

MIL-STD-1369(EC)
31 MARCH 1971

MILITARY STANDARD

INTEGRATED LOGISTIC SUPPORT PROGRAM REQUIREMENTS



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DEPARTMENT OF THE NAVY
NAVAL ELECTRONIC SYSTEMS COMMAND
WASHINGTON, D. C. 20360

INTEGRATED LOGISTIC SUPPORT PROGRAM REQUIREMENTS MIL-STD-1369(EC)

1. This Military Standard was approved 31 March 1971 and is mandatory for use by the Naval Electronic Systems Command.
2. Recommended corrections, additions or deletions should be addressed to Commander, Naval Electronic Systems Command, Attn. ELEX 0517, Department of the Navy, Washington, D. C. 20360

MIL-STD-1369(EC)
31 March 1971

FOREWORD

1. Delivery to the Navy of electronic systems which meet performance requirements is a basic objective of the Naval Electronic Systems Command. The fact that a system meets performance requirements becomes a rather sterile achievement if the system is not "Mission-Ready" in every sense of the word. For a system to be "Mission Ready" it must be adequately supported from a logistics standpoint. To this end the Integrated Logistics Support (ILS) Concept was developed.
2. This standard provides formal guidance for the development and implementation of an Integrated Logistics Support Plan (ILSP). Included in this plan is the requirement to perform Logistics Support Analysis (LSA) (formerly Maintenance Engineering Analysis). The performance of LSA as a coordinated contractor/government effort assures the development of a coordinated logistics technical data base coupled with cost effective involvement of all logistics support elements.
3. Information which supplements the provisions of this standard may be published by the Naval Electronic Systems Command for the purpose of instructing personnel assigned implementation responsibilities. Deliverables resulting from the implementation of this document shall be as specified in the Contract Data Requirements List.

MIL-STD-1369(EC)
31 March 1971

CONTENTS

Paragraph	Page
1. SCOPE	1
2. APPLICABLE DOCUMENTS	1
3. DEFINITIONS	2
4. REQUIREMENTS	6
4.1 General	6
4.2 Logistic planning data	6
4.3 ILS management	7
4.3.1 Integrated logistic support plan (ILSP)	7
4.3.2 Integrated logistic support management team (ILSMT)	8
4.3.3 Planning conference	8
4.3.4 ILSMT meetings	8
4.4 ILS program interfaces	8
4.5 Logistic support analysis (LSA)	8
4.5.1 Subcontractor and vendor LSA data	9
4.5.2 LSA procedures for GPE	9
4.6 Provisioning technical documentation (PTD)	9
4.7 Data collection	9
4.8 Integrated logistic support verification and demonstration	9
5. DETAILED REQUIREMENTS	10
6. NOTES AND CONCLUDING MATERIAL	11/12
6.1 Notes	11/12
6.1.1 Objectives	11/12
6.2 Security classification	11/12
Appendix A - Integrated Logistic Support Plan (ILSP) Requirement	13
10. Purpose, organization and preparation	13
10.1 Purpose	13
10.2 Organization and preparation	13
10.2.1 Format and content	13
20. Approval	20
30. Revision	20
Appendix B - Logistic Support Analysis Requirements	21
10. Purpose, organization and preparation	21
10.1 Purpose	21
10.1.1 Objectives	21
10.2 LSA records (LSA(R))	21
10.2.1 LSA criteria	21

MIL-STD-1369 (EC)
31 March 1971

CONTENTS (Continued)

Paragraph		Page
10.2.2	LSA selection procedures	21
10.2.3	LSA worksheets	22
10.2.4	LSA review procedures	22
10.2.5	Duplication of effort	22
10.3	Document control numbers	22
10.3.1	Subcontractor and vendor-prepared (LSA(R))'s	22
10.4	Preparation	22
10.4.1	Size and quality	22
10.4.2	Data organization	22
10.5	Approval	23/24
	Appendix C - ILS Verification and Demonstration Plan	83
10.	Scope	83
20.	Preparation and application	83
30.	Management	83
40.	Demonstration location and duration	83
50.	Demonstration test team	83
60.	Demonstration system/equipment	84
70.	Maintenance and support	84
80.	Maintenance personnel	84
90.	Demonstration support material	84
100.	Maintenance data collection	84
110.	Analysis/evaluation and report results	85
120.	Change incorporation	85

CROSS REFERENCE TO DELIVERABLE DATA

<u>DATA REQUIREMENT</u>	<u>MIL-STD-1369 (EC) REFERENCE</u>
Integrated logistic support plan	4.3.1 and Appendix A
Revisions to integrated logistic support plan	4.3.1 and Appendix A Para. 30
Agenda for ILSMT meetings	4.3.4
Minutes of ILSMT meetings	4.3.4
Potential maintenance problems introduced by GFE	4.5.2b
Identification of LSA data for GFE determined to be incompatible with total system LSA requirements	4.5.2c
Summary of accrued data.	4.7
Integrated logistic support verification and demonstration plan	4.8 and Appendix C
Logistic support analysis record (including the following)	4.5 and Appendix B

MIL-STD-1369(EC)
31 March 1971

CONTENTS (Continued)

Logistic Support Analysis Cover Sheet & Supplemental Data
WORKSHEET I - Logistic Support Analysis
WORKSHEET II - Reliability Summary
WORKSHEET III - Maintainability & Maintenance Summary
WORKSHEET IV - Maintenance Analysis
WORKSHEET V - Personnel Support Summary
WORKSHEET VI - Support Equipment Requirements Summary
WORKSHEET VII - Maintenance Facility Summary
WORKSHEET VIII - Maintenance/Provisioning Decision List

MIL-STD-1369(EC)
31 March 1971INTEGRATED LOGISTIC SUPPORT
PROGRAM REQUIREMENTS

1. SCOPE

1.1 Scope. This document establishes the requirements, procedures and formats to be used for the development and documentation of an Integrated Logistic Support (ILS) Program. Integrated Logistic Support, including maintainability requirements, is the result of a planning process designed to aid in achieving maximum overall system effectiveness by taking advantage of the direct relationship which exists between hardware design characteristics and resultant logistic support requirements by considering both, concurrently throughout the design process, in a quantitative manner to provide a basis for weapons/weapon systems/ equipment optimization through sound engineering trade-off. As a result, provision is made for more timely and effective support of military weapons systems and individual equipments, in accordance with the stated weapon system plan to be used throughout the entire life cycle. In addition, the documentation required will provide accurate records to assure continuation of an adequate logistics support base throughout the operational life cycle of a weapons system or equipment.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this document to the extent specified herein.

SPECIFICATIONS

MILITARY

STANDARDS

MILITARY

MIL-STD-12	- Abbreviations for Use on Drawings and in Technical Publications
MIL-STD-470	- Maintainability Program Requirements (For Systems and Equipments)
MIL-STD-471	- Maintainability Demonstration
MIL-STD-1345(EC)	- Data, Measurement, In Support of Maintenance, Calibration and Repair of Electronic Equipment.
MIL-STD-1375	- Provisioning, Initial Support, General Requirements for.

PUBLICATIONS

MILITARY

NAVPERS 15105	- Manual of Navy Enlisted Classification.
NAVPERS 18068	- Manual of Qualifications for Advancement in Rating.
NAVSHIPS 0969-125-0250	- NAVEX Preferred General Purpose Test Equipment

MIL-STD-1369(EC)
31 March 1971

CATALOGING HANDBOOKS

- | | |
|------|--|
| H4-1 | - Federal Supply Codes for Manufactures,
Part I, Name to Code |
| H4-2 | - Federal Supply Codes for Manufacturers,
Part II, Code to Name |

(Copies of Specifications, Standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer. Cataloging Handbooks may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402)

2.2 Other Publications. The following documents form a part of this standard to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

UNITED STATES OF AMERICA STANDARDS INSTITUTE (USAS).

Y32.16 Electrical and Electronics Reference Designations.

(Application for copies should be addressed to the United States of America Standards Institute, 10 East 40th Street, New York, New York 10016.)

3. DEFINITIONS

3.1 Terms used in this document are as defined in MIL-STD-721 and MIL-STD-1375. Terms used that are not defined in MIL-STD-721 or MIL-STD-1375 have the following meanings:

3.1.1 Acquisition manager (AM). An individual charged with overall responsibility for acquisition of electronic systems, individual items of equipment, and facilities as well as for logistic support of these end items. Acquisition in this sense includes contract definition, development, test and evaluation, procurement, production, and installation of end items.

