mobilization

LSA TASK INTERFACE

201.2.1
203.2.2,5
301.2.2
302.2.1,3,5
401.2.6
402.2.4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Level of Repair (MOD III, LOR), MIL-STD-1390B (Navy), Appendix A

PURPOSE: The MOD III LOR model is programed to fulfill specifications established by MIL-STD-1390B (Navy), appendix A. It is a mathematical procedure that recommends levels of repair for components of avionics equipment.

DESCRIPTION: It derives optimal (least-cost) LOR solutions in addition to presenting cost evaluations of prescribed LOR alternatives. The model is of the detailed accounting type; i.e., it computes various costs based on summing the detailed input cost data elements rather than using cost estimating relationships. The model seeks an optimum combination of maintenance decisions for each lower-indentured equipment module such that the total cost is minimum at the equipment (line replaceable unit, weapon replaceable assembly) and system level. The model accepts maintenance decision overrides for certain modules. The model has the ability to define and represent maintenance sites individually or collectively. The model also has the capability to represent multiple aircraft types individually at each site. Unique versions of the model are available for application to aircraft, ships, engines, ordnance, and electronic systems.

USERs:
Naval Aviation Logistics Center
ATTN: NALC-612 (Mr. Andreozzi)
Patuxent River, MD 20670
AV 356-4594, com (301)863-4594

PROPONENT	CURRENT USERS/POC
Naval Air Systems Command ATTN: AIR-41112A (Mr. Golembiowski) Washington, DC 20361 AV 222-0965, com (202)692-1632	US Army TACOM ATTN: AMSTA-HP (Mr. Moron) Warren, MI 48090 AV 786-8155, com (313)574-8155

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Level of Repair (MOD III, LOR), MIL-STD-1390B (Navy) Appendix A

INPUTS: Detailed description of maintenance requirements, support structure, and hardware characteristics; e.g., failure rates, removal times, unit costs, repair costs, support equipment, etc., is required. Additional data includes-- a. system program data (44-input parameters); b. site data (14-input parameters); c. item identification (5-input parameters); d. item characteristics (17-input parameters); e. manpower data (12-input parameters); and f. task data (24-input parameters).

OUTPUTS: The results of model runs are presented in six reports. Each report is several pages and their titles are-- a. Total Life Cycle Logistics Cost; b. Item Summary Report with Maintenance Scheme; c. Breakdown of Total Life Cycle Logistics Cost; d. Total Inventory Values; e. Technical Factors; f. Per Site Inventory Values; and g. Sensitivity Analysis Report.

DOCUMENTATION AVAILABLE:
(1) LOR MOD III, Release 3, User's Reference Manual NAVAIR, Jul 83. (2) MIL-STD-1390B (Navy), LOR Appendix A. (3) LOR MOD III, Tape User's Guide.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
Simscript II.5	IBM 360/370	D&V FSD P/D	A B C D E H J

REMARKS: Detailed input is required. The program is 6000 lines of coding. The execution time varies; average is 4 sec.

APPLICATIONS: TACOM Vehicles, Trailer-launched Bridge, Adv. Narrowband Digital Voice Terminal CV-3591, Tactical Digital Facsimile AN/UXC-4.

LSA TASK INTERFACE

203.2.3,5,7
205.2.1,5
303.2.1,3,7-9
501.2.3,5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Multiple Configuration Model (MULTICONFIG)*

PURPOSE: Modify the current LSAR ADP system from a single to a multiple configuration capability, in order to support Production Phase of the PATRIOT Program.

DESCRIPTION: The MULTICONFIG provides modifications to the LSAR system in five major areas. (1) Resources required to effect repair are stored to a file and executed for use with Task Code Narrative (TCNs). The TCNs will be compared to an approval wordfile to assure readability and identify required resources and maintenance significant items. (2) Workfiles are established to facilitate rework of existing system elements or creation of new ones. A rework file for ECPs in the Government Approval Cycle are frozen until the ECP is approved. (3) "OK" (approval) files are established for the latest approved version after extensive quality control checks. (4) Data management files are generated to provide the information necessary to control activities. A configuraton matrix file is created to identify specific configuration differences. (5) Configuration content is determined by end item/effectivity or part number/reference designator list.

NOTE: This model will not be necessary when the new DOD LSAR is out and operating. Therefore, it will not be contained in this guide when the DOD LSAR becomes available.

PROPONENT	**CURRENT USERS/POC**
PM PATRIOT ATTN: AMCPM-MD-S-SL (Mr. Kapolis) Redstone Arsenal, AL 35898 AV 742-3150, com (205)895-3150	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Multiple Configuration Model (MULTICONFIG)*

INPUTS: The LSAR data files and specific configuration changes.

OUTPUTS: Multiple alternative LSAR data files for different configurations.

DOCUMENTATION AVAILABLE:
Multiple Configuration Technical Specification (by contractor).

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
COBOL	IBM 370	CONCEPT D&V FSD P/D	A B C D E F G H J

REMARKS: Documentation is voluminous and provides a detailed description of progam execution.

APPLICATIONS:
The program is tailored to the Patriot system. Pershing is considering adopting this program.

LSA TASK INTERFACE

203.2.2-5
403.2

LSA TECHNIQUE INFORMATION SHEET

PART 1

TECHNIQUE: Network Repair Level Analysis Model (NRLA)

PURPOSE: The NRLA model is a deterministic analytic technique which computes life cycle costs associated with different repair level options (discard failed items, depot repair, and intermediate level repair) to aid the user in formulating maintenance plans.

DESCRIPTION: NRLA is different from previous Air Force ORLA methodologies. NRLA is supported by the AFLC/AFSC 800-4, Repair Level Analysis Procedures, 25 Nov 83. The significant advantages over the Air Force ORLA are-- (1) Recognizes LRU and SRU indenture level relationships and uses the information to preclude inconsistent decisions; e.g., discarding a failed LRU and doing base repair for SRUs within it; (2) Determines repair level recommendations simultaneously for all failure modes of a group of LRUs/SRUs; and (3) Support equipment required to accomplish LRU/SRU repair is considered to be a resource whose cost must be economically shared by the group of items requiring the resource and not prorated to the individual items in the group. The model determines the least cost level of repair for an entire weapon system. Also, sensitivity analysis is provided for LRU/SRU cost/LRU failure rate.

PROPONENT	**CURRENT USERS/POC**
US Air Force Logistics Command ATTN: AFALD/XRS (Mr. Briskin) Wright-Patterson AFB, OH 45433 AV 785-5089/5862 com (513)255-5089/4506	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Network Repair Level Analysis Model (NRLA)

INPUTS: Weapon system data (i.e., # bases, systems/bases, operating hours); Logistics data (i.e., labor rates, item transportation factors); Support equipment data (i.e., cost, availability); LRU and SRU factors (i.e., cost failure rate, repair time).

OUTPUTS: Input data; repair level decisions recommendations which minimize costs; detailed repair level costs; sensitivity analysis information.

DOCUMENTATION AVAILABLE:
(1) Network Repair Level Analysis User's Guide; AFALD/XRS, Feb 83. (2) Network Repair Level Analysis Programer's Guide; AFALD/XRS, Nov 81. (3) AFLC/AFSC 800-4, Repair Level Analysis Procedure, 25 Nov 83.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN IV	IBM 370	D&V FSD P/D	A B C D H

REMARKS:

APPLICATIONS:
MX Missile, LANTERN, F-5G

LSA TASK INTERFACE

203.2.5
204.2.1,3
205.2.2
302.2.1-5
303.2.1-3,7-9

LSA TECHNIQUE INFORMATION SHEET
PART I

TECHNIQUE: National Security Industrial Association Tradeoff Technique (NSIA TECH)*

PURPOSE: Method of ranking alternatives. The purpose of the technique is to rank alternatives based on opinions of different functional personnel involved with the system or area of interest.

DESCRIPTION: This technique is performed by the following steps: a. A document/questionnaire with a system list of alternatives, etc. is developed and appropriate weighting factors given to each factor; b. the document/questionnaire is distributed to associates in related areas without the associates knowing the weighting factors; c. responses are returned and are consolidated and weighted. Then the document with results of the first survey are sent to the associates again. The reviewers are again asked to review the document and based on the survey findings change any responses the reviewers would like to make from their first answer (this step is optional); and e. finally, the results are tabulated, weighted, and a decision is made based on those results.

PROPONENT	CURRENT USERS/POC
Private contractor proponent.	US ALMC ATTN: AMXMC-ACM (R. Taylor) Fort Lee, VA 23801 AV 687-4250, com (804)734-2498

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: National Security Industrial Association Tradeoff Technique (NSIA TECH)*

INPUTS: List of alternatives and factors plus their weights in each of the alternatives.

OUTPUTS: Numerical number which ranks the alternatives based on responses.

DOCUMENTATION AVAILABLE:
The technique is described in detail under Description, Part 1. This documentation, plus ALMC instructional examples, is all that is available on the technique.

AUTOMATION

YES NO * LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
		CONCEPT D&V	A

REMARKS: Used early on in the concept phase to establish scientific opinions of the system operational scenario.

APPLICATIONS:
Used as a teaching aid at ALMC in the LSA techniques in Matl Acq Course (ALMC-LR).

LSA TASK INTERFACE

101.2.1,2
102.2.1,2
201.2.1
202.2.1,3,4
203.2.5
303.2.1

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Operation and Support Costs Model (ONSCOSTS)

PURPOSE: To provide a computerized methodology for providing O&S costs.

DESCRIPTION: The ONSCOSTS model calculates the full gamut of O&S costs attributable to the earth-bound segment of a spacecraft system, exclusive of indirect costs of personnel support. ONSCOSTS was developed to expand the equations originally given in the Air Force Logistics Command, logistics support cost (LSC) model (LD# 31100) and supplements these equations to yield recurring costs matrixed as initial fixed costs. ONSCOSTS calculates annually recurring costs and service life total costs by 17 cost categories. ONSCOSTS will become a successor to the Logistics Support Cost-Repair Level Analysis program (LSC-RLA) (DLSIE LD# S1741 MA thru MC). ONSCOSTS includes the spares estimating and costing (SPARCOST) methodology, a patch onto ONSCOSTS for the estimation of mission spares and repair materiel costs.

PROPONENT	CURRENT USERS/POC
Air Force Space Division ATTN: AQL (Mr. Bruce or R. Roy) P.O. Box 92960 Worldway Postal Center Los Angeles, CA 90009 AV 833-1810, com (213)643-1810	Proponent also user/developer.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Operation and Support Costs Model (ONSCOSTS)

INPUTS: One data set defines one item of equipment/software at each of five levels of indenture: system, support equipment, subsystem, line replaceable unit, and software or program of firmware. Data values may be estimates which are firmed up as the program progresses.

OUTPUTS: Cost totals, cost details, statistic details, costs as percent, cost differences from basic, a single line (initial, annual, and total) of costs, or a single statistic. Up to 17 cost details and up to 12 statistics may be output, depending upon the command issued.

DOCUMENTATION AVAILABLE:
"User's Manual & Programer's Guide for the Operation and Support Cost Model" (DLSIE LD# 46242MA). In the process of updating the user's guide; will be completed in early summer 84.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN IV	Honeywell 635 IBM, CDC, GE, HP 3000.	CONCEPT D&V FSD P/D	B C D H

REMARKS: Minimum storage required: 36K Bytes. Number of Program Statements: 3600.

APPLICATIONS:
1) Shuttle Orbiter Cntrl Cntr;
2) Integrated Operational Nuclear Detonation Detection Sys;
3) GAIT

LSA TASK INTERFACE

202.2.1
203.2.3
205.2.1,5
302.2.1
303.2.5
402.2.1

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: ORACLE-MARC

PURPOSE: To develop failure rate and cost-to-repair models such that reliable estimates of the failure rate and repair/replacement costs of fielded systems can be generated based on information available during advanced development or at full-scale development.

DESCRIPTION: ORACLE consists of two models--
MARC I - To project failure factors for electronic assemblies (PCBs).
MARC II - To project repair costs for electronic assemblies in depot/contractor facility.

PROPONENT	CURRENT USERS/POC
US Army CECOM ATTN: AMSEL-SM-P-PL (Mr. Kasian) Fort Monmouth, NJ 07703 AV 992-3176, com (201)532-3176	No users at present; the model has only been available since Sep 83.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: ORACLE-MARC

INPUTS: (1) Assembly data - Name/PN; Qty/System; Functional category; RF Front End, Digital, Analog, etc.; Surface Area; Test/troubleshooting method; Auto, manual, semiauto; Device packaging; Dip, flat pack, etc.; Quality of parts; Mil spec or not. (2) System data - System name, Operating environment; Ground mobile airborne, etc.; operating hours/year; beginning and ending density; System BITE: yes/no; Intermediate screening: yes/no. MARC II - Management reserve (%), contractor fee (%), cost escalation (%), cost of facilities ($/sq ft/yr).

OUTPUTS: MARC I: Generic parts list/assembly; Intrinsic Failure Rate (Mil-Std-217); Projected failure factor; Number of assemblies arriving at depot; Assembly unit cost; File for cost model (MARC II).

MARC II : (1) Total Management Cost.
(2) Total Repair Cycle Cost.
(3) Total Materiel Cost.
(4) Total Facilities Cost.

DOCUMENTATION AVAILABLE:

(1) ORACLE-MARC MODEL, 21 Sep 83.
(2) ORACLE-MARC Software Maintenance Guide, 21 Sep 83.
(3) ORACLE-MARC User's Guide, 21 Sep 83.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
BASIC	IBM PC with 5 1/4" floppy disc.	D&V FSD P/D	A B C D E H

REMARKS: Hardware required also includes IBM DOS 2.0 interface and a suitable system printer.

APPLICATIONS: No applications yet. The documentation has just been completed Sep 83. Applications are planned on CECOM items.

LSA TASK INTERFACE

401.2.3
403.2

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Optimum Repair Level Analysis (ORLA)-MICOM Version

PURPOSE: To evaluate the should-cost tradeoffs associated with factory repair versus theater repair and discard options at the Battalion Replaceable Unit (BRU) level. Can be used throughout a system development process to develop and validate estimates of support and logistics costs.

DESCRIPTION: The ORLA methodology was developed by the USAF and adapted to Army terminology for use on MICOM projects. The model is written in HP ENHANCED BASIC and was implemented on an HP9830 desktop computer. The model evaluates alternative support plans at the LRU level identifying the alternative with the lowest life cycle cost. The least cost alternative automatically undergoes a sensitivity analysis. Based on the costs of the support alternatives and the sensitivity analysis an optimal repair or discard level is recommended.

CAUTION: This model contains the same outdated algorithms, as does GEMM, for stockage predictions. GEMM is being phased out in favor of OSAMM which provides more accurate stockage predictions.

USERs:
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(Ms. Garret)
Redstone Arsenal, AL 35898
AV 746-1291, com (205)876-1291

PM AAH
ATTN: AMCPM-AAH-LM
(Mr. Hoecker)
4300 Goodfellow Blvd
St. Louis, MO 63120
AV 693-1946, com (314)263-1946

PM FVS
ATTN: AMCPM-FVS-LM
(Mr. Livingston)
Warren, MI 48090
AV 786-8248, com (313)574-8248

PROPONENT
US Army MICOM
ATTN: AMSMI-NS (Ms. Pea)
Redstone Arsenal, AL 35898
AV 746-3561, com (205)876-3561

CURRENT USERS/POC
US Army BRADC
ATTN: STRBE-DL (Ms Woodsinger)
Fort Belvoir, VA 22060
AV 354-5071, com (703)664-5071

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Optimum Repair Level Analysis (ORLA)-MICOM Version

INPUTS: Input data requirements are moderate. Includes labor rates, technical data costs, shipping costs, MTBCT, salvage costs, and maintenance costs. Input data elements are varied from 20% to 300% one at a time. If a repair level decision change occurs, then the point of change is printed out along with the penalties at that point.

OUTPUTS: Output data consist of an economic analysis for the repair level decision. Included are the cost penalties on a life cycle cost breakdown for discard costs, DS/GS costs and factory repair costs.