3.1.2 Allowance parts list (APL). A list of parts developed by the Department of the Navy for specific equipments and components installed on board Naval Ships or shore stations. It normally includes such information as Reference Designation (or Part Number), Source, Maintenance, and Recoverability Code, Federal Stock Number, total quantity allowed, etc.

3.1.3 Configuration management. A discipline applying technical and administrative direction and surveillance to (1) identify and document the functional and physical characteristics of configuration item, (2) control changes to those characteristics, and (3) record and report change processing and implementation.

MIL-STD-1369(EC)
31 March 1971

3.1.4 Contract data requirements list (CDRL). A listing (on DD Form 1423) of all technical data and information required to be delivered to the government by the contractor.

3.1.5 Contractor support. An arrangement during development or initial production of a system/equipment whereby the contractor is obligated to furnish to the government items and services for the maintenance and support of the system/equipment.

3.1.6 Depot maintenance. That maintenance performed on material requiring major overhaul or a complete rebuild of parts, assemblies, sub-assemblies, and end items, including the manufacture of parts, modifications, testing, and reclamation as required. Depot maintenance serves to support lower categories of maintenance by providing technical assistance and performing that maintenance beyond the responsibility of Organizational and Intermediate maintenance levels. Depot maintenance provides stocks of serviceable equipment by using more extensive facilities for repair than are available in lower level maintenance activities.

3.1.7 Equipment repair time (ERT). The median value of time required to repair an equipment.

3.1.8 Facility. A physical plant, such as real estate and improvements thereto, including buildings and equipments, which provides the means for assisting or making easier the performance of a function. Any part or adjunct of a physical plant or any item of equipment which is an operating entity and which contributes or can contribute to the execution of a function by providing some specific type of physical assistance.

3.1.9 General purpose test equipment (GPTE). Test equipment which, without requiring alteration of the basic measurement capability, measures a range of parameters of electronic functions common to two or more equipments of basically different design, used or likely to be used by more than one Naval Command.

3.1.10 Government furnished equipment/contractor furnished equipment (GEF/CFE) listing. A listing of government furnished and/or contractor furnished equipment, as defined by the contract, that make up the end item of equipment.

3.1.11 Integrated logistic support (ILS). A composite of the elements necessary to assure the effective and economical support of a system or equipment at all levels of maintenance for its programmed life cycle. As used herein, the term encompasses the consideration of these elements during the system/design engineering process, the procedures for analyzing and documenting these considerations, and the process of planning for and acquiring these elements on a timely basis.

3.1.12 Intermediate maintenance (Field). That maintenance which is the responsibility of and is performed by designated maintenance activities for direct support of using organizations. Its phases normally consist of calibration, repair, or replacement of damaged or unserviceable parts, components, or assemblies; the emergency manufacture of nonavailable parts; and the provision of technical assistance to using organizations.

MIL-STD-1369 (EC)

31 March 1971

3.1.13 Line replaceable unit (LRU). The lowest level of assembly normally removed from the system/equipment for maintenance. Such removal (and replacement) is normally accomplished at the organizational level of maintenance.

3.1.14 Logistic support analysis (LSA). A process by which the logistic support necessary for a new system/equipment is identified. It includes the determination and establishment of logistic support design constraints, consideration of those constraints in the design of the "hardware" portion of the system, and analysis of the design to validate the logistic support feasibility of the design and to identify and document the logistic support resources which must be provided, as a part of the system/equipment, to the operating and support forces. Analytical techniques used to determine limited aspects of logistic support requirements are a part of the overall LSA process. (An example would be Operational Sequential Diagramming used to determine operator tasks, task times, and skills.)

3.1.15 Logistic support analysis record (LSAR). The final documentation of the logistic support analysis, recorded in deliverable form, that is the basic source of data related to the maintenance and logistic support for a specific item.

3.1.16 Maintenance concept. A brief statement of the overall concept or policy which will control the type of maintenance action to be employed for the system/equipment or segment thereof. A statement of maintenance concept is prerequisite to the development of the Maintenance Plan.

3.1.17 Maintenance index page (MIP). A page in the PMS manual that lists for a certain equipment the title of the equipment concerned, the system card control number, a description of each maintenance requirement, the maintenance periodicity code, the skill level that should perform the maintenance requirement, related maintenance actions and notations included as management aids when such information is available and needed for selective scheduling of requirements.

3.1.18 Maintenance plan. A portrayal of (decisions pertinent to) detailed maintenance requirements, including the relation of specific corrective and preventive maintenance tasks to the applicable level of maintenance and designation of resource requirements together with their estimated rates of consumption. One key to the development of a comprehensive maintenance plan is the establishment of a coordinated, centralized technical logistics data base.

3.1.19 Maintenance requirement card (MRC). A card prepared to cover a specific planned maintenance action which contains the minimum required scheduling information and the step-by-step sequence for accomplishment.

3.1.20 Mean time between failures (MTBF). The mean equipment operating time between failures.

3.1.21 Mean time to repair (MTTR). The mean active repair time required to repair the equipment after a malfunction has occurred.

MIL-STD-1369(EC)

31 March 1971

3.1.22 Navy support date (NSD). The date on which the Navy assumes total support responsibility for an item or equipment. The NSD is a major logistics support planning milestone.

3.1.23 Navy enlisted code (NEC). A code assigned to an occupational group (rating) within the Navy to identify the skills for which enlisted personnel are trained.

3.1.24 Organizational maintenance. That maintenance which is the responsibility of and is performed by a using organization on its assigned equipment. Its phases normally consist of inspecting, servicing, lubricating, adjusting, and replacing parts, minor assemblies, and subassemblies.

3.1.25 Planned maintenance system (PMS). Management tools to plan, direct and control the preventive maintenance of all systems, sub-systems and components installed.

3.1.26 Program evaluation and review technique (PERT). A management tool requiring an estimate of the expected time to complete each activity. From these estimates the PERT evaluator can determine the critical path of events - the path where time constraints will have the greatest consequences.

3.1.27 Reference designation. A combination of letters and numbers used to identify and locate discrete units, portions thereof and basic parts of a specific set (refer to USASI-Y32.16 for detailed explanation).

3.1.28 Request for proposal (RFP). Request for the manufacturer to submit a proposal supported by cost breakdown. It provides a description of the items to be procured. It may include specifications, quantities, time and place of delivery, method of shipment, packaging and instruction manual requirements and material to be furnished.

3.1.29 Special purpose support equipment (SPSE). Support equipment which must be designed and developed in conjunction with the development of the equipment/system being acquired.

3.1.30 Special purpose test equipment (SPTE). Test equipment which must be designed and developed in conjunction with the development of the equipment/system being acquired.

3.1.31 System/equipment. Synonymous with the term "end item" as defined in MIL-STD-1375 (Navy).

3.1.32 Technical logistics data and information. The term "technical logistics data and information," as used herein, refers to specific documents containing technical logistics information acquired from contractors, prepared by the Military Departments or obtained from other government departments and agencies. The term includes, but is not limited to, the following types of documents:

- (a) Engineering Drawings (includes prints and associated lists)
- (b) Standards

MIL-STD-1369(EC)
31 March 1971

- (c) Specifications
- (d) Technical Manuals
- (e) Hardware Changes and Modifications
- (f) Inspection and Testing Procedures
- (g) Performance and Failure Data
- (h) Reports

- (1) Status
- (2) Analyses
- (3) Lists
- (4) Plans
- (5) Records (where applicable, specific types of documents will be identified for each requirement)

3.1.33 Test facilities. Those electrical and mechanical equipments, monitoring devices, special tools, jigs and fixtures, either built-in or used separately, which are necessary from both an operational and maintenance view-point to examine, test, trouble-shoot, align, monitor, measure, adjust, calibrate, repair or otherwise maintain the original functional operating status of an electronic system, subsystem, equipment, or part.

3.1.34 Test point. A convenient and safe access to a circuit which is to be used so that a significant quantity can be measured or introduced to facilitate maintenance, repair, calibration, alignment, or monitoring.

3.1.35 Turn-around-time. That element of maintenance time needed to service or check-out an item for recommitment.

3.1.36 Work breakdown structure (WBS). A product-oriented family tree composed of hardware, software, services, and other work tasks which result from project engineering efforts during the development and production of a defense material item, and which completely defines the project/program. A WBS displays and defines the product(s) to be developed or produced and relates the elements of work to be accomplished to each other and to the end product.

4. REQUIREMENTS

4.1 General. Technical logistic data and information generated through procedures set forth herein provide the medium of communication between the government and the contractor relative to maintenance and logistic support of systems and equipments. The requirements for the development and documentation of an ILS Program will vary in degree and depth as specified in appropriate addenda to this document and the contract. The contractor shall establish management controls that preclude duplication of effort in the development of data required by this document.

4.2 Logistic Planning Data. The contractor shall base all ILS planning and procedures upon logistic planning data provided by the system/equipment specification and other applicable procurement documents. These data will include, but may not be limited to, the following:

MIL-STD-1369(EC)
31 March 1971

- (a) Mission and operational parameters. Collectively, mission and operational parameters may be described and referred to as a "Plan for Use". This class of parameters includes the following:
- (1) Requirements for the components of availability; reliability and maintainability
 - (2) Mission profiles. (Description of Mission(s))
 - (3) System operational states (Modes) required by the mission parameters
 - (4) Mission time factors and system utilization
 - (5) Operational environment(s)
 - (6) Identification of analogous systems and description of experience related thereto
 - (7) Description of magnitude, deployment, and duration of the system life cycle
 - (8) Configuration to the depth known at this time
- (b) Maintenance parameters. These parameters include:
- (1) Description of maintenance echelon structure contemplated and limitations of each echelon
 - (2) Expected dependence on contractor support
 - (3) Description of facility constraints in support of the system being acquired
 - (4) Critical tolerances of physical and electrical characteristics
- (c) Maintenance support parameters. These parameters include:
- (1) Description of existing facilities.
 - (2) Description of the manpower and material resources already available
 - (3) Identification of known deficiencies of logistic support elements
 - (4) Identification of support fund limitations expressed in terms of initial investment in logistic support and annual logistic costs over the system/equipment life cycle

4.3 ILS management.

4.3.1 Integrated Logistic Support Plan (ILSP). The contractor shall develop an ILSP which will provide detailed plans for satisfying the requirements of this document. The ILSP shall be presented for approval at the Planning Conference and shall be periodically updated throughout the life of the contract. It should be noted that the function and intended use of the ILSP dictate two unique characteristics with respect to its prescribed content. First, its use as the single controlling document for an ILS Program necessitates the inclusion of data and planning information contained in other documents (e.g., hardware performance specifications and related contractor plans). Therefore, when the ILSP is submitted as part of a proposal package, it will necessarily include information also required in other portions of the proposal package. Secondly,

MIL-STD-1369(EC)

31 March 1971

to the extent that the ISLP is a joint Navy/contractor plan, updated information for inclusion in the plan will be provided by the Navy, particularly to the Section titled "Navy/Contractor ILS Planning Process", with respect to government participation in the ILS planning process.

4.3.2 Integrated Logistic Support Management Team (ILSMT). A joint government/contractor ILSMT will be established. The ILSMT will normally be an outgrowth of the government ILS Team that was previously formed during Concept Formulation or Validation phases of the acquisition for the purpose of initiating the ILS Program. The Chairman of the ILSMT will be appointed by the government. Sub-teams or committees may be established when justified, to provide detailed management of elements such as personnel and training, provisioning, and support equipment. The ILSMT will manage the combined contractor/government ILS functions. It will, as a minimum, provide the means for coordination; monitor contractor schedules and performance; insure adequacy and timeliness of government input and actions; and support the Acquisition Manager in carrying out his support responsibilities. The contractor shall participate in and support the ILSMT to the extent required for effective joint management of the ILS Program in accordance with the terms of the contract.

4.3.3 Planning conference. Subsequent to contract award, the ILSMT will be convened by the Chairman for the purpose of organizing the joint government/contractor ILS effort. This planning conference will serve to orient the participants to the contents of the contractor's ILSP, to provide for a clear understanding of the scope of effort required of the contractor and the government, and to initiate further modification of the ILSP and amendment of the contract ILS work statement.

4.3.4 ILSMT meetings. Periodically, as scheduled in the ILSP, the ILSMT will meet for the purpose of reviewing all aspects of the contractor's execution of the ILSP and the government inputs to the ILS Program. The meetings will be held at such places as may be mutually agreeable to the ILSMT Chairman and the contractor. The contractor shall prepare and submit to the ILSMT Chairman a proposed agenda for each meeting not later than 20 days prior to the meeting. As a minimum, agenda shall provide for progress reporting, analysis of problem areas, evaluation of schedules, and changes to the ILS Program. Not later than 15 days subsequent to each meeting, the contractor shall submit minutes of the meeting for the approval of the ILSMT Chairman.

4.4 ILS program interfaces. The contractor shall plan for conducting the ILS program consistent with other contractual programs specified in the contract. The contractor's ILSP shall clearly demonstrate, for the particular contract, the relationships, interfaces, and applicability of these programs to the ILS planning process.

4.5 Logistic support analysis (LSA). The contractor shall perform an LSA covering all contractor furnished items which are determined to impose maintenance requirements on the contract end item(s) in accordance with Appendix B. The analysis shall also cover Government Furnished Equipment (GFE) to the degree and depth specified by the contract. The LSA shall be

MIL-STD-1369 (EC)

31 March 1971

conducted by engineers with specialized experience in maintenance and logistic support engineering. It will involve the critical examination of the proposed or actual design of a functional system, set, group, unit, assembly, or subassembly to establish the most effective and efficient procedure for performing maintenance and to determine the logistic resources required to support the system or equipment at all levels of maintenance.

4.5.1 Subcontractor and vendor LSA data. The contractor shall incorporate in subcontractor and vendor contractual specifications a requirement to produce the LSA data and all data identified by the LSA process, needed by the contractor to meet the requirements of this document. Procedures shall be established for assuring that the subcontractor or vendor LSA procedures are consistent with overall item requirements, and provide adequate surveillance of the subcontractor's or vendor's activities.

4.5.2 LSA procedures for GFE.

- (a) When GFE is to be integrated with contractor furnished items, the contractor shall be furnished GFE LSA data by the procuring activity.
- (b) Potential maintenance problems introduced by GFE shall be identified and reported to the procuring activity.
- (c) Government furnished LSA data determined to be incompatible with total system LSA requirements, either by design change or change in maintenance policy, shall be reported to the procuring activity.
- (d) In the event LSA data is not available, the procedures of Appendix B, or other procedures provided in the contract, shall be followed to obtain or estimate the data for GFE.

4.6 Provisioning technical documentation (PTD). The contractor shall prepare and submit PTD in accordance with the Contract Data Requirements List (CDRL). The PTD shall be based upon data developed during the LSA, especially that data recorded on Worksheets IV and VIII of Appendix B.

4.7 Data collection. The contractor shall establish and implement a data collection system compatible with the Navy "3M" Data System for delivery of data to the Navy when requested.¹ At the very minimum, a documented summary of data accrued shall be made available to ILSMT members at each ILSMT conference.

The contractor will commence data collection concurrently with the completion of the first unit of system hardware, and continue until notified otherwise by the Navy.

4.8 Integrated logistic support verification and demonstration. Three (3) stages for verification and demonstration of maintainability and integration of maintenance resources are required for control purposes. These stages are as follows:

¹This data will be utilized in conjunction with the LSA (Appendix B) to assist in the substantiation of Logistics support requirements.

MIL-STD-1369(EC)
31 March 1971

4.8.1 Stage one. Stage one will be in general accordance with MIL-STD-471 and shall be progressively implemented during breadboarding or mock-up of the system/equipment and its sub-systems including support equipment. It shall continue through evaluation of the first representative production end article identified and scheduled specifically for the purpose. During this stage, the contractor will evaluate accessibility, simplicity, equipment size, working environment, maintenance resource requirements, human engineering consideration, and that the operational requirements can be met without exceeding programmed maintenance resources. In addition, this stage shall include evaluation of compatibility between maintenance resources. The initial maintainability predictions shall be continuously verified and updated during this phase. Not later than thirty (30) days after the conclusion of the maintainability demonstration and verification, the contractor shall submit to the Administrative Contracting Officer a report of the verifications. This report shall include all pertinent data and observations, photographs or sketches or major problem areas, and recommendations for corrective action as required. Subsequently, maintainability predictions and maintenance resource requirements data contained in the LSA shall be appropriately updated.