DOCUMENTATION AVAILABLE:
(1) Life Cycle Cost Analysis of the PATRIOT ORLA (DLSIE LD# 46515MA) and (DLSIE LD# 46515MB). (2) AFLCM/AFSCM 800-4, ORLA, 25 Jun 71. (3) ORLA User's Guide, MICOM, W. Prestwood, 25 Mar 83.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
BASIC,HP ENHANCE	HP9830, HP125 IBM4800,3033, HP1000	CONCEPT D&V FSD P/D	A B C D

REMARKS: Small enough to run on "desktop" computers with 16K user workspace.

APPLICATIONS: PERSHING II, PATRIOT,TOW/COBRA, MLRS, NORTH FINDING MODULE, AAH-64, AN/TRQ-32, AHIP, SHORAD C2.

LSA TASK INTERFACE

204.2.3
205.2.2
302.2.1-4
303.2.1,7,8

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Optimum Supply and Maintenance Model (OSAMM, also known as OATMEAL)

PURPOSE: To perform optimal repair level and sparing analysis to meet an Ao target. OSAMM describes where to remove and replace components and modules, place test equipment and skilled manpower, and where to stock and how much.

DESCRIPTION: OSAMM is an optimization model with a mixed interger linear program to determine best multiechelon stockage, TMDE, and maintenance policy decisions.
Computes a steady state cost converted to present value. Maintenance policies can be constrained (25 maintenance policies are available. All or most are typically considered in a single run). Stockage and maintenance policies are found simultaneously to achieve a weapon system target availability at least cost. Decisions are made by application (failure mode). System peculiar TMDE and manpower are allocated in integer amounts to the echelon.
Extensive sensitivity analyses could be expensive. But a backend evaluator allows quick analyses of changes to backorder penalties and to individual component policies. Evaluator also bypasses mixed integer LP optimizer when maintenance policies are tightly constrained across many components.
A symmetrical support structure is assumed. Two indentures (LRU, module, with piece part costs considered by averages by module) are modeled. The weapon system availability target can be met using a special search subroutine.
A SESAME subroutine finds multiechelon stockage.

NOTE: OSAMM and Optimal Allocation of Test Equipment/Manpower Evaluated Against Logistics (OATMEAL) are one in the same model. OATMEAL is the perferred name by the developer (IRO) and OSAMM by the proponent (CECOM).

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PROPONENT	**CURRENT USERS/POC**
US Army CECOM ATTN: AMSEL-PL-E (Mr. Plumeri) Fort Monmouth, NJ 07703 AV 992-5170, com (201) 532-5170 Proponent also user.	US AMSAA IRO ATTN: AMXSY-LIRO (Mr. Kaplan) Room 800, US Custom House Philadelphia, PA 19106 AV 444-3808, com (215)597-8377 IRO also developer.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Optimum Supply and Maintenance Model (OSAMM, also known as OATMEAL)

INPUTS: By weapon system component & module costs including requisition, holding; transportation costs; test equipment costs, thruputs; failure rates by application; supply system data (as in SESAME); component and module unit price and weight; operational availability target; MOS skill levels and labor rates; and policy constraints.

OUTPUTS: Maintenance and replacement task distributions (where to repair/replace) by component and module; number and placement of each type of TE and MOS; multiechelon stockage quantities; throwaway decisions; and operational availability of system.

DOCUMENTATION AVAILABLE:

(1) Optimal Allocation of TE/Manpower Evaluated Against Logistics Model-AMSAA IRO report; Feb 83.

(2) Optimal Supply & Maintenance Model Users Guide-CECOM Plans, Concepts & Evaluation Directorate, Aug 83.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
FORTRAN	CDC 6600	D&V FSD P/D	A B C D E F G H J

REMARKS: Uses APEX III LP library package, which is available on private entity CDC computer time-sharing.

APPLICATIONS: AN/USQ-86 (MICNS), SINCGARS-V

LSA TASK INTERFACE

201.2.1
203.2.2-5,7
204.2.1
205.2.1
302.2.1-4
303.2.1-7
401.2.5
501.2.5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Operating and Support Cost Model (OSMOD)

PURPOSE: The OSMOD program is used to compute the O&S portion of the life cycle cost matrix for a single item of equipment or for a system.

DESCRIPTION: This model is designed to calculate O&S cost for a single item of equipment or for a system. Input sources include the Army Force Planning Cost Handbook (AFPCH), Materiel Systems Requirements Specifications (MSRS), and Military Occupational Specialty (MOS) Training Cost Handbook. Data from the AFPCH are stored in the program. Data from the MSRS are entered on an input form by the user prior to running the program. The user has the option of processing all or some of the cells, but some cells are contingent on others. This model conforms to DA Pam 11-4, Operating and Support Cost Guide for Army Materiel Systems.

PROPONENT	CURRENT USERS/POC
US Army CECOM Comptroller's Office ATTN: AMSEL-CP-CA-SS (J. Carroll) Fort Monmouth, NJ 07703 AV 995-2051, com (201)544-2051	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Operating and Support Cost Model (OSMOD)

INPUTS: Number of years of operation; POM deployment; reserve deployment; reserve factor; training deployment; training factor; and all parameters required to perform calculations found in DA Pamphlet 11-4.

OUTPUTS: (1) Computation of operational units by theater and year over life of cycle; (2) Printout of costs for each cell by theater and year; (3) Breakout of costs per equipment by elements specified in DA Pamphlet 11-4; and (4) Breakout of costs in constant dollars by appropriation, time-phased over life of cycle.

DOCUMENTATION AVAILABLE:
DRAFT-Computerized O&S Cost Model; Guide to O&S Model Input Form; O&S Computerized Cost Model Input Form.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
BASIC	HP 9845B	D&V FSD P/D	B C D H

REMARKS:	**APPLICATIONS:**
	MTCC-Modular Tactical Communication Center; IMF-Improved Message Facility; AN/TRC-170; AN/TPC-39

LSA TASK INTERFACE

203.2.3
205.2.1

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Page Estimating Model (PAGES)

PURPOSE: To estimate the quantity and type of pages for non-troubleshooting and troubleshooting activities at the flightline and in the shop. It can make page estimates for conventional and task-oriented manuals of both electronic and mechanical/hydraulic systems.

DESCRIPTION: PAGES is comprised of two subroutines, each with its own set of algorithms. The algorithms are unique to an equipment category; hence, one set of algorithms is for electrical and another for mechanical/hydraulic systems. The user selects the appropriate algorithm by answering a user prompt question with the identification of the type of system under analysis, either electrical, mechanical, or both. The major variables in each of the algorithms are number of subsystems, line replaceable units (LRUs), and shop replaceable units (SRUs) in the system under analysis.
PAGES operates on the assumption that the technical manual page requirements are directly proportional to the number of subsystems, LRUs and SRUs comprising the system of interest. The proportional factors reflect the equipment characteristics at the timeframe of the algorithm development. The factors cannot be adjusted by the user to account for differing equipment complexity level. This area must be considered when contemplating the use of PAGES.
The following example involves the algorithm developed to predict the content of a fault isolation manual to support the task-oriented approach to flightline troubleshooting. This algorithm determines the number of maintenance actions, pictorials, and schematics as a function of the number of subsystems and LRUs. In this case: number of PAGES = 2 fault isolation charts/subsystems + 2 fault isolation charts/LRU + 1/2 page narrative/LRU + 2 access line art/LRU + 2 fault isolation schematic block/subsystem + 1 fault isolation schematic flow/LRU.
The PAGES model provides estimates for 12 different page types. The PAGES model could be adapted to Army use if proportional factors mentioned above were developed based on Army historical data rather than Air Force historical data.

PROPONENT	CURRENT USERS/POC
Air Force Human Resources Lab ATTN: AFHRL-LRC (Mr. Boyle) Wright-Patterson AFB, OH 45433 AV 785-3771, com (513)255-2606	Proponent also user. Air Force Human Resources Lab ATTN: AFHRL-LRA (Ms. Preidis) Wright-Patterson AFB, OH 45433 AV 785-3871, com (513)255-6718

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Page Estimating Model (PAGES)

INPUTS: Type of system: Electrical or Mechanical/hydraulic also, number of LRUs and SRUs in the subsystem.

OUTPUTS: Estimates number of pages for 12 different page types which are as follows: (1) narrative; (2) half-tone art; (3) half-tone explosion; (4) electronic line art; (5) exploded line art; (6) fault isolation chart; (7) fault isolation schematic block; (8) access line art; (9) fault isolation schematic flow; (10) fault isolation schematic mechanical/hydraulic; (11) job guide narrative; and (12) job guide illustrations.

DOCUMENTATION AVAILABLE:
ASSET User's Guide, 7 Aug 82.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
FORTRAN V	Cyber-74 CDC-6600	CONCEPT D&V FSD P/D	NONE APPLY

REMARKS: PAGES can be run separate or as part of the ASSET methodology.	**APPLICATIONS:** F-16, B1 Bomber

LSA TASK INTERFACE

401.2.3

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Repair vs. Discard Model (PALMAN)

PURPOSE: To compare life cycle support costs associated with a specified repair policy versus discard of individual equipment assemblies. -

DESCRIPTION: Computer analysis is used to compile a life cycle support cost summary for a single assembly given variable input data. The model considers the variables associated with repair versus discard and does not address fixed costs. Only one assembly can be analyzed per computer run. The PALMAN model is menu-driven and user friendly. The model is made up of two programs; one called ROSE, which is the original PALMAN model that has parametric analysis (sensitivity analysis), and one called Cost, which has the parametric analysis plus an optimum cost (where throwaway cost equals repair cost) feature which is determined by the bisect root finding method. The menu allows you to choose either program plus it has an option to plot out the results from the cost program. You can easily change as many variables as is desired to analyze how they effect the output. The model can be run repetitively in a short period of time. PALMAN has been revised by the proponent to expanded sensitivity analysis, initial provisioning, and better user interactive operation. The revised PALMAN model is called Interactive PALMAN Model (IPM).

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PM Sgt York
ATTN: AMCPM-ADG-LR(R)
(Mr. Wasson) (Developer of IPM)
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PROPONENT

US Army AMCCOM
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(Mr. Shepherd)
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CURRENT USERS/POC

Proponent also user.
US Army AMCCOM
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Repair vs. Discard Model (PALMAN)

INPUTS: There are approximately 13 standard input variables which can be changed by the use of the user friendly menu. There are also 13 user input variables which are required. The user input variables include cost of replacement assembly, repair time, repair parts cost, number of unique parts, development costs of test equipment, procurement costs of test equipment, failures per million hours, manuals pages, training time, number assemblies per end item, number of end items, operating time, and number of personnel trained per year.

OUTPUTS: There are three output formats which will be generated when the program is executed. (1) life cycle cost comparison for repair versus discard; (2) analysis of repair policy cost per failure (develops the percentage that a particular factor has on the overall cost for a failure such as labor cost; cost of replacement assembly); and (3) a parametric analysis for each of six cost factors (which is automatically varied over a predetermined range). The last output which can be obtained is a plot of the optimum points where discard and repair costs are equal.

DOCUMENTATION AVAILABLE:
Interactive PALMAN Model Users Guide, 21 Jun 84.
Program listing also has extensive comment cards.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
FORTRAN IV	UNIVAC 1108/ 1100; DEC VAX 11/780;PRIME	CONCEPT D&V FSD P/D	A B C D E H

REMARKS: The graph version of the model uses EZGRAF (similar to plot 10) which is on PRIME only. Approx 700 lines coding.

APPLICATIONS:
AN/TSQ-73, TACFIRE, PERSHING II PATRIOT, XM81, XM22, XM17, XM85 XM86, M3A3, SM21, XM16, SM52

LSA TASK INTERFACE

203.2.5,6,7
205.2.1
303.2.1,7

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: PERSHING O&S Cost Model (PERSHINGONS)*

PURPOSE: To quantify manpower and O&S costs resulting from technological improvements.

DESCRIPTION: The PERSHINGONS model provides a tool to evaluate or determine the O&S costs for any defined PERSHING system configuration. In providing this capability, new system design candidates can be compared with each other or compared to the existing system. This allows the evaluation of a proposed system or design change to an existing system early in the process by determining the operating and support cost for the candidate system.

The printed cost outputs provide the means to determine the costs of the selected system candidate in any or all of the cost categories associated with the operation and support of a unit. The model logic not only provides the cost output but also computes the maintenance personnel requirements for a described unit when the equipment requirements for the unit are provided. In order to compute the maintenance personnel requirements and provide the cost outputs for a unit, the TOE/MTOE structure for the organization must be defined and input into the model.

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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: PERSHING O&S Cost Model (PERSHINGONS)*

INPUTS: Numerous system, hardware, support related data elements such as: TOE/MTOE structure, costing time period, number of deployed battalions; firing batteries per battalion, and number of firing batteries.

OUTPUTS: O&S costs and maintenance personnel requirements.

DOCUMENTATION AVAILABLE:
PERSHING Operating and Support Cost Model Final Report, Volume 1-6; Volume 1, 30 Nov 79; Volume 2-6, 31 Oct 77; Supplement to Volume 1-6, 30 Nov 77.

AUTOMATION

YES * NO	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
LANGUAGE			
FORTRAN	IBM 3033,	D&V FSD	A B C D E
	CYBER	P/D	

REMARKS: The executable load module requires 31,632 bytes of computer core storage. Very long data hungry program.

APPLICATIONS: Pershing II, Patriot

LSA TASK INTERFACE

203.2.3
205.2.1

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Personnel Requirements Analysis Model (PRAMOD)

PURPOSE: To determine personnel and training needs imposed on a military establishment due to the fielding of a new system over a period of years.

DESCRIPTION: Based on projected TO&E requirements and attrition rates of an appropriate set of MOSs, all personnel and training pipeline requirements are computed and displayed by program year. The PL/1 program loops on variants, program years, MOS, and finally, MOS courses. Eight output reports yielding information on the ILS personnel and training burdens imposed by the new system are provided. For example, facility requirements, training facility and staff requirements, training costs, training pipelines, and salary costs can be obtained from the output. Convenient executive summary reports are available. The program is written in PRIME PL/1, subset G, and may be adapted to any system offering a PL/1 compiler.

PROPONENT	CURRENT USERS/POC
US Army TACOM ATTN: AMSTA-HC (Dr. Brierly) Warren, MI 48090 AV 786-8155, com (313)574-8155	Proponent also user/developer.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Personnel Requirements Analysis Model (PRAMOD)

INPUTS:
1. TO&E numbers of MOS.
2. Training course data.
3. Program production schedule.
4. Training facilities data.
5. Attrition rates for MOSs.

OUTPUTS:
1. Training pipelines.
2. Facilities and quarters requirements.
3. Detailed program costs.
4. Facilities staffing needs.
5. Personnel requirements.

DOCUMENTATION AVAILABLE:
PRAMOD Automated User's Guide, TACOM, Feb 82.
USMC LAV, Manpower Personnel, and Training Assessment, May 82. Volume 1-2, by TACOM.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
PL/1 Subset G	IBM 360 PRIME	D&V FSD	C E F G

REMARKS:	APPLICATIONS:
	Light Armored Vehicle (LAV)

LSA TASK INTERFACE

205.2.1
303.2.1,4,5
401.2.1,3,4
402.2.1,2

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Programed Review of Information for Costing and Evaluation (PRICE)

PURPOSE: The PRICE model is a computerized method of deriving cost estimates of electro-mechanical hardware assemblies and systems.

DESCRIPTION: PRICE is a family of cost predicting models. The basic PRICE model (sometimes called PRICE H) predicts development and production costs for proposed electro-mechanical devices or systems while they are still in the concept stage. PRICE has been in development over the last 15 years and has been available for general use since Aug 75.

PRICE HL, (also known as PRICE L), the PRICE Life Cycle Cost Model, is a supplement to and operates in conjunction with the basic PRICE model to rapidly compute support costs for many varieties of systems.