4.8.2 Stage two. Stage two will occur concurrently with the test program during which time and achievement of the end article maintainability and other logistic support requirements will be verified. The verification shall be performed on a test system as specified in the test plan. The specific time phasing, and the maintainability and other logistic support requirements to be verified and demonstrated shall be stipulated by the contractor, agreed to by the Naval Electronic Systems Command and be included in the maintainability program plan. The demonstration will utilize the numbers and skill levels of personnel and maintenance resources recommended by the LSA and agreed to be the government. Publications and support equipment will be examined for adequacy, compatibility, and capability to support the established maintenance concept. Maintainability predictions and maintenance resource data requirements shall be updated during this stage.

4.8.3 Stage three. Demonstration of the in-service end article maintainability characteristics and integration of maintenance resources will be accomplished by the Naval Electronic Systems Command. In-service verification will be accomplished using only those tools, equipment, data, training, personnel, and material resources which have been programmed and provided. In-service demonstration of the weapon system maintainability and maintenance support requirements will be in accordance with Appendix C of this standard.

5. DETAILED REQUIREMENTS

5.1 The detailed requirements of this standard are contained in the appendices which are a part of this standard. Appendix A provides comprehensive guidance relative to the development, submittal and approval of an Integrated Logistics Support Plans (ILSP). Appendix B provides procedures and guidance which will facilitate development of an optimum Logistics Support Analysis (LSA) Program. Included is detailed information regarding the preparation of data worksheets which will be utilized to document the accomplishment

MIL-STD-1369(EC)
31 March 1971

of LSA. Appendix C provided guidelines for the establishment of an Integrated Logistics Support and Demonstration Program.

6. NOTES AND CONCLUDING MATERIAL

6.1 Notes

6.1.1 Objectives. The objectives of this document are to:

6.1.1.1 Organize a combined government/contractor management effort as required to achieve effective and economical logistic support of systems/equipments.

6.1.1.2 Document the management organization, disciplines, controls, and contract work statements in a contractor-developed ILS Plan.

6.1.1.3 Cause hardware design decisions to be influenced by and reflect consideration of logistic support requirements.

6.1.1.4 Achieve systematic control over the definition and integration of the elements of maintenance and logistic support concurrently with system/equipment development, production, and introduction into operational use.

6.1.1.5 Achieve definition of the ILS Program interfaces with systems/design engineering, configuration management, maintenance and material management (3M), data management, life cycle costing, standardization, and other related programs specified in the contract.

6.1.1.6 Document the results of the Logistic Support Analysis in a Logistic Support Analysis Record.

6.1.1.7 Provide for the demonstration and validation of logistic resources on an integrated basis and consistent with other related test and demonstration requirements.

6.1.1.8 Define requirements for contractor support and/or contract maintenance of systems and equipments by development and production contractors.

6.2 Security classification. Security and classification of material shall be accomplished in accordance with contract security regulations. Every effort shall be made by the contractor to limit the need for classifying the data furnished in accordance with the requirements of this document. When data is classified it shall be made as a separate supplement to the basic data requirement to which it applies.

Preparing activity:
Navy - EC
(Project EDS-N019)

MIL-STD-1369 (EC)
31 March 1971

APPENDIX A

INTEGRATED LOGISTIC SUPPORT PLAN (ILSP) REQUIREMENT

10. Purpose, organization and preparation.

10.1 Purpose. The ILSP will be used as the controlling document for executing a joint Navy/contractor ILS program applicable to contracts issued by the Naval Electronic Systems Command.

10.2 Organization and preparation. The ILSP shall be organized into four major sections. The specific content of each major section of the ILSP shall be in accordance with the requirements set forth herein. Each segment of Section 4, the Plan for Support, paragraph 10.2.1.4, shall be keyed to the Work Breakdown Structure (WBS) element(s) within which the cost to execute the plan and to deliver specified products has been included. The ILSP shall be typed or printed on durable white paper. Page size shall be 8-1/2(W) x 11 (L) inches. Pages shall be punched suitable for binding in a three-ring loose-leaf binder.

10.2.1 Format and content. The ILSP shall be arranged by sections and shall contain the following in the sequence indicated:

10.2.1.1 Section 1 - Introduction

10.2.1.1.1 Purpose and scope. Provide a concise statement on the scope and intended purpose of the ILSP as the controlling document for executing a joint Navy/contractor ILS Program in consonance with the specific requirements of the acquisition project to which it applies.

10.2.1.1.2 ILSP brief. Provide a concise description of the ILSP sufficient to establish a clear understanding of the total scope, content, and organization of the material presented.

10.2.1.1.3 Updating process. Describe the manner in which changes and revisions to the content of the plan will be developed and incorporated therein. Specifically point out provisions for updating applicable sections of the ILSP to reflect changes to established baselines controlled by configuration management, the contract work statement, and other contractor plans summarized in the ILSP.

10.2.1.2 Section 2 - Summary of system characteristics. The data included in this section will be an abstract of the detailed data contained in the system and configuration element specifications, and will serve to convey an understanding of the significant characteristics of the system, and the manner in which the system will be employed in its intended operational environment. The requirements of major significance will be stated in this section with reference to specific paragraph numbers of applicable documents for amplifying detail.

MIL-STD-1369 (EC)

31 March 1971

10.2.1.2.1 System description. Describe briefly the functional and physical characteristics of the system and its major segments, including the relationship between major system segments and the identity of major subcontractors and GFE contractors involved with each. Include a description of the physical and functional relationships between the contract end items and associated systems with which they will interface when operational. Block diagrams or other graphic means may be used as determined necessary to support this text.

10.2.1.2.2 Mission profile. A detailed time line analysis of the system response requirements as related to system mission(s) shall be prepared for normal and degraded system operation. The analysis shall include all modes of operation including secondary modes and the probability of using each mode of operation on system state. The amount of degradation which can occur without affecting mission success shall be determined for each mode of operation and for the system as a whole.

10.2.1.2.3 Operational parameters. Provide a summary of operational parameters having an impact on logistic planning. The discussion shall include (as applicable), but not be limited to duty cycle, maximum allowable down time, geographical environment, life expectancy, and special environmental requirements.

10.2.1.2.4 Maintenance parameters. Provide a summary of the maintenance parameters, such as provisions for locating spares close to installed equipment, centralized maintenance management, and operation and maintenance within prescribed rates and skill levels.

10.2.1.2.5 Reliability program. Summarize the reliability program, covering the following points:

- (a) The system MTBF (include probability statement)
 - (1) Required
 - (2) Predicted
 - (3) Demonstrated (including decision risks and discrimination ratio)
- (b) Any redundancy used in the design including fail-safe devices
- (c) List any components with a known useful life and frequency of replacement.
- (d) List component and shelf life of all components with a known shelf life (storage)
- (e) List the ten Line Replaceable Units (LRU) with the highest failure rate

10.2.1.2.6 Maintainability program. Summarize the maintainability program covering as a minimum the following:

- (a) The system MTTR
 - (1) Required
 - (2) Predicted
 - (3) Demonstrated

MIL-STD-1369(EC)
31 March 1971

- (b) List the ten repair actions with the highest repair rate for both preventive and corrective maintenance

10.2.1.2.7 Test points and test facilities. Provide a summary of the requirements to provide test points and built-in test facilities in order to facilitate rapid localization of malfunction, and to effect efficient maintenance, repair, calibration, alignment, and monitoring of electronic and electro-mechanical systems.

10.2.1.2.8 Human factors engineering. Summarize the requirements for analysis of the system configuration from the standpoint of the interfaces between the operator/maintenance personnel and the system hardware. Include the following, as applicable:

- (a) Physical interface between personnel and equipment
- (b) Design of displays and controls
- (c) Arrangement of working spaces
- (d) Consideration of support and safety factors

10.2.1.2.9 Safety engineering. Summarize the safety requirements with emphasis on the procedures for liaison, coordination and exchange of data between safety engineering and ILS planning functions. As a minimum, provide a summary of the safety principles to be applied relative to operator, maintenance and equipment handling tasks.

10.2.1.2.10 Other requirements of major significance. Summarize any requirements not listed above which will affect employment of the system.

10.2.1.3 Section 3 - Navy/Contractor ILS planning process. The purpose of the planning data incorporated in this section is to provide a description of the overall process, involving both the Navy and the contractor, that will be employed in planning, developing, and acquiring an ILS package.

10.2.1.3.1 Contractor's objectives, policies, and general management Procedures. State the contractor's objectives, policies, and general management procedures as they relate to the ILS program that has been planned for the system under development (or production).

10.2.1.3.2 Contractor's ILS organizational structure. Describe the organizational structure that has been selected by the contractor to accomplish the contractual effort delineated in the ILSP. Provide a statement of responsibility and authority for each organizational element. State the rationale supporting the contractor's organizational structure.

10.2.1.3.3 Subcontractor and vendor interface management. Indicate the major subcontractors involved in the ILS program and describe the scope of ILS work assigned to each, the method of controlling the accomplishment of this work, and the organization interfaces established with each subcontractor. Include a general description of the method of specifying ILS requirements in vendor

MIL-STD-1369(EC)

31 March 1971

purchase orders and controlling the accomplishment of specified work and deliverable data. The text may cross-reference the procurement plan for amplifying detail.

10.2.1.3.4 Navy ILS organizational interface. Include a description of the Navy ILS organization established for the particular acquisition and indicate the relationships with the contractor's ILS organization delineated in 10.2.1.3.2 above. Initially, this description will consist of the planning information provided in the RFP.

10.2.1.3.5 GFE planning data. Provide a listing, in equipment nomenclature sequence, of GFE to be integrated into the system. Indicate the quantity of each equipment to be provided, date required, and point of delivery/acceptance. Include for each equipment identification and date required of all supporting logistic data determined to be necessary to meet contractual requirements. Also include identification of any other requirements related to GFE to be provided under the end item contract.

10.2.1.3.6 ILS Management Team (ILSMT). Describe the function, composition, and mode of operation of the ILSMT. Include the manner in which agenda for team meetings will be established, minutes and action items resulting from team meetings will be documented, and follow-up corrective action will be accomplished and controlled. Indicate the degree of responsibility and authority that has been delegated to the designated contractor representatives to this team and the manner in which subcontractors will participate in team meetings. State the interval and proposed location at which team meetings will be scheduled.

10.2.1.3.7 Cost, schedule and technical control. Provide a summary description of the system employed by the contractor to control the cost, schedule, and technical requirements of the contract. Emphasize the manner in which the contractor's management system will be applied to control the ILS contractual effort delineated in this plan. Reference to the contractor's management plan may be made for amplifying details of the overall management control system applicable to the contract.

10.2.1.3.8 Configuration management program. Describe the contractor's configuration management organization including policies, responsibilities, authority and its relationship and interfacing activity with the overall management organization and the ILS program. Identify briefly the ILS and configuration documentation to be used in establishing configuration baselines, configuration control, and status accounting.

10.2.1.3.9 Major program milestones. Major milestones of the ILS program shall be identified, described, and graphically displayed. If PERT or a similar technique is an established contract requirement, or elected by the contractor as a planning and control technique, the ILS milestones shall appear on the PERT network(s) and shall be keyed to the appropriate event number.

10.2.1.3.10 Communication media. Describe the system for documenting, storing, retrieving and communicating information, data, and decisions of the ILS planning process. Discussion shall cover:

MIL-STD-1369 (EC)
31 March 1971

- (a) Deliverable data to the Navy in accordance with the terms of the contract (i.e., data items specified in the CDRL)
- (b) Documentation furnished by the Navy to the contractor
- (c) Documentation utilized internally within the contractor's organization as communication media (e.g., design drawings, engineering change proposals, etc.)
- (d) The documentation flow between the contractor and subcontractor/vendors (e.g., purchase orders, specifications, progress reports, and deliverable data)

The flow of documentation shall be graphically depicted so that visibility is given to data dependencies, timing, and flow among organizations participating in the ILS planning process.

10.2.1.3.11 Management and utilization of LSA. Describe the detailed methodology that will be used in conducting the LSA. Include, as a minimum, the specific scope of this analysis and its influence on detailed design requirements, the estimated number of separate LSA Records (LSAR) that will be generated for each configuration element, and an explanation of the analysis and methodology that was employed to arrive at the estimate. Indicate when the LSA process will begin, identify contractor personnel who will be involved in the LSA and subsequent reviews, provide dates of availability for ILSMT review of the LSAR, and develop procedures to ensure that appropriate LSAR's are utilized as inputs to design review conferences. State the proposed location(s) and dates of review of the LSA Record by the ILSMT. Provide a brief statement as to how the data recorded in the LSA process will be utilized to produce the various data deliverables required by the contract (e.g., Technical Manuals, Maintenance Requirement Cards, Provisioning Technical Documentation, Support Equipment List). State the method to be utilized for progressively developing the Plan For Support and indicate the time frames, following establishment of the product baseline configuration, in which the final LSA Record will be delivered.

10.2.1.3.12 Acquisition of logistic resources. State the contractor's plan for the identification, quantification, procurement and distribution of all resources required to support the system. This plan shall include, as a minimum, all resources included in the section of the ILSP titled PLAN FOR SUPPORT. Summarize the quality assurance requirements with emphasis on the provisions for ensuring the quality of required logistic resources and deliverable data.

10.2.1.4 Section 4 - Plan for support. The purpose of the planning data incorporated in this section is to provide a description of the logistic support concept established for the system and a definition of the logistic resource elements required to support the system throughout its life cycle commencing with prototype testing and evaluation.

10.2.1.4.1 Life cycle support concept. Describe the overall life-cycle logistic support concept resulting from the contractor's hardware development and support planning efforts. The support concept devised for the system shall

MIL-STD-1369(EC)
31 March 1971

be depicted in the form of logistic flow diagrams that portray the sequence of logistic functions required to support the system effectively. Depending on the support concept and the particular configuration of the system, the functional diagrams shall provide coverage, as applicable, for organizational, intermediate, and depot maintenance.

The information required herein shall be derived from an analysis of each maintenance function to be performed as specified by the LSA process of Appendix B to this document.

The supporting rationale for the logistic support concept shall also be stated and supported, as appropriate, by reference to applicable trade-off studies.

10.2.1.4.2 Personnel support requirements. Plans for personnel support shall include information for the following factors:

- (a) Recommended personnel requirements per system. An estimate of the numbers of personnel recommended to operate and maintain a single installation of the system is required. The estimate should provide information on personnel by rating or occupation and level to cover a watch (four hours) or a shift (eight hours) and also a 24 hour period.
- (b) Estimated personnel support requirements. Provide estimated personnel support requirements for the total number of systems in the planned acquisition, tabulated by the numbers of personnel required to support the new system up to five fiscal years, considering operating personnel, maintenance personnel at all levels of maintenance and Navy school staffs.

10.2.1.4.3 Training support requirements. Plans for training support should be prepared as early as possible in the life cycle of the system acquisition and be updated as necessary to satisfy requirements of the Navy Training Plans System. Planning consideration should be given to standard training program elements including the following:

- (a) Skill/Topic descriptions. Skill/topic descriptions are prepared for new or modified skills/topics for personnel who will be required to operate and maintain the system. Whenever possible, skill/topic descriptions shall be based upon information from valid analysis, such as those accomplished during the LSA.
- (b) Training course plans. Training course plans are prepared for each occupation or rating (including instructors) involved in the introduction of the system into the operating forces. Needed for each training course is a set of instructional materials, including an instructor's guide, a learner's guide, and the necessary training aids.
- (c) Functioning equipment setup. Functioning equipment setups for training purposes are required to provide realistic situations and

MIL-STD-1369(EC)

31 March 1971

opportunities for selected personnel to acquire the skills and knowledges for the operation and maintenance of the system. For each setup, prepare: (1) a one-page sketch of the setup; (2) a copy of the layout showing training location(s) and designated work stations; and (3) a list of the equipments, materials, test equipment, and tools needed.

- (d) Instructor advisory services. Contractor furnished instructor advisory services are required to assist military instructors in connection with the conduct of the pilot groups for training courses for the system at Navy training sites.