PRICE S, the PRICE Software Model, applies the PRICE parametric modeling methods to the problems of computer software costing. It is designed to cover the complete range of systems and applications programing.

PRICE SL estimates the cost for support computer software during its operational life-cycle.

All PRICE models are exercised interactively through commercial time-sharing computer networks. Comprehensive training courses for the users are provided at the proponents plant. After completion of the course, users operate the model from their own location under strict computer security procedures.

Included in this family of models are also PRICE M, A, and D which are microcircuit cost estimating and supporting models, respectively.

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PROPONENT	CURRENT USERS/POC
Private contractor proponent.	US Army ERADCOM ATTN: AMDEL-PO-IL (LTC Lartique) 2800 Powder Mill Road Adelphi, MD 20783 AV 290-3557, com (202)394-3557

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Programed Review of Information for Costing and Evaluation (PRICE)

INPUTS: PRICE H: electronics weight; mechanical/structural weight; densities; volume; quantity; amount of design repetition.
PRICE HL: unit MTBF; unit and module repair times; hardware costs, quantities and learning curves; cost of test equipment; number of modules and parts per unit; number of maintenance locations; transportation, stockage, labor rates, scrap, and maintenance concepts.

OUTPUTS: PRICE H: Engineering and manufacturing costs; development and/or production schedule; economic basis of the costs, and uncertainty measures on the cost.
PRICE HL: life cycle costs; availability and readiness; location and number of test equipment sets, and total cost.

DOCUMENTATION AVAILABLE:
PRICE Parametric Cost Models - An Executive Guide.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN IV	PRICE Time-sharing Service	CONCEPT D&V	A B C D E

REMARKS: Due to proprietary nature of this model it is only accessed through the contractor's time-sharing network.	**APPLICATIONS:** DIVAD Gun System, SINCGARS, AN/TPQ-37, AN/MLQ-34, AFATDS, MSCS, Stingray, PLRS, SCOTT

LSA TASK INTERFACE

203.2.3,5
205.2.1,2
302.2.2,4
303.2.1,2,5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: TRADOC/DARCOM Pamphlet 70-11, RAM Rationale Annex Handbook (RAM Handbook)*

PURPOSE: To provide general guidance in the development of RAM requirements or the RAM Rationale Annex.

DESCRIPTION: TRADOC/DARCOM Pamphlet 70-11 gives general guidance in the development of RAM requirements or the RAM rationale annex. A RAM rationale annex is required to be prepared for every LOA, TDLOA, ROC, LR, TDR, or TDLR. The RAM Handbook outlines how to develop a RAM rationale annex by providing guidance on development of operational mode summary/mission profiles, failure definitions and scoring critera, RAM parameters, historical RAM data base, rationale for selection of the best operational capability values for the RAM parameters, and minimum acceptable value for RAM parameters. The handbook also provides guidance on the LSA/LSAR interfaces.

PROPONENT	CURRENT USERS/POC
US Army Log Center ATTN: ATCL-MR Fort Lee, VA 23801 AV 687-2360, com (804)734-3659	Proponency shared by: US AMC ATTN: AMCQA-E 5001 Eisenhower Ave Alexandria, VA 22333 AV 284-8919, com (202)274-8920

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: TRADOC/DARCOM Pamphlet 70-11, RAM Rationale Annex Handbook (RAM Handbook)*

INPUTS: Operational scenario data are required which include predicted RAM parameters, ALDT, PM time, OT, standby time, maintenance time, maintenance ratio, and historical data on ALDT.

OUTPUTS: Operational RAM data for both wartime and peacetime.

DOCUMENTATION AVAILABLE:
RAM Rationale Annex Handbook, TRADOC/DARCOM Pamphlet 70-11, 1 Jul 82.

AUTOMATION

YES NO * LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
		CONCEPT D&V	A B

REMARKS:	APPLICATIONS:
	All Army systems require a RAM Rationale Annex IAW AR 702-3, Army Materiel Systems RAM.

LSA TASK INTERFACE

201.2.2
203.2.1-5
205.2.3,5

LSA TECHNIQUE INFORMATION SHEET
PART 1

TECHNIQUE: Reliability Centered Maintenance (RCM)

PURPOSE: To apply decision logic analysis to translate failure mode, effects and criticality analysis (FMECA) data into specific maintenance requirements in the form of scheduled and unscheduled maintenance tasks designed to retain inherent equipment safety and reliability levels at the lowest life cycle cost.

DESCRIPTION: A decision logic that is uniquely designed to focus on identification of maintenance alternatives which subsequently are translated into a cost-effective maintenance plan. The decision logic considers four basic areas: (1) criticality relating to safety and reliability of the item and each of its potential failure modes; (2) status or regulation that govern interference with other equipment or the environment; (3) economics of preventive maintenance versus corrective maintenance, and (4) detection method potential addressing the capability of the operator/crew or maintenance personnel and test equipment to detecting degradation. The logic results lead to one of the following requirements: (a) on-condition or scheduled inspections or tests designed to measure deterioration; (b) hard time or scheduled removal tasks at predetermined intervals of age or usage; (c) condition monitoring or unscheduled tasks where components allowed to degrade/fail during normal operation, and (d) system/component redesign.

USERs:
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US Army AMCCOM
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PROPONENT
US AMC MRSA
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Proponent also developer.

CURRENT USERS/POC
PM Fighting Vehicle System
ATTN: AMCPM-FVS-LM
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LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Reliability Centered Maintenance (RCM)

INPUTS: Maintenance significant items; failure mode, effects and criticality analysis; and fault detection and isolation data. Field experience information is used to verify the analysis.

OUTPUTS: A maintenance workload that is reduced to the minimum essential level (per state of the art) sufficient to retain inherent safety and reliability levels designed into the equipment.

DOCUMENTATION AVAILABLE:
(1) Draft DARCOM-P 750-16, Appx C(RCM), Apr 84.
(2) DA PAM 750-40, Guide to RCM for Fielded Equip, May 82.
(3) AR750-1, 15 Apr 83. (4) DARCOM-R 750-8 Impl of RCM, 9 May 80.
(5) DARCOM-R 750-9 RCM-Application for DMWRs, 5 Oct 83.

AUTOMATION

YES NO * LANGUAGE	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
		D&V FSD P/D	B C

REMARKS:	**APPLICATIONS:**
	All Army equipment which includes: FVS, Pershing II, LACV-30, AN/TYC-39, SAW, FAASV, FISTV plus several more.

LSA TASK INTERFACE

301.2.4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Learning Curves Applied to Reliability Growth Forecasting and Assessment (REL GROWTH)*

PURPOSE: To forecast and assess reliability growth.

DESCRIPTION: This model uses the methodology of DARCOM-P 702-4 to predict reliability growth or assess reliability growth from test data via learning curves. REL GROWTH affords a reliability growth analysis that forecasts the growth curves required to achieve a desired minimum acceptable value (MAV) of a system, MTBF/a predicted value (PV) of MTBF. These growth curves are based on the assumption that the failure rate of the system will decay or grow by a constant percentage that equals the slope of the growth curve each time the cumulative number of test hours doubled. It is further assumed that the forecasted curve for the MAV passes through the MAV point at the end of testing just as the learning curve for predicted growth passes through the PV point at the end of testing. The model is interactive and was designed for use on an HP 9845B.

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US Army BRADC
ATTN: STRBE-DL
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Fort Belvoir, VA 22060
AV 354-5071, com (703)664-5071

PROPONENT	CURRENT USERS/POC
US Army MICOM ATTN: AMSMI-SL (Mr. Lawler) Redstone Arsenal, AL 35898 AV 746-5807, com (205)876-6807	PM PERSHING ATTN: AMCPM-PE-S (Ms. Garrett) Redstone Arsenal, AL 35898 AV 746-1291, com (205)876-1291

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Learning Curves Applied to Reliability Growth Forecasting and Assessment (REL GROWTH)*

INPUTS:

A. Forecasting Data:
   (1) A point on the learing curve.
   (2) The slope of the curve.
B. Assessment Data:
   (1) Number of systems in test.
   (2) Identifier for each system failure.
   (3) Elapsed time for each system failure.
   (4) Time of test termination.

OUTPUTS: Prediction of the reliability growth curve denoted by a MTBF equation in terms of time. Also, the initial MTBF forecasts for the predicted and MAV curves. A negative exponent of time denotes reliability growth and a positive exponent of time denotes reliability decay.

DOCUMENTATION AVAILABLE:
(1) Learning Curves Applied to Reliability Growth Forecasting and Assessment, 26 Nov 82.
(2) DARCOM-P 702-4.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
HP Enhance BASIC	HP 9845B	CONCEPT D&V FSD	B C

REMARKS:	APPLICATIONS:
	PERSHING II, Patriot, MLRS, Improved Hawk, LACV-30

LSA TASK INTERFACE

201.2.2
203.2.3

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Repair/Replacement Optimization Model (REPSIM)

PURPOSE: This model initially was developed to simulate the life cycle of a tactical wheeled vehicle fleet and then compare various replacement models relative to cost when applied to the same wheeled vehicle fleet. REPSIM yields the best maintenance expenditure for minimizing costs in operating equipment.

DESCRIPTION: The objective of this Monte Carlo simulation model (repair/replacement optimization models) is to find the replacement model which will minimize cost per usage for maintaining a fleet of equipment. The simulation consists of a succession of mile nodes; each represents a specified segment in the life cycle of an equipment. Usage for any given vehicle for a year is determined randomly from known usage patterns of similar equipments. It is assumed no more than one repair action can occur in a given segment. As the equipment goes through each node, a random function causes it to go into the repair mode where a repair may or may not be required. If repair is required, then another random function generates a repair cost based on frequency distribution of repair costs. Then, the simulated unit of equipment through one of the 10 replacement models (previously designated by the user) which determines whether to repair or scrap the equipment using the replacement models decision actions. Each piece of equipment goes through this using a given replacement model and then the procedure can be repeated for each of the 10 replacement models encompassed by REPSIM.

PROPONENT	**CURRENT USERS/POC**
US Army TACOM ATTN: AMSTA-HC (Dr. Brierly) Warren, MI 48090 AV 786-8155, com (313)574-8155 Proponent also developer/user.	US Army AMCCOM ATTN: AMSMC-SC-SA(D) (Mr. Trifiletti) Dover, NJ 07801 AV 880-6020, com (201)742-6020

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Repair/Replacement Optimization Model (REPSIM)

INPUTS: The input requirements are basically in two parts: (1) System under analysis information approximately 21 inputs; i.e., number vehicles simulated, repair costs inflation factor, etc.; (2) Probability parameters which accounts for a large part of the required input. These include probability repair costs, failure rate, fatal failure, e

OUTPUTS: The output will provide an average vehicle miles for the fleet, average cost per mile for operating the fleet, replacement cost sensitivity analysis, and year mileage sensitivity analysis for each or all of the 10 replacement models dependent on how many runs are made with the program.

DOCUMENTATION AVAILABLE:
Rating Vehicle Repair/Replacement Strategies by Computer Simulation, by Dr. Brierly, TACOM, Nov 82 (User's Manual). TACOM User's Manual, Mar 84.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN IV	IBM 360,PRIME	CONCEPT D&V FSD P/D	A E H

REMARKS: In the process of updating the documentation. There are approximately 1400 lines of coding.

APPLICATIONS:
UH-60A; SAW; M130; XM131/132; GEMSS; VOLCANO, XM139; FLIPPER, XM138; WASPM, XM84

LSA TASK INTERFACE

201.2.2
202.2.2,3
203.2.2,5,7
205.2.1-3,5
303.2.1,2,11
402.2.3,4
403.2
501.2.2,3,5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Return to Combat (RETCOM)

PURPOSE: This model is designed to provide information on RAM of ground elements in either a peacetime or wartime environment. The model considers losses due to both combat damage and system failure, as well as lack of maintenance resources (manpower, tools and test equipment, and administrative delays).

DESCRIPTION: RETCOM is a stochastic event oriented model which simulates the operation of single system type (e.g., M1 tank, ammunition haulers) belonging to a peacetime or combat force engaged in a series of activities and missions (e.g., offense, rearm/refuel, defense, road march, retrograde, gunnery training, etc.). During the performance of these missions, the systems in the force are allowed to incur mission-abortive combat damage (if wartime), machanical failure, and deferred maintenance including PM, and to be repaired and returned to the force. Data requirements include: a description of the maintenance and logistics assets used to support the system; and a description of the force structure and a time-ordered list of activities the force is to perform. The model requires about 40,000 words of storage, on the Sperry 1100/82 computer plus data. The model outputs a summary for each case describing the amount of system time spent in action, available but not required, failed, being repaired, and waiting for maintenance or logistics assets. A full maintenance action history can also be generated.

PROPONENT	CURRENT USERS/POC
US Army TRADOC System Analysis Activity (TRASANA)	US Army Armor School
ATTN: ATOR-ATAA-TEM (Mr. Wing)	ATTN: ATSB-CD-SD (Mr. Vowels)
White Sand Missile Range, NM 88002	Fort Knox, KY 40121
AV 258-2826, com (505)678-2826	AV 464-3776/3648 com (502)624-3776/3648

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Return to Combat (RETCOM)

INPUTS:
1. Combat damage over time.
2. Mission profiles over time.
3. Maintenance organizations.
4. Administrative logistics down time for parts.
5. RAM data for sytems of interest.

OUTPUTS:
1. Parts required.
2. System failures.
3. Maintenance manpower requirements.
4. Operational availability.

DOCUMENTATION AVAILABLE:
User documentation is available on TRASANA computer which includes: Model Description, Model Design Documentation, User Manual, Program Listing, Programer's Manual, Sample Input and Output.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
SIMSCRIPT II.5	UNIVAC 1182	CONCEPT D&V	
	UNIVAC 1108	FSD P/D	B D

REMARKS:	APPLICATIONS:
	M1

LSA TASK INTERFACE

302.2.3
303.2.4,11

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Readiness Indicator Model (RIM)

PURPOSE: RIM reflects the impact on unit fill resulting from distribution and redistribution of major end items, in order to meet prioritized time-sensitive requirements following mobilization.

DESCRIPTION: RIM enables the planner to rapidly analyze the Army's capability to simultaneously fill deloyment requirements, training base requirements, and overseas requirements with on-hand and near-term assets. Authorized fill levels, deployment schedules and priorities for various claimants can be varied and the impact assessed by the model. RIM considers all the scenario assets and fill requirements and allocates the assets in accordance with planner input fill priorities. RIM structures time-phased requirements generated by the training base, forward deployed units, deploying units, sustaining base (CONUS nontraining base units), and replacement needs of deployed units. Assets are matched against these requirements. The type of fill for each detail claimant is computed. When the asset in the unit is excess, it is placed in a pool for redistribution. When the asset in a unit is in a shortfall status, it is filled in priority from the pool. When the asset in the unit is filled, it is not affected by RIM. One of the outputs of RIM is the C-rating status (based on AR 220-1) of each unit, when it deploys. The distribution of C-ratings can be used in assessing that portion of the force that would not deploy because of a C-rating less than adequate and also the impact of cross-leveling. RIM can be used to support the planner. Since RIM is a simulation model, policies, in the form of parameters, can be varied to assess the sensitivity of outputs to policy changes. Using RIM, a great number of "what if" questions can be addressed rapidly. For example, what is the impact on force buildup in theater if all deploying units must be filled to a C-2 level instead of a C-3 level prior to deployment? As another example, what is the effect of using equipment from later deploying units to fill early deploying units? Although a variety of "what if" questions can be addressed using RIM, it is not an interactive model; once the simulation is started, the model operator can not affect the results.

PROPONENT	CURRENT USERS/POC
US Army LEA ATTN: DALO-LEP (MAJ Setcavage) New Cumberland, PA 17070 AV 977-6387, com (717)782-6387	US Army Concepts Analysis Agcy ATTN: CSCA-FOB (Mr. Wolpert) 8120 Woodmont Ave Bethesda, MD 20814 AV 295-1588, com (202)295-1588

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Readiness Indicator Model (RIM)

INPUTS: MTOE, MTDA, TDA Class VII requirement, force structure, force deployment sequence, current item inventory, depot overhaul schedule, mobilization production capability, war reserve requirement, attrition of equipment, attrition of US weapons. Input is in the form of nine separate data bases with the above type data.