10.2.1.4.4 Prototype test-phase support requirements. Identify and describe the logistic resources required to support the prototype test program prior to acceptance of the system by the Navy. Include, as appropriate for each test site, a discussion of contractor maintenance and support personnel, supply support requirements, facilities, technical logistic data, and support and test equipment.

10.2.1.4.5 Contractor interim support requirements. Delineate the support requirements that the contractor proposes to furnish for the direct support of prototype and production models subsequent to Navy acceptance and prior to Navy Support Date. These support requirements shall cover, as applicable and to the extent which they have been defined, provisions for technical assistance, direct supply and maintenance support, and other requirements which, on a most economical basis, can best be furnished under a contractor-support arrangement. Also include an identification of the systems to be supported and periods of support based upon prototype test schedules and the scheduled installation and distribution of production models.

The initial contract normally will not contain provisions for all contractor-support services and material that ultimately may be required. However, to the extent that contract-support provisions have been incorporated in the contract, reference shall be made to the appropriate portion of the ILSP for a detailed description of this type of support and the terms and conditions under which it will be provided.

10.2.1.4.6 Supply support requirements. The contractor shall establish a repair parts plan for the end item and shall deliver PTD and provide material and services required to support the system as specified in the contract. The contractor's repair parts plan shall be based upon data developed in the LSA, e.g., frequency of failure, frequency of maintenance requirements, maintenance concept for the system or sub-elements of the system, and levels of maintenance where repairs and replacements will be performed. The Navy schools and other training activity requirements shall be included.

10.2.1.4.7 Support and test equipment requirements. The contractor shall identify his plan for built-in instrumentation, Contractor and Government

MIL-STD-1369 (EC)

31 March 1971

furnished Special Purpose Support Equipment (SPSE), Special Purpose Test Equipment (SPTE), and the need for General Purpose Test Equipment (GPTE) required for the operation and maintenance of the system or equipment at all levels of support. His listing of Government furnished SPSE and SPTE and any GPTE shall be selected from NAVSHIPS 0969-125-0250. In the event support equipment cannot be selected from NAVSHIPS 0969-125-0250, the requirements shall be called to the attention of the government cognizant agency instrumentation code. All equipments identified shall be designated as contractor furnished or Government furnished.

10.2.1.4.8 Facility requirements. Describe the estimated facility requirements necessary to support maintenance of the system during the operational phase. Facilities required shall be described for all levels of maintenance.

10.2.1.4.9 Packaging, handling, storage, and transportation requirements. Identify and describe any unique resource requirements associated with packaging, handling, storage, and transportation functions (e.g., equipment, facilities, and materials). Include the weight, cube, and dimensions of the largest and heaviest item of equipment.

10.2.1.4.10 Life cycle contract maintenance requirement. Identify those items that, on a most economical basis, should be maintained under a separate contract. Delineate the anticipated scope and extent of required maintenance for the items selected. Indicate the specific period of time to be covered by the proposed contract maintenance.

10.2.1.4.11 Technical logistic data requirements. Separately identify and briefly describe all data items required to support maintenance and operation of the system under development (or production). Include information as to existing data or data under procurement considered to be usable in their current or prescribed format during the operational phase (e.g., technical manuals, microfilm drawings, maintenance requirement cards, provisioning technical documentation, etc.).

20. Approval. The ILSP shall be submitted for approval as specified in the CDRL.

30. Revision. Unless otherwise specified in the CDRL, ILSP updating shall be by revised page(s). Revisions shall be prepared and submitted as specified in the CDRL. Each copy of the ILSP shall contain a record of revised pages.

MIL-STD-1369(EC)
31 March 1971

APPENDIX B

Logistic Support Analysis Requirements10. Purpose, organization and preparation.

10.1 Purpose. This section establishes minimum requirements for contractor performance of an LSA of proposed and actual designs to be utilized in the development of Logistic Support of systems, sets, groups, units, assemblies and subassemblies (as defined in USASI-Y32.16 - 1965). Further, it establishes requirements, procedures and formats for the associated documentation.

10.1.1 Objectives. The objectives of the LSA are to influence design of systems and equipment toward optimum readiness, performance, and economical support; and to document the LSA for utilization as the common basis for the integration of all support requirements and resources.

10.2 LSA records (LSAR). The LSA process systematically generates data and information that shall be documented in a series of worksheets which, when assembled, constitute a LSAR. Through the LSA process, consideration shall be given to the design, reliability, maintainability, testing techniques and safety characteristics of the system, set, group, unit, assembly, or sub-assembly being analyzed. The results shall be recorded in the appropriate worksheets in accordance with the requirements set forth in this appendix. This process identifies all preventive and corrective maintenance requirements. The contractor's procedures shall recognize that the LSAR's shall be prepared progressively and updated on a continuing basis. Preliminary LSAR's shall be prepared concurrently with system/equipment design. They shall contain sufficient information to provide the basis for early maintenance, logistic resource planning, and trade-off decisions, and they shall be made available for review when required. Contractor responsibility for updating shall continue until the subject of the LSA has reached design stability or as otherwise specified in the contract. Completed LSAR's shall be delivered to the Navy as specified in the contract.

10.2.1 LSA criteria. Systems, sets, groups, units, assemblies, subassemblies and support equipment that require documentation of new maintainability requirements and qualitative goals and for which the Government does not currently have an established maintenance capability shall be candidates for a LSA. Maintenance capability as used in this paragraph includes but is not limited to training/trainers, publication/technical data, support equipment, personnel skills, spares and repair parts and facilities.

10.2.2 LSA selection procedures. The selection process for items requiring a LSA shall be governed by the following procedures:

- (a) The contractor will prepare a list of LSA candidates in consonance with the criteria of paragraph 10.2.1. The list shall include part number and nomenclature as available. The list of LSA candidates shall be augmented by the contractor as design engineering progresses. Selection of the new candidates and related action shall be identified by the ILSMT as these supplemental listings are provided.

MIL-STD-1369(EC)
31 March 1971

- (b) The ILSMT will review the above list and select those items designated for LSA.

10.2.3 LSA worksheets. The contractor shall produce the LSA Worksheets in the format specified in this appendix unless otherwise specified in the contract. If the contractor proposes revised worksheet formats, the proposed formats will require government approval during negotiation of the engineering development contract. The contractor may employ supplemental in-house forms, worksheets and other management devices as desired in the performance of the LSA, but is not relieved of the requirement to deliver to the government LSA Worksheets as specified in the contract. Approval of LSAR's does not imply approval of an ECP proposed as the result of LSA. Such approval must be obtained through the normal ECP review/approval process.

10.2.4 LSA review procedures. The contractor shall establish internal procedures that provide for the progressive review of the LSA to assure adequacy and technical accuracy of the data. These internal procedures shall be in consonance with the government LSA review program as specified in the contract.

10.2.5 Duplication of effort. The contractor shall establish management controls which preclude duplication of effort in the development of data required to document the LSA.

10.3 Document control numbers. Document control numbers will be assigned by the contractor so as to uniquely identify each LSA. All worksheets directly supporting a LSA(R) will be identified by the same document control number. Document control numbers will be patterned in a manner which will facilitate interlocking the LSA(R)'s for functionally related equipments and sub-divisions thereof.

10.3.1 Subcontractor and vendor-prepared LSA(R)'s. The contractor will be responsible for assuring the continuity and dove-tailing of document control numbers for subcontractor and vendor-prepared LSA(R)'s with the pattern established for such numbers.

10.4 Preparation. The contractor shall prepare the worksheets in accordance with the formats and instructions contained in this appendix. Where the worksheet does not provide sufficient space, the contractor has the option of preparing continuation sheets in the prescribed format. Such additional sheets shall include the item nomenclature, document control number, page number and date. The data in the worksheets may be recorded using automatic data processing equipment, microfilm, or manual methods, as specified in the contract. Deviations from the form and content of the LSAR, as specified herein, will require approval by the government in accordance with 10.5.

10.4.1 Size and quality. All worksheets shall be prepared on durable white paper 11 inches long x 14 1/2 inches wide unless otherwise specified in the contract.

10.4.2 Data organization. The organization of the worksheets which comprise the LSA(R) is as follows:

MIL-STD-1369(EC)
31 March 1971

<u>Worksheet</u>	<u>Title</u>
	Logistics Support Analysis (LSA) Cover Sheet & Supplemental Data
I	Logistics Support Analysis
II	Reliability Summary
III	Maintainability & Maintenance Summary
IV	Maintenance Analysis
V	Personnel Support Summary ¹
VI	Support Equipment Requirements Summary ¹
VII	Maintenance Facility Summary ¹
VIII	Maintenance/Provisioning Decision List

10.5 Approval. Worksheet III requires signature of contractor's agent and Navy approval prior to completion of the remainder of the LSA(R). Navy approval of the LSA(R) for an item will be indicated by signature of Worksheet I. All LSA(R) shall be reviewed and approved by the ILSMT prior to incorporating any data required by the LSA into other Navy documents, such as the ILSP, PMS Documentation and PTD.

¹Note: Worksheets V, VI and VII are required only for end item hardware deliverables separately nomenclatured such as: exciter, radio set, or system.

MIL-STD-1369 (EC)
31 March 1971

APPENDIX B

LSA WORKSHEETS AND INSTRUCTIONSLSAR COVER SHEET
AND SUPPLEMENTAL DATA

1. This LSA coversheet serves five purposes. It indicates the type LSA to which it is attached (system, set, unit, etc.); identifies the associated lower level LSA's when applicable; indicates which of the LSA worksheets are intended for inclusion in the analysis, and which of the intended worksheets are prepared; provides a record of changes affecting the particular LSA; and contains supplemental logistic support data not appearing in the related LSA worksheets. This coversheet shall be included for each LSAR prepared.

BLOCK INSTRUCTIONS

- 1 Nomenclature. Enter appropriate item nomenclature. For a non-standard item, the noun name of the item shall be established by the contractor. For standard items, enter the established name.
- Document Control Number. Insert control number per paragraph 10.3.
- Reference Designation. Insert the reference designation of the item covered by the LSA.
- Prepared By. Name of individual(s) preparing LSA.
- Contractor. Insert contractor's name.
- Model. Insert model designation of contract end item.
- 2 Next Higher Assembly. Insert the part number and nomenclature of the next higher assembly
- 3 Time Allowed Off Site. Insert the recommended allowed off site time (hours, tenths, hundreds) during scheduled depot or intermediate level maintenance.
- 4 Turn-around-time. Insert the estimated turn around time for the item during rework.
- 5 Time Removal Item. Insert the mandatory removal requirement for the item expressed as applicable in operating hours, calendar period, events, cycles, etc. If not applicable, check "NO".
- 6 Total Direct Maintenance Manhours/Operating Hour. Enter the total DMMH/OH for the item. This value is calculated from either the data appearing in the attached worksheets, or, in the case of LSA's, having subordinate LSA's, from the cumulative totals of the subordinate LSA's.

MIL-STD-1369(EC)
31 March 1971

<u>BLOCK</u>	<u>INSTRUCTIONS</u>
7	<u>Rework Removal Rate.</u> Insert the recommended rework removal rate; the rate that the item will be removed for rework during scheduled rework. If not applicable, check "NO".
8	<u>Pool Quantity.</u> Insert the recommended pool quantity based on the data contained in Blocks 3, 4 and 7.
9	<u>Mission Essentiality Code (MEC).</u> Insert the appropriate mission essentiality code from Worksheet II.
10	<u>Worksheets Herein.</u> Indicate the worksheets that are intended for inclusion in the LSA by a diagonal line in the appropriate circles (/). When the exhibits are completed and included in the LSA data package, indicate by a cross (X) in the same circles.
11	<u>Type LSA.</u> Indicate the LSA level by checking the appropriate box.
12	<u>LSA Change Record.</u> <u>LSA Change Number.</u> Enter the LSA change number (the change numbering method to be at the Contractor's option). <u>Reason For Change.</u> Briefly state the reason for the change, e.g., engineering order, ECP, usage data, maintainability or reliability data, maintenance data, etc. If LSA change is based on EDC. <u>Approved By.</u> The procuring activity representative will sign in this space to indicate concurrence with the change. <u>Date.</u> Date of approval or concurrence. <u>Exhibits Affected.</u> Indicate the LSA worksheets affected by the change.
13	<u>Training Requirements.</u> Indicate the scope or levels or training required.
14	<u>Approved By And Date.</u> Acceptance signature of procuring activity representative and date of acceptance (for the complete cover sheet).

LSA _____
 1. Nomenclature _____
 COVER SHEET AND SUPPLEMENTAL DATA
 Prepared By: _____ Doc. Control No. _____
 Contractor: _____

Reference Designation			MODEL	
2. Next Higher Ass'y: Part No. _____ Nomenclature _____	3. TAOS _____ 7. RRR _____ <input type="checkbox"/> NO	4. TAT _____ 8. Pool Quantity _____ <input type="checkbox"/> NO	5. Time RMV Item <input type="checkbox"/> No _____ RATE	6. DMMH/OH _____ 9. MCC _____
10. Worksheets Herein: IA <input type="radio"/> IB <input type="radio"/> II <input type="radio"/> III <input type="radio"/> IV <input type="radio"/> V <input type="radio"/> VI <input type="radio"/> VII <input type="radio"/> VIII <input type="radio"/>				
11. TYPE LSA: <input type="radio"/> SYSTEM <input type="radio"/> SET <input type="radio"/> GROUP <input type="radio"/> UNIT <input type="radio"/> ASSY				
12. LSA CHANGE RECORD				
LSA CHANGE NO.	REASON FOR CHANGE	APPROVED BY	DATE	EXHIBITS AFFECTED
13. Training Requirements: Personal <input type="radio"/> Not Req'd <input type="radio"/> Organization <input type="radio"/> Intr Level <input type="radio"/> Depot Level <input type="radio"/> Devices <input type="radio"/> WEP Sys <input type="radio"/> Maintenance <input type="radio"/> Flight <input type="radio"/> OTHER <input type="radio"/>				
				14. Approved By _____ Date _____

MIL-STD-1369(EC)
31 March 1971

LSA SUMMARY
WORKSHEET I

PURPOSE

Section A: The LSA Summary, Worksheet I, identifies all maintenance requirements applicable to an item to be covered by a separate LSAR. The worksheet summarizes and is an index to the other worksheets which comprise the LSAR. The LSA Summary Worksheet provides a basis for controlling maintenance documentation of an item throughout the life cycle. The information on the worksheet is sufficient to indicate the need for a design modification trade-off study should the maintenance effort or support resources indicate a marginal or unsatisfactory condition.

Section B: This section of the Worksheet identifies the next subordinate level LSARS and summarizes their logistic support requirements data.

RELATIONSHIP. The LSA Summary, Worksheet I, is related to each of the other supporting worksheets by identification of the Document Control Number. Information found in columns 19-26 summarize the detailed data appearing in the supporting worksheets. Information found in columns 28-36 (Section B) reiterates summarized data from the Worksheet I's of the next subordinate level LSARS.

SECTION A

<u>BLOCK</u>	<u>DATA ELEMENTS</u>
1	<p><u>Nomenclature.</u> Enter appropriate item nomenclature. For a non-standard item, the noun name of the item shall be established by the contractor. For standard items, enter the established name.</p> <p><u>Document Control Number.</u> Insert control number per paragraph 5.3.</p> <p><u>Reference Designation.</u> Insert the reference designation of the item covered by the LSA.</p> <p><u>Prepared By.</u> Name of individual(s) preparing LSA</p> <p><u>Contractor.</u> Insert contractor's name.</p> <p><u>MODEL.</u> Insert model designation of contract end item.</p>
2	<p><u>Next Higher Assembly.</u> Insert the part number and nomenclature of the next higher assembly.</p>
3	<p><u>WBS.</u> Enter the Work Breakdown Structure number within which the item identified in Block 1 is included. The WBS numbering system is to be specified elsewhere in the contract.</p> <p><u>DWG. No.</u> Enter the manufacturer's drawing number which identifies the item.</p> <p><u>EIC.</u> Enter Equipment Identification Code (when known).</p> <p><u>APL/CID.</u> Indicate the appropriate Allowance Parts List/Component Identification Number (when known).</p>
4	<p><u>Standard-Non Standard.</u> Place "X" in the appropriate block to indicate whether or not the item examined is standard or non standard, i.e., JAN., AN, MIL, SAE.</p>
5	<p><u>Quantity Per NHA.</u> Enter the total number of items, Block 1, that are included within the next higher assembly identified in Block 2.</p>
6	<p><u>Item Application Cross-Reference.</u> List the Work Breakdown Structure, Equipment Identification Code and LSAR Document Control Number for items that are identical to item in Block 1. Block 6 is used to identify all applications of the item in Block 1. This information will indicate requirements for separate LSAR's and identify the item with similar use so that LSAR's are not needlessly repeated.</p>
7	<p><u>Applicable Maintenance Index Pages.</u> If item is standard, enter identifying number of Maintenance Index Page(s).</p>