OUTPUTS: RIM constructs a record for every unit-line item number (LIN) combination and records all resourcing actions taken after mobilization. Data relating to LIN are war-time required quantity, quantity on hand, shortage/overage, and the quantity provided from each of 12 asset pool categories after mobilization starts.

DOCUMENTATION AVAILABLE:
User's Manual for Readiness Indicator Model Equipment Programs, Documentation, CAA-D-83-5, Sep 83.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
COBOL	UNIVAC	D&V FSD P/D	NONE APPLY

REMARKS: Computer system consisting of multiple programs. 500k bytes and 1000 CPU seconds required.

APPLICATIONS: USACAA Analysis determining Dist of Sys Study, Jun 83. USACAA, Mobilization and Operations Planning, Dec 81.

LSA TASK INTERFACE

303.2.11

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Risk Network (RISNET)

PURPOSE: To evaluate the effect of interactions of various activities.

DESCRIPTION: A risk network model is able to simulate activities and events in a network structure. Also, it is able to handle decisions in a deterministic or probabilistic manner. The model analyzes systems using time and cost as inputs.

USERs:

US Army ERADCOM
ATTN: AMDEL-CP-CA (Mr. Coy)
Fort Monmouth, NJ 07703
AV 995-2432, com (301)544-2432

US Army MICOM
ATTN: AMSMI-DP (Mr. Ellis)
Redstone Arsenal, AL 35898
AV 746-2379, com (205)876-2379

PROPONENT	**CURRENT USERS/POC**
Private contractor proponent.	US Army AMCCOM ATTN: AMSMC-PM(D) (Mr. Mitsock) Dover, NJ 07801 AV 880-6395, com (201)742-6395

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Risk Network (RISNET)

INPUTS:

1. Two activity parameters; time, cost.
2. Node logic for combining activities.

OUTPUTS:

1. Probability of accomplishing the programs effort vs time/cost for a total program effort or a segment of an effort.
2. GANTT chart.
3. Critical path for schedule and cost or other parameters.

DOCUMENTATION AVAILABLE:

RISNET Analyst's Guide, (Update), 18 Feb 81.
This model is designated proprietary and is leased for Government use only. RISNET is furnished from the contractor in binary code only.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
FORTRAN IV	IBM 370, CDC 6500/6600, CYBER 825/74	CONCEPT D&V FSD P/D	NONE APPLY

REMARKS:	APPLICATIONS:
RISNET requires 120/240k memory. CPU time is dependent on number of inputs/iterations.	DIVAD; DSWS; GEMMS; 500 watt thermoelectric generator

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LSA TASK INTERFACE

101.2.1,2
102.2.1,2
202.2.4
203.2.8
204.2.3
205.2.2,5
301.2.3
302.2.5
303.2.1

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Reliability, Maintainability, and Cost Model (RMCM)

PURPOSE: To provide an analytical tool for estimating life cycle cost of a weapon system and its associated support.

DESCRIPTION: The RMCM program consists of two main components which are a reliability and maintainability (R&M) portion and a cost portion. The primary purpose of the R&M portion is to assess the basic RAM parameters portion of the RMCM. The R&M portion can be exercised independently. In this mode it provides a means of analyzing the R&M impact of changes in various design and support concept elements. The cost portion combines these R&M inputs with cost element inputs to determine the weapon system life cycle cost. It is designed for use early in the weapon system development process when data for emerging systems are scarce and comparability analysis offers a validated/ systems approach to resource requirements estimation.

PROPONENT	**CURRENT USERS/POC**
Air Force Human Resources Lab ATTN: AFHRL-LRA (Ms. Preidis) Wright-Patterson AFB, OH 45433 AV 785-3871, com (513)255-6718	Proponent also user. Air Force Human Resource Lab ATTN: AFHRL-LRC (Mr. Boyle) Wright-Patterson AFB, OH 45433 AV 785-3771, com (513)255-2606

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Reliability, Maintainability, and Cost Model (RMCM)

INPUTS:
Two data files are required for this model:

1. R&M (Reliability & Maintainability Parameters)

2. Cost data file which includes cost elements for LCC calculations.

OUTPUTS:
Two types of output:

1. Point estimate of a simple R&M or cost element as requested by the user.

2. A binary file generated by the model which contains all the R&M and cost elements. This file can be accessed by the user to produce reports which detail the cost analysis.

DOCUMENTATION AVAILABLE:
1. Asset Users Guide.
2. RMCM Users Guide for the H66/20 computer.
3. RMCM Technical Report by private contractor.

AUTOMATION

YES * NO	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
LANGUAGE			
FORTRAN	H66/20 CYBER 74 CDC-6600	CONCEPT D&V FSD P/D	A B C D

REMARKS:	APPLICATIONS:
	Aviation platforms Naval warfare and land combat systems.

LSA TASK INTERFACE

203.2.3-5,7	501.2.1
302.2.1-4	
303.2.1-5,9,10	
401.2.1,5	
403.2	

LSA TECHNIQUE INFORMATION SHEET
PART I

TECHNIQUE: US Roland Life Cycle Cost Model (ROLCOM II)

PURPOSE: ROLCOM II was developed to support the life cycle cost estimates required during the acquisition phase of a system.

DESCRIPTION: The ROLCOM II computer model can handle a wide range of life cycle cost estimating requirements. It is organized on the principle that the total LCC can be estimated for all program phases by computing each major end item in the Work Breakdown Structure (WBS) against a defined Cost Breakdown Structure (CBS). This matrix structure permits the user to break down the WBS and the CBS to nine indenture levels. This matrix technique permits the user to cost complex systems at varying levels (down to nine) of detail, and then automatically aggregate the data to a common or higher manageable reporting level. The model considers up to four geographical deployment areas (such as CONUS, EUROPE), up to five organizational unit elements (such as battery, DSU, GSU, depot), and specific staffing for each unit element.

PROPONENT	CURRENT USERS/POC
PM ROLAND ATTN: AMCPM-ROL-MA (Mr. Messervy) Redstone Arsenal, AL 35898 AV 746-1766, com (205)8876-2363	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: US Roland Life Cycle Cost Model (ROLCOM II)

INPUTS: Must build a data base that includes numerous data elements related to--

1. Cost Breakdown Structure (CBS).
2. System Schedules.
3. Deployment.
4. WBS Computation Instructions.
5. Inflation Indices.
6. Supply and Maintenance Data.

OUTPUTS: LCC output reports in several formats including--

1. Spread of funding by fiscal year.
2. Life cycle cost by components.
3. Time-phased LCC by appropriation per fiscal year.
4. Army Materiel Plan.
5. Budget stratification report.

Output can be tailored by the user.

DOCUMENTATION AVAILABLE:
US Roland Life Cycle Cost Model (ROLCOM II)
System Description, Second Revision, Feb 81.

AUTOMATION

YES * NO	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
LANGUAGE			
FORTRAN IV	CDC 6600	CONCEPT D&V FSD P/D	A B C E H

REMARKS:	APPLICATIONS:
	US Roland

LSA TASK INTERFACE

203.2.3,5,7
303.2.9

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: US Roland Logistics Model (ROLOG)

PURPOSE: A computer model designed to evaluate logistics support and operational alternatives against both resources required and operational availability.

DESCRIPTION: A series of routines which inputs the LSAR tapes, merges them into a single data base, and evaluates the operational and support costs against a required operational availability. The ROLOG computer programs are designed to assess the operational availability and cost-effectiveness associated with different maintenance and supply support concepts; justify the life cycle cost estimates for ASARC/DSARC; support the budget requests for spares, repair parts, support and training equipment; and to evaluate maintenance allocations, manloading, engineering change proposals, deployment decisions, and the levels of suppy at the wholesale and retail levels. A sensitivity option is available.

PROPONENT	**CURRENT USERS/POC**
PM ROLAND ATTN: AMCPM-ROL-MA (Mr. Messervy) Redstone Arsenal, AL 35898 AV 746-2363, com (205)876-2363	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: US Roland Logistics Model (ROLOG)

INPUTS: The LSAR data, selected Force Planning Handbook data elements, and selected current Army data such as order and ship times, system density, and system distribution.

OUTPUTS: O&S LCC output. Provisioning List and Summary. Support equipment usage, operational availability, maintenance man-hours, and VECP collateral savings report.

DOCUMENTATION AVAILABLE:
System Description/User's Manual for US Roland Logistics Model, Revision 2, February 82.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
FORTRAN	CDC 6600	D&V FSD	A B C D E F J

REMARKS:	**APPLICATIONS:**
	US Roland

LSA TASK INTERFACE

203.2.2-7
205.2.1
302.2.1,2,5
303.2.1-3,7,10

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Slide Rule Model System: System Aggregate Model (SAM)

PURPOSE: To perform system level design/cost trade-off analyses during the early stages of design.

DESCRIPTION: SAM is one of three models which make up the slide rule model system (SRS). It is used in conjunction with the other two SRS models (TDM and LRAM) to conduct front end design/cost trade-off analyses. The model produces a bottom-up LCC estimate of a system by aggregating individual LRAs and adding system costs. The SAM is used to aggregate LRAs to system or subsystem level to produce life cycle cost estimates. Output from the SAM can also be used as input to the SAM itself, making mixed and multi-level aggregation possible. Based on the results of the SAM, the system designer may wish to examine alternative system designs in which case the TDM and LRAM are run again with new design parameters. This iterative process is very useful in refining system design based on cost considerations. Because the LRAM estimates are available continuously, SAM makes full up cost estimates possible as frequently as desired from the earliest stages of the design process.

PROPONENT	CURRENT USERS/POC
HARDMAN Development Office Chief of Naval Operations Code OP-112C (Cdr Council) Washington, DC 20350 AV 224-4910, com (202)694-491	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Slide Rule Model System: System Aggregate Model (SAM)

INPUTS: Data cards from TDM along with LRAM output data cards used as SAM input. This input can be modified by the user. These inputs include 14 input data elements to describe the proposed system design; only seven are needed when the model is used at the subsystem level. Operating environment variables are read from a data card prepared by the TDM. In addition, an output card for each LRA or subsystem used is read through the model and aggregated.

OUTPUTS: Computes system life cycle cost as the sum of 13 cost categories, six of which are initial cost; the remaining seven are those which recur each year of the system's life. Also, three system performance parameters: mean time between failures; mean time to repair, and achieved confidence against stockout.

DOCUMENTATION AVAILABLE:
HARDMAN Cost Model System/Shipboard Electronics,
Volume 2-Slide Rule Model System (DLSIE LD# 54912 B)

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
HP-41C Keystroke	HP-41C programable calculator	CONCEPT D&V	A B C

REMARKS:	**APPLICATIONS:**
	AMTESS (Army), SEAFIRE (Navy) NCSS (Navy)

LSA TASK INTERFACE

203.2.6
203.2.1,3,7

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: HARDMAN Cost Model System - Shipboard Electronics Design Cost Model (SEDCOM)

PURPOSE: To perform component to system level design/cost and hardware/manpower tradeoff analyses.

DESCRIPTION: SEDCOM is an interactive LCC model implemented on a Z-80 based microcomputer system. SEDCOM is a bottom-up model which can deal with both an individual LRA and aggregate suites of LRAs into subsystems and systems. It automatically considers 4 levels of repair at the assembly level, local repair; contractor depot repair, military depot repair, and discard at failure. The model does not optimize values for any of the input parameters; however, given fixed input parameters, it will find the most cost-effective spare stockage purchase and level of repair posture for each LRA. SEDCOM is intended for use as a comparison to the Slide Rule Model System. Particular attention is paid to hardware/manpower tradeoff issues in SEDCOM.

PROPONENT	CURRENT USERS/POC
HARDMAN Development Office Chief of Naval Operations Code OP-112C (Cdr Council) Washington, DC 20350 AV 224-4910, com (202)694-4910	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: HARDMAN Cost Model System - Shipboard Electronics Design Cost Model (SEDCOM)

INPUTS: Requires 50 system level input variables divided into 3 categories:

1. Navy environmental and cost factors.
2. System operating environment variables.
3. System design parameters.

Also requires 12 variables to describe each LRA.

OUTPUTS:

1. Cost summary for each LRA.
2. LRA LCC estimate for each of the four repair postures expressed as the sum of five procurement related and seven O&S-related costs.
3. Summaries include the number of maintenance personnel to be trained, MTBF, MTTR, and confidence level against stockout.

DOCUMENTATION AVAILABLE:
HARDMAN Cost Model System/Shipboard Electronics
Volume 3 SEDCOM, PR-A106.3-5, Aug 81 (DLSIE LD# 54912C).

AUTOMATION

YES * NO	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
LANGUAGE MBASIC	IMS 8000 Microcomputer	CONCEPT D&V FSD P/D	A B C D E H

REMARKS:	**APPLICATIONS:**
	REMBASS (Army) VTXTS (Navy) CAT (Tri-Service)

LSA TASK INTERFACE

203.2.6
303.2.1,3,7

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Selected Essential-Item Stockage for Availability Method (SESAME)

PURPOSE: SESAME is a computer program used for estimating budget requirements for provisioning. It computes stockage quantities for SIP and in an optimum manner for ERPSLs. SESAME can also produce allowance quantities in DARCOM Form 1731 (Selection Worksheet)

DESCRIPTION: SESAME can be used in either the Standard Initial Provisioning (SIP) mode or in the Essential Repair Parts Stockage Lists (ERPSL) mode. In either mode, provisioning requirements are calculated for each item for all retail levels and for a CONUS depot. In the SIP mode, these requirements are the same as computed by the CCSS ARCSIP program. In the ERPSL mode, the ARCSIP quantity is used as the minimum amount of stock calculated for each echelon. Additional stock may be allocated to meet the requirements of operational availability. If additional stock is provided, the program allocates it in a manner that the expected NMCS rate will be minimized for any amount of stock programed. Thus, SESAME may be used to find the best retail allocation of stock for a given total budget or to find the smallest budget to achieve a given supply availability. SESAME was developed by the US Army Inventory Research Office (IRO) which is listed below.

USERs:
US Army CECOM
ATTN: AMSEL-PL-E (Mr. Medicus)
Fort Monmouth, NJ 07703
AV 992-5170, com(201)532-5170

US Army TROSCOM
ATTN: AMSTR-BT (Mr. Ruffus)
4300 Goodfellow Blvd
St. Louis, MO 63120
AV 693-2750, com(314)263-2750

US AMSAA-IRO (Developer)
ATTN: AMSXY-LIRO
Room 800, US Custom House
Phildelphia, PA 19106
AV 444-3808, com (215)597-8377

US Army MICOM
ATTN: AMSMI-SL (Mr. Strickland)
Redstone Arsenal, AL 35898
AV 746-6898, com(205)876-6898

PROPONENT
US AMC
ATTN: AMCSM-WRS
5001 Eisenhower Avenue
Alexandria, VA 22333-0001
AV 284-9655, com(202)274-9655

CURRENT USERS/POC
US Army TACOM
ATTN: AMSTA-MFS (Mr. Moron)
Warren, MI 48090
AV 786-8155, com(313)574-8155

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Selected Essential-Item Stockage for Availability Method (SESAME)

INPUTS: Input requirements are system deployment by year, TAT, RTD, MTD, OST, and maintenance factors. Data can be obtained from the LSAR via the LSAEXTRC program (contained in this guide).·

OUTPUTS: Provisioning requirements for each retail level and CONUS depot, cost of provisioning, supply and operational availability achieved by the amount provisioned. Allowance quantities in DARCOM Form 1731 K card format can also be produced.

DOCUMENTATION AVAILABLE:
DARCOM-P 700-18, User's Guide for the Selected Essential Item Stockage for Availability Method (SESAME) program.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
Fortran	IBM 3033,4341	D&V FSD	
	4331,4800,360	P/D	A H
	CDC 6600		

REMARKS: Hardware also includes the PRIME and Harris 800 computers.

APPLICATIONS: This is the standard Army provisioning model to be used for almost all systems.

LSA TASK INTERFACE

203.2.3,5
303.2.4,9
401.2.8
402.2.1

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Sustainability Predictions for Army Spare Component Requirements for Combat (SPARC)

PURPOSE: The purpose of SPARC is to enhance combat sustainability of critical systems by predicting parts that will be damaged in combat. This data are then used to product-improve these parts, where feasible and developing field expedients and combat damage repair programs.

DESCRIPTION: SPARC analyses identifies mission-essential parts or components and their vulnerabilities in a simplified representative combat scenario. There are several steps involved in accomplishing a SPARC analysis. The three main steps include--

(a) Computerized target description which includes representation of all mission-essential components.

(b) Identify major threat weapons that the system will face on the battlefield.

(c) Subject the computerized target description to the effects of the most likely threats and identify the frequency with which different mission-essential components are required for repair.

These steps involve some very sophisticated and complex computer programs along with engineering/scientific experience and judgment. Dependent on the type weapon system that a SPARC is initiated computer programs used could include--

(a) Combinatorial-geometry program (COM-GEOM by BRL) for target description.

(b) Computation of Vulnerable Area & Repair Time (COVART by BRL) for assessment of impacting projectiles,

(c) Evaluation of Air Defense (EVADE by AMSAA) for probability of a hit.

(d) End-game simulation (by AMSAA) for hit and kill probability for missile threats.

(e) Incorporation of Readiness into Effectiveness modeling (IREM by AMSAA) for simulating aircraft company operation before & during combat to get ASL/PLL & maintenance policy in combat.

This list is not all-inclusive but gives a general idea of the complexity of a SPARC analysis.

AMSAA has developed SPARC methodology for aircraft systems as applied to the AH-1S reference 3. AMSAA is developing SPARC methodology for ground support. SPARC analyses are done by AMSAA in coordination with the Ballistic Research Lab (BRL).

PROPONENT	**CURRENT USERS/POC**
US Army AMSAA ATTN: AMXSY-LM (Mr. Heaps) Aberdeen Proving Gd, MD 21005 AV 298-6617, com (301) 278-6617	Proponent also user/developer. US Army Ballistic Research Lab ATTN: AMSMC-BLV-A (Mr. Bently) APG, MD 21010 AV 298-2032, com (301)278-2032

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Sustainability Predictions for Army Spare Component Requirements for Combat (SPARC)

INPUTS: Several detailed inputs are required for a SPARC analysis both physical and functional data describing the weapon system under analysis. The data include --

1. Mission essential parts.
2. Technical manuals figures.
3. Unit price, volume, weight, and quantity per system.
4. Mission duration.
5. Threats.
6. Number of aircraft.
7. Repair time and repair personnel by MOS.

OUTPUTS: Outputs are generated from each of the different programs employed when a SPARC analysis is initiated. The most important output that is related to SPARC is the outputs detailing the usage and supply of spare parts. This summary of parts usage is given by maintenance level and includes parts used, on hand, back order, etc., for the combat scenario.

DOCUMENTATION AVAILABLE:
(1) User's Manual for tabulating mission-essential parts for SPARC, NO. C-170, AMSAA, Jul 82. (2) Example reports for various weapon systems using SPARC have been developed. (3) SPARC AH-1S, No. C-97, AMSAA.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
Several programs	CDC CYBER 70 UNIVAC	FSD P/D	A B C D E H J

REMARKS: SPARC analyses are very complex. AMSAA should be contacted to run such an analyses.

APPLICATIONS: M1, M60A1, Tanks; UH-60A; M198 Howitzer; MLRS; AH-1S; Patriot; OH-58C; M813 Truck; BFVS; plus 13 others.

LSA TASK INTERFACE

205.2.1,5
303.2.1,11
402.2.4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Tank/AFARV Forward Area Ammo Resupply Simulation (TAFAARS)

PURPOSE: 1. To compare the existing ammo resupply system with new division 86 resupply concepts of M1 Abrams battalion. 2. To compare new alternative resupply concepts among each other.

DESCRIPTION: The model evaluates ammo resupply as a function of weapon/support design alternatives such as tank storage capacity, tank/AFARV load time, addition of AFARV, AFARV capacity firing, and rate capability. TAFAARS models dynamic situations where supportability is interrelated with hardware performance. The model is easy to modify. Limitations include, no ammo mix (one type ammo at a time), constant vulnerability at all locations, none during ammo transfer, and unlimited ammo supply. TAFAARS can compare various ammo resupply concepts and identify the concept that can best satisfy the demand for ammo.

PROPONENT	CURRENT USERS/POC
US Army AMCCOM ATTN: AMSMC-RA(D) (Fran Luzzi) Dover, NJ 07801 AV 880-5978, com (201)742-5978	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Tank/AFARV Forward Area Ammo Resupply Simulation (TAFAARS)

INPUTS: (1) Vehicle data such as: number per battalion, capacity, travel times, interdiction times, loading and unloading time; (2) firing rates; (3) attrition rates of all vehicles; (4) battlefield scenario; (5) resupply concepts; and (6) RAM data on armored forward area resupply vehicle (AFARV).

OUTPUTS: (1) Ammo consumption rate; (2) usage time; (3) tank offline data such as: number of times offline, request for supply, and waiting for resupply time; (4) AFARV in forward area time; (5) ammo load status of tanks and AFARVs at all times; and (6) availability of AFARV vs truck.

DOCUMENTATION AVAILABLE:
Tech report - Jan 84 estimated completion date.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
GPSS/FORT IV	CDC 6600 CYBER 825 CYBER 74	CONCEPT D&V FSD P/D	NONE APPLY

REMARKS: Uses 220K bytes memory and 5000 CPU seconds to execute.	**APPLICATIONS:** M1 Tank M60 Tank Bradley Fighting Vehicle

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LSA TASK INTERFACE

303.2.1,3,4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: TRASANA Aircraft Reliability and Maintainability Model (TARMS)

PURPOSE: TARMS was developed as a tool for evaluating the effect of component malfunctions, combat damage, scheduled maintenance, and the resulting maintenance workload on the mission effectiveness of US Army aviation organizations.

DESCRIPTION: The initial version of the model was developed by a private contractor in early 1978 under contract to TRASANA. The model was an outgrowth of the Aircraft Reliability and Maintainability Simulation (ARMS). TARMS was first used for the Army Aviation Program Review (AAPR) and Army Aviation Program Review Sustained Operation (AAPRSO) studies. In order to reduce computer run time and memory requirements and provide better responsiveness to model modifications, TRASANA has since converted TARMS from the GPSS to the SIMSCRIPT II.5 computer language. TARMS is a stochastic, event oriented model which can simulate the operations of any US Army aviation organization from company to theater in size. The BLUE aircraft with weapons, maintenance personnel, test equipment, and repair parts are modeled. The RED force is modeled as a mix of weapons systems, each providing a threat to the BLUE force. Peacetime or wartime scenarios may be simulated and are driven by a mission request list. While performing a mission, a mix of BLUE aircraft may experience component failure and combat damage which may result in a total loss of the aircraft, a force landing in the field, an abort of the mission, and/or the generation of maintenance. Combat is two-sided, with BLUE and RED exchanging rounds. RED weapons inflict damage on the components of the BLUE aircraft. However, the result of a BLUE round being fired at RED is modeled simplistically as either miss or kill based on input values for probability of kill.

USERs:
US Army AVSCOM
ATTN: AMSAV-[illegible] (Mr. Geoffroy)
St. Louis, MO 63120
AV 693-1575, com (314)263-1575

PROPONENT
US Army TRASANA
ATTN: ATOR-TEA (Mr. Gamble)
WSMR, NM 88002
AV 258-1901, com (505)678-4111
Proponent also developer.

CURRENT USERS/POC
US Army Concept Analysis Agency
ATTN: CSCA-FCC (MAJ Rutledge)
8120 Woodmont Ave
Bethesda, MD 20814
AV 295-1652, com (202)295-1652

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: TRASANA Aircraft Reliability and Maintainability Model (TARMS)

INPUTS: BLUE force definition (aircraft and manpower TOE, organizational structure), mission request list (scenario), flight paths, aircraft component data (malfunction rates, time-to-repair, manpower repair packages, part replacement, etc.), consequence of malfunction, combat damage data (shortlines), repair parts stockage, RED force definition (enemy weapon TOE and location).

OUTPUTS: All facets of mission, maintenance, and combat engagement statistics. Time/event output in chronological order which includes: launches; failures; combat hits; mission diversions; aircraft losses; threat losses; mission aborts; operational availability; parts required system failure; and maintenance manpower requirements.

DOCUMENTATION AVAILABLE:
(1) Draft TARMS model Users Guide, Concepts Analysis Agency. (2) AAH MALA-Phase 1, Apr 83, TRASANA. (3) TRASANA model description document.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
SIMSCRIPT II.5	UNIVAC 1180 VAX	CONCEPT D&V FSD P/D	A B C D E F

REMARKS: Applications listed were on the GPSS FORTRAN version which is the older version.

APPLICATIONS:
UTTAS
UH-1
AH-64
CH-47

LSA TASK INTERFACE

203.2.2,3,5-7
205.2.1
301.2.4
302.2.1,3
303.2.1-5,9,11
402.2.1,2,4

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Slide Rule Model System: Top Down Model (TDM)

PURPOSE: To estimate equipment level life cycle costs early in the development process.

DESCRIPTION: TDM is one of three models which make up the Slide Rule Model System (SRS). It is used in conjunction with the other two SRS models (LRAM and SAM) to conduct front-end design/cost trade-off analyses. The model produces equipment level life cycle cost (LCC) estimates. The LCC estimate is computed as the sum of 13 cost categories, six of which are procurement related and seven of which are O&S related. TDM can be run as a stand-alone model for LCC estimates. TDM does not have to be run in conjunction with LRAM and SAM.

PROPONENT	CURRENT USERS/POC
HARDMAN Development Office Chief of Naval Operations Code OP-112C, (Cdr Council) Washington, DC 20350 AV 224-4910, com (202)694-4910	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Slide Rule Model System: Top Down Model (TDM)

INPUTS: 45 data elements which describe operational environment, operational requirements, and proposed system design.

OUTPUTS: LCC estimate as the sum of 13 cost elements, six of which are procurement related and seven which are O&S related. Output is also stored on magnetic card to be used as input for the LRAM and SAM programs, if so desired.

DOCUMENTATION AVAILABLE:
HARDMAN Cost Model System/Shipboard Electronics
Vol 2 - Slide Rule Model System (DLSIE LD# 54912B), Aug 81.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
HP-41C Keystroke	HP-41C programable calculator	CONCEPT D&V	A B C

REMARKS:	**APPLICATIONS:**
	AMTESS (Army) SEAFIRE (Navy) NCCS (Navy)

LSA TASK INTERFACE

203.2.6
303.2.1,3,7

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Artillery Battalion Time-Line Model (TLM)

PURPOSE: TLM is used to evaluate the effect cn the fire mission response time (FMRT) of system characteristics, O&O structure and target characteristics. Also to estimate ammunition per 24-hour mission.

DESCRIPTION: The TLM is a computer model written in GPSS. The model simulates a direct support artillery battalion consisting of 24 155mm self-propelled howitzers, three battery fire direction centers, a battalion fire direction center and several target acquisition systems. The primary measurement of the model is the mission service time, the time from first acquiring a target until the last round fired arrives on target. In addition, the model computes ammunition expenditure rates, reliability and maintainability (RAM) failures, and the distance traveled by each howitzer in 24 hours (and the number of moves). It also tracks targets acquired, fired on and fired on in time, and computes queue statistics in the system. Targets come into the model at rates based on the Artillery Force Simulation Model (AFSM) target list generated at the Artillery School, Ft Sill, OK and reflects a SCORES-2A scenario. There is no attrition. Assumptions of the model include an adequate ammo supply, and no downtime for preventive maintenance and administrative/logistics time.

PROPONENT	CURRENT USERS/POC
US Army AMCCOM ATTN: AMSMC-RA(D) (Mr. Kovacs) Dover, NJ 07801 AV 880-5978, com (201)742-5978	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Artillery Battalion Time-Line Model (TLM)

INPUTS: Separated into several types: (1) target related types such as: inter-arrival time, duration time, and ranges; (2) armament related such as: number of volleys and tubes fixed, rate of fire, projectile flight time, MRBF, MTTR; (3) Vehicle related such as: number of movements, MRBF, MTTR; and (4) Fire control/ communications equipment related such as: types of communications lines, processing and transmission times.

OUTPUTS: Targets acquired, targets fired upon, ammo expenditure, fire mission response times, waiting times, moves per day, firing time, standby time, travel time and also, downtimes, and availability.

DOCUMENTATION AVAILABLE:
Documentation is under development in the form of a final report by AMCCOM (AMSMC-RA(D)) completion date not available.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
GPSS/FORTRAN	CDC 6600 CYBER 825 CYBER 74	CONCEPT D&V FSD P/D	A B H

REMARKS: TLM requires 240k bytes of memory and 150 seconds CPU time.	**APPLICATIONS:** M109 self-propelled Howitzer; DSWS

LSA TASK INTERFACE

202.2.1

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Kasian TPS Model (TPS KASIAN)

PURPOSE: The TPS KASIAN was developed as an analytic tool to determine the cost-effectiveness of Test Program Set (TPS) development.

DESCRIPTION: For each system TPS candidate, the computer program calculates support cost differences associated with the following four alternatives: discard after screening (GO/NO-GO TPS), contractor repair (with or without Government screening of good items), and Government test/repair to piece part (Diagnostic TPS). These calculations are based on each item's total expected failures over the operating life of the end system.

APPLICATIONS (CONT'D)
DGM, AN/TYC-39, AN/TTC-39 and 42, AN/UYK-7 and 20, AN/UYQ-19 and 30, PLRS, AN/UGC-74, AN/USM-26, etc.

USERs:
US Army AMCCOM
ATTN: AMSMC-MA-ATE (Mr. Lowing)
Rock Island, IL 61299
AV 793-5070, com (319) 793-5070/4427

PROPONENT	CURRENT USERS/POC
US Army ERADCOM ATTN: AMDEL-PO-SA (Mr. Price) Fort Monmouth, NJ 07703 AV 995-4952, com (201)544-4952	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Kasian TPS Model (TPS KASIAN)

INPUTS: Three parts to the input data are--

1. A separate data base which contains UUT type, complexity failure rate, and unit cost.
2. Main program data which contains such values as cost for diagnostic TPSs, costs for end-to-end TPSs, cost for post deployment support; 21 variables in all.
3. Direct user input such as number systems, operating hours, number years employed, derating factor, inflation rate, and repair costs for contractor and Government; 12 variables in all.

OUTPUTS: A compact summary is developed which lists each TPS candidate and the cost associated with each of the four alternatives. The output also displays the data base and direct user input data. It provides a system MTBF based on the failure rates used and displays the cumulative percentage that each TPS candidate contributes to the system failure rate.

DOCUMENTATION AVAILABLE:
Model validation and user documentation is under development.

AUTOMATION

YES * NO **LANGUAGE**	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
FORTRAN IV(68)	CDC 6500/6600 VAX	CONCEPT D&V FSD P/D	A B E H

REMARKS: The program is approx 230 lines of coding and requires approx 41k bytes of memory

APPLICATIONS:
AN/USQ-86(MICNS), AN/TMQ-31, JSTARS, AN/ALQ-17A, AN/USM410, (see description Part 1 for other applications).

LSA TASK INTERFACE

203.2.5,7
205.2.1
303.2.1,7-9
501.2.3

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Total Risk Assessing Cost Estimate (TRACE)

PURPOSE: TRACE was developed to estimate risks in any type acquisition/development process of a weapon system and allocate funds for this risk.

DESCRIPTION: If an item in a system is determined to be high risk, either developmental or cost, a certain amount of funds are set aside. If the risk comes into being, the funds become available.

USERs:
US AMC
ATTN AMCDE-PBC (Ms. Fitzgerald)
5001 Eisenhower Ave
Alexandria, VA 22333
AV 284-8975, com (202)274-8975

US Army CECOM
ATTN: AMSEL-POD-SA
(Mr. Hill)
Fort Monmouth, NJ 07703
AV 995-2515, com(201)544-2515

PROPONENT	**CURRENT USERS/POC**
US AMC ATTN: AMCDE-P (Mr. Greene) 5001 Eisenhower Ave Alexandria, VA 22333 AV 284-9486, com (202)274-9486	US Army AMCCOM ATTN: AMSMC-RA(D) (Mr. Mitsock) Dover, NJ 07801 AV 880-6395, com (201)724-6395

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Total Risk Assessing Cost Estimate (TRACE)

INPUTS: Cost estimation probabilities and data.

OUTPUTS: Probability of risks.

DOCUMENTATION AVAILABLE:
(1) ALM-63-4476-H, and H3 Methodology for Developing Trace by ALMC. (2) Total Risk Assessing Cost Estimate (TRACE) Guide, by contractor, 1 Mar 79.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
COBOL	CDC 6500/6600 CYBER 74 CYBER 825	FSD	NONE APPLY

REMARKS:

APPLICATIONS:
DIVAD, DSWS, GEMSS
AFATDS
FOTS-LH

LSA TASK INTERFACE

303.2.9

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Total Risk Assessing Cost Estimate for Production (TRACE-P)

PURPOSE: TRACE-P is intended as a contingency-funding vehicle for the first 3 years of production of designated systems.

DESCRIPTION: TRACE-P extends the TRACE concept of RDT&E to production, and serves to quantify risks in terms of their cost impact on designated systems. A mechanism is proposed for generating such risk costs. It extends the use and application of the contractor's work breakdown structure (WBS) in identifying risk prone areas, and combines the WBS with probabilistic networking techniques to create a data structure which generates risk costs for the designated program. The Venture Evaluation and Review Technique (VERT) output can be/sometimes is used as input into the TRACE-P analysis.

PROPONENT	**CURRENT USERS/POC**
US AMC ATTN: AMCCP-ER (Mr. Baker) 5001 Eisenhower Avenue Alexandria, VA 22333 AV 284-8030, com (202)274-8030	US Army CECOM ATTN: AMSEL-SM-P-PL(Mr. Kasian) Ft Monmouth, NJ 07703 AV 992-3176, com (201)532-3176

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Total Risk Assessing Cost Estimate for Production (TRACE-P)

INPUTS: Schedule of time, costs, risks, and performance as any combination either statistical or constant and costs associated with risks.

OUTPUTS: Cost distributions and probability distribution of possible costs.

DOCUMENTATION AVAILABLE:
Letter of Instruction, DARCOM comptroller,
6 Oct 82.

AUTOMATION

YES NO * LANGUAGE	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
		FSD P/D	NONE APPLY

REMARKS: TRACE-P is done manually.	**APPLICATIONS:** RPV, AHIP, MCS, Pershing II, M1E1 Tank, SINCGARS-V, Quickfix

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LSA TASK INTERFACE

303.2.9

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Transportation Network Attack (TRANATAK)

PURPOSE: This model permits the assessment of transportation problems and their solutions in the face of equipment constraints and enemy attack of transportation modes.

DESCRIPTION: This model may be either stochastic or deterministic. Requirements for transportation are input into the model based on other model outputs or SCORES scenarios. Vehicles can be loaded using the LADEN model and move over the given networks to the user. Vehicles may be attacked when halted. All forms of transportation except pipelines may be considered. The model requires approximately 200k bytes of user memory and 200k bytes of extended memory for execution. The program is being documented to DA standards as part of the Army Standard System (DAMMS-MPM).

PROPONENT	**CURRENT USERS/POC**
US Army Logistics Center ATTN: ATCL-OD (S. Cockrell) Fort Lee, VA 23801 AV 687-5640, com (804)734-3449	Proponent also user.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Transportation Network Attack (TRANATAK)

INPUTS: Loads to be moved, transportation available, networks available, attrition factors and rebuild times, unit locations and movements are all required inputs.

OUTPUTS: Load delivered, loads destroyed, and preferred transportation modes and schedules.

DOCUMENTATION AVAILABLE:

No current documentation. In process of converting it for IBM 4341 with documentation to follow Jan 85.

AUTOMATION

YES * NO LANGUAGE	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
FORTRAN	CYBER 176	CONCEPT P/D	NONE APPLY

REMARKS: This model requires extensive data input.

APPLICATIONS: Ammunition and barrier material PADS

LSA TASK INTERFACE

203.2.2
303.2.12
401.2.7

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Usage/Age Distribution Projection (USAPRO)

PURPOSE: Project wear on a fleet of equipment in future years assuming that the inputted usage patterns stay relatively constant.

DESCRIPTION: This program predicts the distribution by years of age, and intervals of mileage (or other measures) for a fleet of equipment based upon the following: (1) proposed purchases and receipts; (2) expected sales and losses; and (3) distribution of equipment. This prediction can be made for as many years into the future as there are receipt and loss data available. Active equipments are projected forward in age and mileage (or other measures, i.e., flight hours, etc.), assuming a uniform distribution of vehicles in each age and each usage cell of the base distribution. Equipments in storage are advanced in age only. Losses are removed from all cells proportionally, or from specific cells as applicable. The main goal of the model is to develop a rational method for projecting procurements and estimating fleet age. From the age and mileage (or other measures) of a random sample of the fleet the model predicts the mileage and age of each equipment type in successive years. USAPRO is an offshoot from an earlier AMSAA developed model.

PROPONENT	**CURRENT USERS/POC**
US Army TACOM ATTN: AMSTA-HC (Dr. Brierly) Warren, MI 48397-5000 AV 786-8155, com (313)574-8155	Proponent also user/developer.

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Usage/Age Distribution Projection (USAPRO)

INPUTS: Age and mileage (or usage) of a random sample of a fleet, with projected sales, replacement consumption figures; and usage increments.

OUTPUTS: Tables showing projected distribution of equipment for a fleet by age and usage, at the end of each year for all years desired.

DOCUMENTATION AVAILABLE:

Equipment Usage/Age Distribution Projection Model (USAPRO) User Guide, TACOM, Dec 83.

AUTOMATION			
YES * NO LANGUAGE	**HARDWARE**	**LIFE CYCLE**	**LSAR INTERFACE (DATA RECORDS)**
FORTRAN IV	IBM 360/370 PRIME 750 CDC 6600/6500	FSD P/D	A

REMARKS: USAPRO has approx 1080 lines of coding. It also contains a very large amount of arrays.	**APPLICATIONS:** Wheeled Vehicles

LSA TASK INTERFACE

201.2.2
403.2
501.2.5

LSA TECHNIQUE INFORMATION SHEET
PART1

TECHNIQUE: Venture Evaluation and Review Technique (VERT)

PURPOSE: A decision risk analysis model that can be used throughout the life cycle to systematically assess the risk involved in undertaking new ventures or in the planning, monitoring, and evaluating of ongoing projects.

DESCRIPTION: The model is the most widely used and powerful of its type available today. It expresses the factors of effort in a probability sense using network analysis techniques. VERT can be used to assess the risks involved in any new venture, as well as, to estimate future projects. The results are displayed in histogram and tabular form which provides deterministic/stochastic models of the decision environment. A network in the VERT context is the flow representing the actual completion or processing of various parts of the projects. Approximately 16 probability distributions are available for use in the VERT program.

USERs:
US Army ERADCOM
ATTN: AMDEL-PO-SA (Mr. Price)
Fort Monmouth, NJ 07703
AV 995-2681, com (201)544-4952

US Army CECOM
ATTN: AMSEL-POD-SA (Mr. Hill)
Fort Monmouth, NJ 07703
AV 995-2515, com (201)544-2515

US Army AMCCOM
ATTN: AMSMC-OAA-S
(Mr. Moeller) (Developer)
Rock Island, IL 61299
AV 793-5041, com (309)794-6370

PROPONENT	CURRENT USERS/POC
None officially designated at present. Unofficially AMCCOM (DRSMC-OAA-S) is the proponent.	US Army TROSCOM ATTN: AMSTR-A (Mr. Kearley) 4300 Goodfellow Boulevard St. Louis, MO 63120 AV 693-3161, com (314)263-3161

LSA TECHNIQUE INFORMATION SHEET
PART2

TECHNIQUE: Venture Evaluation and Review Technique (VERT)

INPUTS: Input data to the model are time, costs, risks, performance, as any combination, either statistical or constant.

OUTPUTS: Predictions of schedules, cost, risks, and performance.

DOCUMENTATION AVAILABLE:
User's manual "Venture Evaluation and Review Techniques (VERT)," November 1979.

AUTOMATION

YES * NO LANGUAGE	HARDWARE	LIFE CYCLE	LSAR INTERFACE (DATA RECORDS)
Fortran IV	IBM 360/370; PRIME; CDC 6600; IBM4341	CONCEPT D&V FSD P/D	NONE APPLY

REMARKS: Restricted for government use only.	**APPLICATIONS:** 105 Howitzer; AH-1S Cobra; AAH; UH-60A; PLRS; SINCGARS; GPS; AFATDS; AN/TTC-39; JSTARS; RPV

LSA TASK INTERFACE

101.2.1,2
102.2.1,2
202.2.4
203.2.8
204.2.3

205.2.2,5
301.2.3
302.2.5
303.2.1

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Appendix A

REJECTED LSA TECHNIQUES AND RATIONALE

Part 1

Failure to Meet Technique Qualifications (para 1.2)

(sorted by title)

1. Acquisition of Supportable Systems Evaluation Technology (ASSET). ASSET is a collection of eight separate models which use a single, consolidated data base. ASSET has never had any application applied to it and the proponent indicated there are no planned applications for the immediate future. Therefore, ASSET was not included in this guide because it does not meet the criteria cited in paragraph 1.2e.

2. Aircraft Reliability and Maintainability Simulation (ARMS). ARMS is no longer supported by the proponent and has been replaced by TARMS (contained in this guide). Since ARMS is no longer supported documentation is scarce and, therefore, ARMS does not meet the criteria cited in paragraphs 1.2b and 1.2f. This, coupled with the fact that TARMS has more features and is improved compared to ARMS, is the rationale why ARMS is not included in this guide.

3. Analytic Methodology for System Evaluation and Control (AMSEC). AMSEC documentation has not been updated since 1977. The proponent indicates AMSEC has not been applied to a weapon system for over 6 years. Since AMSEC has not been used or documentation updated in over 6 years, it does not satisfy the criteria of paragraphs 1.2b and 1.2e in terms of the intent that the guide was developed.

4. Army Logistics Assessment (ALA). This technique was developed to assess sustainability of the force (IAW AR 700-5). ALA is made up of approximately a 100 software programs. But no documentation has been developed for ALA and it was developed for in-house use only. Therefore, ALA does not satisfy the criteria in paragraph 1.2b.

5. Automatic Requirements Computation System Initial Provisioning (ARCSIP). The ARCSIP is a Commodity Command Standard System (CCSS) embedded program and, as such, is not a usable model in LSA task accomplishment. Therefore, ARCSIP does not meet the criteria in paragraph 1.2c.

6. Bare Bones Standard Initial Provisioning Model (BBSIP). BBSIP has been incorporated into the SESAME model (contained in this guide) and is no longer maintained as a separate model. Therefore, it does not meet the criteria of paragraph 1.2b, 1.2e, and 1.2f for inclusion into the guide.

7. Bare Bones War Reserves (BBWRSV). BBWRSV has been incorporated into the SESAME model (contained in this guide) and is no longer maintained as a separate model. Therefore, it does not meet the criteria of paragraphs 1.2b, 1.2e, and 1.2f for inclusion into the guide.

8. Battlefield Damage Effect and Logistics Requirements for Battlefield Survivability. No formal documentation exists for this model. Therefore, it was not included in the guide for failure to meet the criteria of paragraph 1.2b.

9. Battlefield Recovery and Evacuation Simulation (BRESIM). BRESIM has not been maintained and is no longer in use. This model was developed in 1978 for one specific application on the recovery vehicle M88. It has not been used since. Therefore, BRESIM was not included in the guide for failure to meet the criteria of paragraphs 1.2d and 1.2e.

10. Civilian Billet Cost Model (CBCM). CBCM is maintained by Chief of Naval Operations as a data base and provided to the user as a collection of charts on which the life cycle costs of civilian billets are calculated. This data could be used as a source of information for input into life cycle cost models but as a data base it does not satisfy any MIL-STD-1388-1A tasks. Therefore, CBCM was not included in the guide for failure to meet the criteria of paragraph 1.2a.

11. Compendium of Front-end Analysis Techniques. This is a pamphlet which contains a list of logistics models used by a private contractor. It is not an LSA technique in itself and it does not satisfy any LSA task in MIL-STD-1388-1A. Therefore, this compendium was not included in the guide for failure to meet the criteria of paragraph 1.2a.

12. Computer-aided Estimation of Failure Factors. This model has been superseded by DARCOM-P 750-5 (contained in this guide). Therefore, this model was not included in the guide for failure to meet the criteria of paragraph 1.2f.

13. Continuing Balance Sheet Expanded (CBS-X). The CBS-X is a CCSS embedded program and as such is not a useable model in LSA task accomplishment. CBS-X is used for inventory management and does not satisfy any LSA tasks in MIL-STD-1388-1A. Therefore, the CBS-X was not included in the guide for failure to meet the criteria of paragraph 1.2a.

14. Expected Value Model (EXPVAL). EXPVAL is a model used as part of the ASSET methodology. But, this model has not been used since LCOM (contained in this guide) became available approximately 1974. Therefore, the EXPVAL was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2e.

15. Failure Factor Assessment via Recurring Field Demands. This model has been superseded by DARCOM-P 750-5 (contained in this guide). Therefore, this model was not included in the guide for failure to meet the criteria of paragraph 1.2f.

16. Field Artillery Simulation Two-sided (FAST). FAST is basically a force-on-force artillery combat simulation with very limited considerations to logistics issues. FAST does not appear to satisfy any LSA task set forth in MIL-STD-1388-1A. Therefore, FAST was not included in the guide for failure to meet the criteria of paragraph 1.2a.

17. Firefinder Model System for Sparing to Availability (FIREFINDER). The FIREFINDER model is no longer approved by AMC and direction was that the model no longer be used to develop either funding or requirements projections. Problems experienced with fielding the FIREFINDER hardware (AN/TPQ-36/37) have been attributed in part to constraints within the FIREFINDER model. Therefore, the FIREFINDER model was not included in the guide for failure to meet the criteria of paragraph 1.2e.

18. Fleet Management System (FMS). The FMS model is no longer maintained by the proponent and the project was canceled due to inactivity of FMS for the last 5 to 7 years. Therefore, this model was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2e.

19. GOALSEEKER. GOALSEEKER is a subroutine of SESAME (contained in this guide). Therefore, GOALSEEKER was not included in the guide because it is covered as an integral part of the SESAME model. GOALSEEKER also was not included for failure to meet the criteria of paragraph 1.2f.

20. Interactive Venture Evaluation and Review Technique (INTERVERT). INTERVERT is no longer supported by the proponent and has not been used for over 4 years. It is very similar to VERT (contained in this guide). INTERVERT was developed using graphic features that required special graphic terminals which have subsequently become obsolete. Therefore, INTERVERT was not included in the guide for failure to meet the criteria of paragraphs 1.2b, 1.2d, and 1.2e.

21. Japan SAM-X Analysis. This is not an LSA technique but is a comparative analysis of PATRIOT vs NIKE systems provided to the government of Japan. There is no information or documentation available on the models or methodologies used for this analysis. Therefore, this analysis was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2d.

22. Level of Repair Alternatives (LORA). This is not an LSA technique but a phrase used in the Mod III LOR program (contained in this guide) developed by the Navy. Therefore, it was not included in the guide for failure to meet the criteria of paragraph 1.2b.

23. Logistics Analysis Cost Evaluation Model (LACE). LACE is no longer supported by the proponent due to its requirement to use a system 2000 data base, its voluminous lines of coding (approximately 17,000 lines), and because it is not user friendly. This model was dropped in favor of smaller less complicated models such

as OSAMM (contained in this guide). Therefore, LACE was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2f.

24. LSA Forecasting via Regression and Averaging Models. This model is an automated computational aid in applying a regression analysis and an averaging analysis to a set of data. This automated procedure is not an LSA technique but rather a computational tool and is not a complete analysis. This computational tool does not appear to satisfy any LSA tasks in MIL-STD-1388-1A. Therefore, this model was not included in the guide for failure to meet the criteria of paragraph 1.2a.

25. Logistic Support Analysis Tailoring Procedure Guide (DARCOM- C 700-4). The essential elements of this guide are being incorporated into the draft LSA Contracting Guide (DARCOM-P 700-21). DARCOM-C 700-4 is no longer maintained or supported by the proponent. Therefore, this guide was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2f.

26. Logistic Support Cost (LSC) Model. LSC has been replaced by a model called LSC-RLA and is no longer supported. The LSC-RLA model has subsequently been replaced by the ONSCOSTS model (contained in this guide). Therefore, LSC was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2f.

27. Logistic Support Cost-Repair Level Analysis (LSC-RLA) Version II. LSC-RLA has been replaced by a model called ONSCOSTS (contained in this guide) and is no longer supported. Therefore, LSC-RLA was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2f.

28. Logistic Support Cost Model (LSCM). LSCM was developed by taking parts of the TRITAC model and extensively revising it for the detector unit (XM85/86) exclusively. Therefore, LSCM does not meet the criteria in paragraph 1.2d for being applicable to more than one system.

29. Maintenance Manpower and Logistic Analysis (MALA) Methodology. MALA is not an LSA technique but rather a term used to examine manpower and logistics issues using various models. There is no formal documentation on the MALA methodology. It is a tailored analysis using any of a variety of models. Therefore, MALA was not included in the guide for failure to meet the criteria of paragraph 1.2b.

30. Maintenance Support Concept Model (MASC). MASC is no longer supported by the proponent and there are no plans to do so in the future. MASC is a retired model according to the proponent. Therefore, MASC was not included in the guide for failure to meet the criteria of paragraph 1.2b.

31. Markov Decision Model for Logistic Policy. No documentation was ever completely developed for this model. The developer of it

has since left the Government and has been dropped by the proponent as a result. Therefore, this model was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2e.

32. McClintic Theater Model (MTM). MTM is a computer simulation of force-on-force combat strategy and tactics used for instructional purposes. MTM does not appear to satisfy any LSA tasks set forth in MIL-STD-1388-1A. Therefore, MTM was not included in the guide for failure to meet the criteria of paragraph 1.2a.

33. Military Manpower/Hardware Procurement (HARDMAN) Training Requirements Determination Methodology (H-TRDM). H-TRDM has been combined with the manpower and personnel requirements methodology to create a total manpower, personnel, and training (MPT) requirements methodology contained in this guide. H-TRDM as a result is no longer maintained by the proponent. Therefore, this model was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2f.

34. Modified Multi-Echelon Technique for Recoverable Items (MOD-METRIC). MOD-METRIC has been incorporated into SESAME (contained in this guide) and, as such, no longer supported by the proponent. Therefore, MOD-METRIC was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2f.

35. NATO PATRIOT Operation and Support Costs Analysis. This analysis is not an LSA technique. It was a study that was based on the common acquisition program between six NATO countries. At the present time, this study is outdated since four of the nations have pulled out and there are no plans to update this study. Therefore, this analysis was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2d.

36. Optimum Repair Level Analysis (ORLA), AFLCM/AFSCM 800-4. This technique has been superseded by the Item Repair Level Analysis (IRLA) method contained in AFLCP/AFSCP 800-4, Repair Level Analysis Procedures, 25 Nov 83. The IRLA has basically the same content as the old AFLCM/AFSCM 800-4, 25 Jun 71. The Air Force proponent states that the preferred method contained in the new AFLCP/AFSCP 800-4 is called the NRLA which is contained in the guide. Therefore, the ORLA technique was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2f.

37. Organic Programs/Routines for Use in Solving Recurring Problems. These programs/routines are not LSA techniques but rather internal/informal routines used/developed by US Army CECOM. No formal documentation exists and there are no plans to export these routines outside CECOM. Therefore, these routines were not included in the guide for failure to meet the criteria of paragraphs 1.2a and 1.2.

38. PATRIOT Deployment Model using SLAM. SLAM is a discrete event simulator which employs the use of both GASP IV and Q-GERT simulation languages. This models dependency on the Q-GERT software

causes it not to be exportable. Therefore, this model was not included in the guide for failure to meet the criteria in paragraph 1.2c.

39. Personnel Availability Model (PAM). The PAM has never had any applications applied to it and the proponent indicates there are no planned applications for the immediate future. Therefore, PAM was not included in this guide because it does not meet the criteria cited in paragraph 1.2e.

40. Reliability and Maintainability Model (RM). The RM model has never had any applications applied to it and the proponent indicates there are no planned applications for the immediate future. Therefore, RM was not included in this guide because it does not meet the criteria cited in paragraph 1.2e.

41. Repair Level Analysis Model (RLAM). RLAM was developed by taking parts of the TRITAC model and extensively revising it for adaptation to the detector unit, XM 85/86, exclusively (like the LSCM model). Therefore, RLAM does not meet the criteria in paragraph 1.2d for being applicable to more than one system.

42. Selected Essential Stockage Availability (SESAVAIL). SESAVAIL is a subroutine of SESAME which is contained in the guide. Therefore, SESAVAIL was not included in this guide because it does not meet the criteria cited in paragraph 1.2f.

43. Solution Network (SOLVNET). SOLVNET has been superseded by VERT which is contained in this guide. SOLVNET is no longer supported by the proponent. VERT replaced SOLVNET because additional features were needed that SOLVNET did not have available. Therefore, SOLVNET was not included in this guide because it does not meet the criteria cited in paragraphs 1.2b and 1.2f.

44. Test Program Sets (TPS) Requirements through LSA. This methodology was never fully developed or documented and the rationale for this methodology has subsequently changed. It has never been successfully applied to a weapon system. Therefore, this method was not included in the guide for failure to meet the criteria cited in paragraphs 1.2b and 1.2e.

45. Tracked-Vehicle Resource Analysis and Display (TREAD) Cost Model. The TREAD model was a one time development conducted in 1981 sponsored by the now disbanded US Armored Combat Vehicle Technology Office. Presently there is no proponent or current users of this technique. The model was used to develop life cycle cost estimates of the M1 Tank using cost elements of DA Pam 11-2,3, and 4. Therefore, TREAD was not included in the guide for failure to meet the criteria of paragraphs 1.2b and 1.2d.

46. Training/Aiding Matrix Model (TAM). The TAM model has never had any applications applied to it and the proponent indicates there are no planned applications for the immediate future. There-

fore, TAM was not included in this guide because it does not meet the criteria cited in paragraph 1.2e.

47. Training Requirements Analysis Model (TRAMOD). The TRAMOD model has not been successfully applied to a weapon system and the proponent indicates there are no planned applications for the immediate future. Therefore, TRAMOD was not included in this guide because it does not meet the criteria cited in paragraph 1.2e.

48. Transportability Analysis Reports Generator Unit Transportability Subsystem (TARGET). TARGET is not an LSA technique but a data base generator designed to acquire data from various sources such as the DA TOE master file, DA standard characteristics for transportability of military equipment, etc. TARGET then feeds transportability determination type models. Since it is a data base, it does not satisfy any tasks in MIL-STD-1388-1A. Therefore, TARGET was not included in the guide for failure to satisfy the criteria in paragraph 1.2a.

49. Workload Computation Model (WORLOC). WORLOC was intended to serve a one-time requirement for ATE workload requirements. Analysis in WORLOC are limited to printed circuit boards. WORLOC has been replaced by the ATE Workload Analysis model which is contained in this guide. The documentation for WORLOC was never fully completed. Therefore, WORLOC was not included in the guide for failure to a satisfy the criteria in paragraphs 1.2b, 1.2d, and 1.2f.

Appendix A

REJECTED LSA TECHNIQUES AND RATIONALE

Part 2

Insufficient Information to Evaluate
(sorted by title)

1. Aggregate Sparing to Required Availability (ASTRA).
2. Air-launch Cruise Missile Logistics Support Simulation (ALCMLGST).
3. Artillery Battalion Resupply Model (RESUP).
4. Best Buy Nonlinear Optimization Model.
5. Computer Model for Aircraft Product Improvement Programs (PIP) and Engineering Change Proposals (ECP).
6. Concepts Evaluation Model (CEM).
7. Contingency Force Analysis Model (CFAM).
8. Dynamic Metric (DYNAMETRIC).
9. Human Resources Test and Evaluation System (HRTES).
10. Interactive Manpower Aggregation Estimation System (IMAGES).
11. Marine Corps Tri-Service Tactical Model (TRITAC).
12. Multi Attribute Decision Analysis Model (MADAM).
13. Patriot Screening Analysis.
14. Performance/Effectiveness Trade-off Studies via Analytical Modeling.
15. Return on Investment from RDT&E (ROIMOD).
16. Sample Size Determination Model.

Appendix B

INSTRUCTIONS FOR COMPLETION OF "LSA TECHNIQUE INFORMATION SHEET"
(AMC Forms 2759a-R, 2759b-R, and 2759c-R)
(Local reproduction on 8½- by 11-inch paper is authorized.)

PART 1.

1. TECHNIQUE. State the formal name of the technique. Include any abbreviations, acronyms, or short names used to identify the technique.

2. PURPOSE. State why the technique is used, i.e., the purpose or objective of the technique.

3. DESCRIPTION. Briefly state the technique methodology. This would include a summary of the key procedural steps, the logic process, sensitivity or risk analysis capabilities, etc.

4. PROPONENT. Identify the organization (military proponents are desired) who sponsored the development of the technique. Should include organizational name, individual POC, address and telephone number (both AUTOVON and commercial). No private industry proponents will be included in this pamphlet. However, requests for proprietary techniques (and the private industry proponent) should be addressed to the LSA executive agent who will provide the firm's name and address on a need-to-know basis.

5. CURRENT USER. Identify two or three of the organizations (preferably military) who use the technique or POCs who are intimately knowledgeable of the technique. This should include organizational name, individual POC, address and telephone number (both AUTOVON and commercial).

PART 2.

1. TECHNIQUE. The formal name of the technique as stated in part 1.

2. INPUTS. Identify the input data required by the technique. This includes constraints, assumptions, goals, etc. If adequate space is not available, general categories of data should be used.

3. OUTPUTS. Identify the type of reports and the data/information which is either a direct or indirect product of the technique.

4. AUTOMATION. Indicate whether the technique is automated (YES) or manual (NO). If yes indicate:

(1) LANGUAGE. The language used (e.g., COBOL, FORTRAN IV, BASIC, etc.) and indicate what version of the language was used (e.g., FORTRAN IV version G).

(2) HARDWARE. The type of hardware the technique is designed for or used on (e.g., IBM 4340, CDC 6600, UNIVAC 1106, etc.).

(3) REMARKS. Any additional information which may be helpful (e.g., time share available, unique hardware requirements, core size requirements). This block is optional.

5. LIFE CYCLE PHASE. Darken the circle(s) of the appropriate life cycle phase(s) during which the technique can be used to cover MIL-STD-1388-1A tasks to be performed in that phase.

6. LSAR INTERFACE. Darken the circle(s) of the appropriate LSAR data record(s) which provide information to the technique (input) or is an output of the technique. The LSAR data sheets shown on the information sheet could be applied to either the Army LSAR version (DARCOM-P 750-16) or the new DOD LSAR version (MIL-STD-1388-2A).

7. APPLICATION. Identify any systems (preferably Army) on which the technique has been applied within the last 5 years. If the technique is under development, so state in the block and state the system it is being developed for.

8. LSA TASK INTERFACE. Darken the circle(s) of the appropriate LSA task(s) and indicate the LSA subtask(s) (MIL-STD-1388-1A) which is supported by the technique.

9. DOCUMENTATION AVAILABLE. Identify any documentation available on the technique, e.g., user's guide. Should include source from which documents can be obtained (if different than proponent), document classification (proprietary, for Government use only, classified secret, etc.), and any associated cost.

PART 3.

1. TECHNIQUE. The formal name of the technique as stated in Part 1.

2. LEVEL OF DETAIL. Darken the circle(s) of the appropriate level of detail that the technique can be applied. Some techniques can be applied to either or both system or Line Replaceable Unit (LRU) level.

3. OPERATIONAL SCENARIO. Darken the circle(s) of the appropriate operational scenario that the technique can be applied. Some techniques can be applied to either or both war and peace. This is being used to determine if the technique can be used to address both or either wartime readiness measures (e.g., daily sortie rates) or peacetime readiness questions.

4. MODEL TYPE. Darken the circle of the appropriate model type that the technique best fits (either dynamic or steady state). Dynamic implies that the technique uses probability distributions, simulation languages, queues, etc., in its calculations. Steady state implies that the technique is straightforward and does not predict parameters in its calculations.

5. ILS ELEMENT ADDRESSED. Darken the circle(s) of the appropriate ILS element(s) that the technique addresses. The ILS elements could

be either input to, output from, or evaluated in the technique. The ILS elements listed are from DODD 5000.39(1-9) and AR 700-127(10-12).

6. DEVELOPER. Identify the organization (private industry or Government agency) who developed the technique. Should include organizational name, individual POC, address and telephone number (both AUTOVON and commercial). Even though no private industry developers will be included in this pamphlet, the information is needed so that this pamphlet can be made available to those organizations with an interest in LSA. The LSA executive agent will provide addresses of private industry developers on a need-to-know basis.

7. STATUS. Darken the circle(s) which properly reflects the status of the technique. If the circles for "under development" or "being modified" is darkened, enter the scheduled completion date for the effort.

LSA TECHNIQUE INFORMATION SHEET

(PART 1)

(AMC-P 700-4)

TECHNIQUE

PURPOSE

DESCRIPTION

PROPONENT	**CURRENT USERS/POC**

AMC FORM 2759a-R
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LSA TECHNIQUE INFORMATION SHEET

(PART 2)

(AMC-P 700-4)

TECHNIQUE

INPUTS

OUTPUTS

AUTOMATION

YES ○ NO ○

LANGUAGE

HARDWARE

REMARKS

LIFE CYCLE

CONCEPT ○
D&V ○
FSD ○
PROD/DEPLOY ○

LSAR INTERFACE
(DATA RECORDS)

○ A ○ D ○ G
○ B ○ E ○ H
○ C ○ F ○ J

APPLICATIONS

LSA TASK INTERFACE

○ 101
○ 102
○ 103
○ 201
○ 202
○ 203
○ 204
○ 205
○ 301
○ 302
○ 303
○ 401
○ 402
○ 403
○ 501

DOCUMENTATION AVAILABLE

AMC FORM 2759b-R
1 Jun 85

LSA TECHNIQUE INFORMATION SHEET

(PART 3)

TECHNIQUE

LEVEL OF DETAIL

○ SYSTEM

○ LRU

OPERATIONAL SCENARIO

○ PEACE

○ WAR

MODEL TYPE

○ STEADY STATE

○ DYNAMIC

ILS ELEMENTS ADDRESSED

1. ○ THE MAINTENANCE PLAN
2. ○ MANPOWER AND PERSONNEL
3. ○ SUPPLY SUPPORT (INCLUDING INITIAL PROVISIONS)
4. ○ SUPPORT AND TEST EQUIPMENT
5. ○ TRAINING AND TRAINING DEVICES
6. ○ TECHNICAL DATA
7. ○ COMPUTER RESOURCES SUPPORT
8. ○ PACKAGING, HANDLING, STORAGE, AND TRANSPORTATION
9. ○ FACILITIES
10. ○ TRANSPORTATION AND TRANSPORTABILITY
11. ○ STANDARDIZATION AND INTEROPERABILITY
12. ○ DESIGN INFLUENCE TO INCLUDE LOGISTICS RELATED RAM

DEVELOPER

STATUS

PROPRIETARY ○
NON–PROPRIETARY ○
UNDER DEVELOPMENT ○
BEING MODIFIED/ENHANCED ○
COMPLETION DATE ○

AMC FORM 2759c-R
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Glossary

List of Abbreviations/Acronyms

AAH	Advanced Attack Helicopter
AAPR	Army Aviation Program Review
AAPRSO	Army Aviation Program Review Sustained Operations
Acq	Acquisition
ADP	Automated Data Processing
ADPS-14	Automated Data Processing System 14
AFALC	Air Force Acquisition Logistics Command
AFARV	Armored Forward Area Resupply Vehicle
AFATDS	Advanced Field Artillery Tactical Data System
AFB	Air Force Base
AFLC	Air Force Logistics Command
AFLCP	Air Force Logistics Command Pamphlet
AFOTEC	Air Force Operational Test and Evaluation Center
AFPCH	Army Force Planning Cost Handbook
AFSC	Air Force Systems Command
AFSCP	Air Force Systems Command Pamphlet
AFSM	Artillery Force Simulation Model
Ag	Agency
Agcy	Agency
AH-1S	Cobra (Modern Attack Helicopter)
AH-64	Apache (Advanced Attack Helicopter)
AHIP	Army Helicopter Improvement Program
ALDT	Administrative Logistics Down Time
ALMC	US Army Logistics Management Center
AMC	US Army Materiel Command (Formerly DARCOM)
AMSAA	US Army Materiel Systems Analysis Activity
AN/MLQ-34	TACJAM (Tactical Communications Jammer)
AN/MSM-105	Automatic Test Equipment and Repair Facility
AN/TMQ-31	FAMAS (Meteorological Data System)
AN/TPQ-37	Firefinder (Firefinder-Artillery)
AN/TRC-170	Radio Term Digital Set
AN/TRQ-32	Radio Receiving Set (Term Mate)
AN/TTC-39	Automatic Communication Central Office, CS
AN/TTC-42	Central Office Telephone, Automatic
AN/TYC-39	Automatic Communication Central Office, MS
AN/UGC-74	Communication Terminal
AN/USM-410	Automatic Test Equipment Station
AN/USQ-86	MICNS (Modular Integrated Communication/ Navigation System)
AN/UXC-4	Tactical Digital Facsimile
AN/UYK-7	Computer, General Utility Data Processing
AN/UYK-20	Computer, General Utility Data Processing
AN/UYQ-19	Tactical Computer Terminal
AN/UYQ-30	Tactical Computer System
AN/WSN-2	Stabilized Gyrocompass (USN)
Ao	Operational Availability
APC	Armored Personnel Carrier
APG	Aberdeen Proving Ground

App	Appendix
AR	Army Regulation
ARI	Army Research Institute
ASARC	Army System Acquisition Review Council
ASCII	American Standard Code for Information Interchange
ASD	Aeronautical Systems Division
ASL	Authorized Stockage List
ATE	Automatic Test Equipment
ATSS	Automatic Test Support System
ATTN	Attention
AV	AUTOVON
AVRADA	Aviation Research And Development Agency
AVSCOM	US Army Aviation Systems Command

B-1	Air Force Bomber
B-52	Air Force Bomber
BASIC	Beginner's All-purpose Symbolic Instruction Code
BFVS	Bradley Fighting Vehicle System
BITE	Built-In Test Equipment
Blackhawk	Utility Helicopter
BPI	Bits Per Inch
BRADC	US Army Belvoir Research and Development Center
BRL	Ballistics Research Lab
BRU	Battalion Replaceable Unit
BTE-77	Battery Test Equipment 77

C-5	Cargo Aircraft (USAF)
C-1[illegible]	Cargo Aircraft (USAF)
C-1[illegible]	Cargo Aircraft (USAF)
CAA	US Army Concepts Analysis Agency
CACDA	US Army Combined Arms Combat Developments Activity
CAIG	DOD Cost Analysis Improvement Group
CAORA	US Army Combined Arms Operations Research Activity
CAWS	Cannon Artillary Weapon System
CBS	Cost Breakdown Structure
CCSS	Commodity Command Standard System
CDB	Consolidated Data Base
CDC	Control Data Corporation
CDEP	Common Data Extraction Programs
CECOM	US Army Communications-Electronics Command
CH-47D	Chinook (Cargo Helicopter)
Cmd	Command
Cntr	Center
Cntrl	Control
COBOL	Common Business Oriented Language
com	Commercial
COM-GEOM	Combinatorial-geometry program
CONUS	Continental United States
CPU	Central Processing Unit
CS	Combat Support
CSS	Combat Service Support
CSSMAA	Combat Service Support Mission Area Analysis
CSWS	Combat Support Weapon System

Ctr	Center
CUCV	Utility, Cargo Truck, 4x4
DAAS	Defense Automatic Addressing System
DAMMS	Department of the Army Movement Management System
DAMMS-MPM	Department of the Army Movement Management System - Movement Planning Module
DARCOM	US Army Materiel Development and Readiness Command
DGM	Digital Group Multiplier
Div	Division
DIVADS	Division Air Defense System (or Gun)
DLSIE	Defense Logistics Studies Information Exchange
DOD	Department of Defense
DODD	Department of Defense Directive
DOS	Disk Operating System
DS	Direct Support
DSARC	Defense System Acquisition Review Council
DSLOG	Deputy Chief of Staff for Logistics
DSWS	Division Support Weapon System
DTIC	Defense Technical Information Center for Scientific and Technical Information
D&V	Demonstration and Validation Phase
ECP	Engineering Change Proposal
Engr	Engineering
ERADCOM	US Army Electronics Research And Development Command
ERPSL	Essential Repair Parts Stockage List
ESPAWS	Enhanced Self-Propelled Artillery Weapon System
Estl	Essential
EVADE	Evaluation of Air Defense
F-15	Air Force Fighter
F-16	Air Force Fighter
F-111	Air Force Fighter
F/A-18A	Hornet (Navy Fighter/Attack Plane)
FAAR	Forward Area Alert Radar
FAASV	Field Artillery Ammunition Support Vehicle
FF	Failure Factors
FISTV	Fire Support Team Vehicle
Flipper	Mine Dispenser, XM138
FMECA	Failure Mode, Effects and Criticality Analysis
FMRT	Fire Mission Response Time
FOTS-LH	Fiber Optics Transmission System - Long Haul
FSD	Full-scale Development Phase
Ft	Fort
FVS	Fighting Vehicle System
G&A	General and Administrative (also GA)
GAIT	Ground Airborne IONDS Terminal
GASP IV	Generalized Attributes Simulation Package
Gd	Grounds
GEMSS	Ground Employed Mine Scattering System
GPS	Global Positioning System

GPSS	General Purpose Simulation Language
Grd	Grounds
GS	General Support
GSA	General Services Administration
GSE	General Support Equipment
H8-60D	Helicopter
HAWK	Homing All the Way Killer (ground to air missile)
HEI	High Explosive Incendiary
Hellfire	Heliborne Missile
HELP	Howitzer Extended Life Program
HM/AE	Military Manpower vs. Hardware Procurement Cost Model System for Aircraft Electronics
HMMWV	Highly Mobile Multipurpose Wheeled Vehicle
HP	Hewlett Packard
HQ	Head-Quarters
HQ DA	Department of the Army
I	Intermediate
IAW	In Accordance With
IBM	International Business Machines
I HAWK	Improved HAWK (Air Defense Missile System)
ILS	Integrated Logistics Support
ILSP	Integrated Logistics Support Plan
IMF	Improved Message Facility
IONDS	Integrated Operational Nuclear Detonation Detection System
IRLA	Item Repair Level Analysis
IRO	US Army Inventory Research Office
JSTARS	Joint Surveillance Target Attack Radar System
LACV-30	Lighter-than Air Cushioned Vehicle 30 ton
LANCE	Ground to ground missile
LANTERN	Low Altitude Terrain Infrared Navigation
LAV	Light Armored Vehicle
LCC	Life Cycle Cost
LCN	LSA Control Number
LCSS	Land Combat Support System
LEA	US Army Logistic Evaluation Agency
LIN	Line Item Number
LOA	Letter of Agreement
LOR	Level of Repair
LP	Linear Programing
LR	Letter Requirement
LRA	Line Replaceable Assembly
LRI	Lowest Replacement Item
LRU	Line Replaceable Unit
LSA	Logistics Support Analysis
LSAP	Logistics Support Analysis Plan
LSAR	Logistics Support Analysis Record
LSA-TWG	Logistics Support Analysis Technical Working Group
M1	Abrams Main Battle Tank

M1E1	120MM Turret M1 Tank
M2	Bradley Infantry Fighting Vehicle
M3	Bradley Calvary Fighting Vehicle
M9	ACE (Armored Combat Earthmover)
M60A1	Tank
M109	Howitzer
M198	Howitzer 155MM
M813	Truck
MAC	Maintenance Allocation Chart
MAC	Military Airlift Command
Maint	Maintenance
MAPS	Modular Azimuth Positioning System
MARS	Materiel Acquisition Readiness System
Matl	Materiel
MAV	Minimum Acceptable Value
MCF	Military Computer Family
MCS	Manuever Control System
MCTBF	Mean Calendar Time Between Failures
MCTBF	Mean Corrective Time Between Failures
MDC	Maintenance Data Collection
MEMO	Army Mission Essential Maintenance Only
Mgmt	Management
MICOM	US Army Missile Command
MIL-STD	Military Standard
MLRS	Multiple Launcher Rocket System
MOS	Military Occupational Specialty
MPM	Movement Planning Module
MPT	Manpower, Personnel and Training
MRBF	Mean Time Between Rounds
MRC	Materiel Readiness Command
MRO	Materiel Release Order
MRSA	US Army DARCOM Materiel Readiness Support Activity
MSRT	Mean Supply Response Time
MSCS	Multi-Service Communications System
MSRS	Materiel Systems Requirements Specifications
MTBCT	Mean Time Between Corrective Tasks
MTBF	Mean Time Between Failures
MTBR	Mean Time Between Removal
MTBUM	Mean Time Between Unscheduled Maintenance
MTCC	Modular Tactical Communication Center
MTD	Maintenance Task Distribution
MTDA	Modified Table of Distribution and Allowances
MTOE	Modified Table of Organization and Equipment
MTR	Mean Time to Restore
MTRR	Mean Time to Remove and Replace
MTT	Medium Tactical Truck
MTTR	Mean Time To Repair
MX	Missile System
N/A	Not Applicable
NATO	North Atlantic Treaty Organization
NCCS	Navy Command and Control System
NLT	No later than

NMC	Not Mission Capable
NMCS	Not Mission Capable Supply
NSIA	National Security Industrial Association
NVEOL	US Army Night Vision and Electro-Optics Lab
OH-58C/D	Near Terrain Scout Helicopter
O&M	Operation and Maintenance
O&O	Operation and Organization
O&S	Operating and Support
OST	Order Ship Time
OT&E	Operational Test and Evaluation
PACAF	Pacific Air Forces
PADS	Position/Azimuth Determining System
PCB	Printed Circuit Board
P/D	Production/Deployment Phase
PIP	Product Improvement Program
Piranha	Jammer (AN/VLQ-4)
PL/1	Programing Language One
PLISN	Provisioning List Item Sequence Number
PLL	Prescribed Load List
PLRS	Position Location Reporting System
PLSS	Precision Location Strike System
PM	Preventive Maintenance
PM	Project, Program, or Product Manager
PM-ATSS	PM Automatic Test Support System
PN	Part Number
POC	Point Of Contact
POL/AMMO	Petroleum, Oil and Lubricant/Ammunition
POM	Program Objective Memorandum
PRC-68	Radio
PV	Predicted Value
Quickfix	Countermeasures Sets Special Purpose (AN/ALQ-151)
RAM	Random Access Memory
RAM	Reliability, Availability and Maintainability
R&D	Research and Development
RDT&E	Research, Development, Test and Evaluation
Redeye	Shoulder Held Anti-Aircraft Missile System
Rembass	Intrusion Detection System (AN/GSQ-187)
RF	Radio Frequency
RIW	Reliability Improvement Warranty
R&M	Reliability and Maintainability
ROC	Required Operational Capability
RPV	Remote Piloted Vehicle
RTD	Replacement Task Distribution
SAC	Strategic Air Command
SAW	Squad Automatic Weapon (M249)
SB-3865	Automatic Communication Switching Unit
SCORES	Scenario Oriented Recurring Evaluation System
SCOTT	Single Channel Objective Tactical Terminal

Sentry	Antiballistic missile system
SHORAD C2	Short Range Air Defense Command and Control
SINCGARS-V	Single Channel Airborne Radio Subsystem
SIP	Standard Initial Provisioning
SLUFAE	Surface Launched Fuel Air Explosive
SMR	Source, Maintenance and Recoverability
SOC	Specific Operational Capability
SOLE	Society of Logistic Engineers
SRS	Slide Rule Model System
SRU	Shop Replaceable Unit
SSC	Soldier Support Center
SUSV	Small Unit Support Vehicle, M973
Sys	System
TAC	HQ Tactical Air Command
TAC	Tactical
TACCS	Tactical Computer System
TACFIRE	Tactical Fire Direction System
TACMIS	Tactical Management Information Systems
TACOM	US Army Tank-Automotive Command
TADS	Target Aircraft Designation System
TAT	Turn-Around Time
TCN	Task Code Narrative
TDA	Table of Distribution and Allowances
TDLOA	Training Device Letter of Agreement
TDLR	Training Device Letter Requirement
TDR	Training Device Requirement
TE	Test Equipment
TI-59	Texas Instruments Programable Calculator
TM	Technical Manual
TMDE	Test, Measurement, and Diagnostic Equipment
TMDS	Test, Measurement, and Diagnostic Systems
TNFS	Theater Nuclear Force Survivability Program
TOE	Table of Organization and Equipment
TO&E	Table of Organization and Equipment
TOE/MTOE	Table of Organization and Equipment/Modified TOE
TOW	Tube-launched Optically sighted wire-guided missile
TPS	Test Program Set
TRADOC	US Army Training and Doctrine Command
Tran	Transportation
TRASANA	US Army TRADOC Systems Analysis Activity
TROSCOM	US Army Troop Support Command
TSQ-73	Missile Minder
U-2 (USAF)	High Altitude Reconnaissance Aircraft
UH-1H	Heavy Utility Helicopter
UH-60A	Blackhawk Utility Helicopter
US	United States
USACAA	US Army Concepts Analysis Agency
USACC	US Army Communications Command
USAF	United States Air Force
USAFE	United States Air Force in Europe

USN	United States Navy
UUT	Unit Under Test
VECP	Value Engineering Change Proposal
Volcano	Mine Dispenser, XM139
VULCAN	Vulcan Air Defense System (AN/ISM-115)
WASPM	Wide Area Side Penetrator Munitions
WBS	Work Breakdown Structure
WSMR	White Sands Missile Range
XM16	Jet Exhaust Decontamination System
XM17	Decontamination, Nuclear, Biological, and Chemical SANATOR
XM18	Diesel-powered Decontamination Apparatus
XM21	Remote Chemical Agent Alarm
XM22	Chemical Agent Automatic Detector
XM81	Chemical Agent Alarm
XM86/85	Chemical Agent Detector
XM131/132	Modular Pack Mine System
XM138	Flipper (Mine Dispenser)
XM139	Volcano (Mine Dispenser)
XM-158	Rocket
XM963	2.5-Ton Truck

The proponent of this pamphlet is the US Army Materiel Command. Users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Commander, USAMC Materiel Readiness Support Activity (AMXMD-EL), Lexington, KY 40511-5101.

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