MIL-STD-1369(EC)
31 March 1971

<u>BLOCK</u>	<u>DATA ELEMENTS</u>
8	<u>Technical Manual Number.</u> Enter the identifying number of technical manual for standard item.
9	<u>Equipment Model Designation.</u> Enter Nomenclature, if item is standard; e.g., EXCITER, 0-1761.
10	<u>Approximate Dimensions.</u> Self explanatory.
11	<u>Approximate Weight.</u> Self explanatory.
12	<u>Shelf Life (Months).</u> Enter length of time, in months, that the item may be stored before maintenance or discard is required.
13	<u>Estimated Average Repair Cost.</u> Self explanatory.
14	<u>Estimated Replacement Unit Price.</u> Self explanatory. (Indicate price breaks for economic procurement).
15	<u>SM&R.</u> Enter the recommended Source, Maintenance and Recoverability Code.
16	<u>Spec. No. - Design, Procurement.</u> Enter design and/or procurement specification numbers, if applicable.
17	<u>Engineering Design Changes.</u> Enter the Design Change number, the reason for the change, and the known or estimated effect the Design Change will have on the reliability, maintainability and safety features of the item and on the maintenance support requirements.
18	<u>Maintenance Identification Code.</u> List in order of maintenance levels (i.e., organizational, intermediate, and depot) each Maintenance Identification Code identified in this LSA(R) and supported by a separate Worksheet IV. (For instructions on assignment of Maintenance Identification Codes, see instructions for Block 3, Worksheet IV).
19	<u>Maintenance Manhours Per Year.</u> Enter total manhours required to perform the maintenance requirements as coded. Information will be calculated from data in Worksheet IV, blocks 8 and 15a or taken from Worksheet V, block 7.
20	<u>Number of Men.</u> Enter the number of military or industrial men recommended to accomplish the maintenance requirement. Information will be taken from Worksheet IV, block 15b or Worksheet V, block 7.
21	<u>Support Equipment.</u> Indicate a support equipment requirement as reflected in Worksheet VI by entering "X" in appropriate column.
22	<u>Facility.</u> Indicate the location of the facility where it is planned that the maintenance requirement will be satisfied.

MIL-STD-1369 (EC)
31 March 1971BLOCK DATA ELEMENTS

- 23 Technical Data. Enter data required to accomplish maintenance requirement by marking the following code columns:
- | | |
|-----|------------------------------|
| MRC | Maintenance Requirement Card |
| TM | Technical Manual |
| ED | Engineering Drawings |
| TC | Test Criteria |
- 24 Material Required. Indicate by placing "X" in appropriate column that a material requirement is listed on Worksheet VIII.
- 25 Safety. Indicate that hazards, which will require special safety equipment, facilities or instructions, do or do not exist in the execution of this maintenance requirement by placing "X" in the appropriate column.
- 26 Cost. Enter estimate of annual cost to perform maintenance including labor material and transportation.
- 27 Approval. Signatures indicate approval of the entire LSAR by the contractor and the government logistic Directorate Technical Director, and the Navy Project Manager.

MIL-STD-1369(EC)
31 March 1971

LSA
WORKSHEET I (SECTION A)

1. <u>Nomenclature</u>		<u>Contractor</u>		<u>Document</u>		<u>Control No.</u>		
<u>Reference Designation</u>		<u>Prepared By</u>						<u>Model</u>
2. Next Higher Ass'y: Part No. Nomenclature	3. WBS _____ Drawing No.	EIC _____ APL/CID	4. STD. <input type="checkbox"/> _____ NON-STD <input type="checkbox"/> _____	5. _____ QTY/NHA	6. Item Application Cross Ref. WBS _____ EIC _____ LSA(R) _____			
7. Applicable MIP No. (s)	8. Tech Manual No. _____		9. _____ Equip. Model Designation		10. Approx. Dimen: length width height			
11. Approx Weight _____	12. Apporx. Shelf Life (Mos.) _____	13. Est. Ave. Repair Cost _____		17. Engineering Design Change Change No. _____ Reason _____ Effect on Maint. _____				
14. Est. Repl Unit Cost _____ SMR _____	15. _____ Design Procurement		16. Specification Nos.					
18. Maint. Ident. Code	19. MMH/Yr.	20. Number of Men	21. Support Equip. Yes No	22. Facility	23. Tech. Data MRC TM ED TC	24. Mat. Req'd Yes No	25. Safety Yes No	
						26. Cost		
27. Approval: Contractor _____ Date _____		Reviewed _____ Date _____		Project Manager _____		Date _____		

MIL-STD-1369(EC)
31 March 1971

SECTION B

COMPILATION OF DATA FROM NEXT SUBORDINATE LEVEL LSAR'S

Section B is required only for systems, sets, groups, units, assemblies, and sub-assemblies having subordinate elements for which LSAR'S are prepared. Heading entries will be the same as Worksheet IA, block 1.

<u>BLOCK</u>	<u>DATA ELEMENTS</u>
28	<u>Next Subordinate Level LSAR Document Control Number.</u> List Document Control Numbers of each LSAR of the next lower level.
29	<u>Next Subordinate Level LSAR Nomenclature.</u> Enter appropriate item nomenclature of each next subordinate level LSAR item. For a non-standard item, the noun name of the item shall be established by the contractor. For standard items, enter the established name.
30	<u>Maintenance Manhours Per Year.</u> Enter the total manhours required to perform the maintenance for each next subordinate level LSAR. Information will be obtained from Worksheet IA of the subordinate LSAR.
31	<u>Support Equipment.</u> Indicate a support equipment requirement as reflected in Worksheet IA of each next subordinate level LSAR.
32	<u>Facility.</u> Indicate the location of the facilities required for each next subordinate level LSAR.
33	<u>Technical Data.</u> Indicate the technical data requirements as reflected in Worksheet IA of each subordinate level LSAR.
34	<u>Material Required.</u> Indicate a material requirement as reflected in Worksheet IA of each subordinate level LSAR.
35	<u>Safety.</u> Indicate safety factors as reflected in Worksheet IA of each next subordinate level LSAR.
36	<u>Cost.</u> Enter estimate of cost to perform maintenance including labor, materials & transportation as reflected in Worksheet IA of each next subordinate level LSAR.

MIL-STD-1369 (EC)
31 March 1971

LSA
WORKSHEET I (Section B)

Nomenclature _____ Doc. Control No. _____
Reference Designation _____ Contractor _____
Model _____

COMPILATION OF DATA FROM NEXT SUBORDINATE LEVEL LSA'S											
28. Control No.	29. Nomenclature	30. MMH Per Year	31. Suppt. Eqpt. Yes <u> </u> No <u> </u>	32. Facility		33. Technical Data MRC <u> </u> TM <u> </u> ED <u> </u> TC <u> </u>	34. Mat'l Req'd Yes <u> </u> No <u> </u>		35. Safety Yes <u> </u> No <u> </u>		36. Cost
				ORG	INTER		DEPOT	Yes	No	Yes	

MIL-STD-1369(EC)
31 March 1971

RELIABILITY SUMMARY
WORKSHEET II

PURPOSE: Reliability Data, Worksheet II, is used to provide reliability design data on proposed and selected hardware items.

RELATIONSHIP: For newly designed items the data for Worksheet II will be derived from an engineering analysis. For standard items, the data will be based on documentation relative to the actual reliability of the items. Reliability data recorded on Worksheet II are reflected throughout the LSAR to the extent that the maintenance plan and supporting logistic resource requirements are influenced by the failure frequencies and effects of the item.

BLOCK DATA ELEMENTS

- 1 Nomenclature. Enter appropriate item nomenclature. For a non-standard item, the noun name of the item shall be established by the contractor. For standard items, enter the established name.

Document Control Number. Insert control number per paragraph 5.3.

Reference Designation. Insert the reference designation of the item covered by the MEA.

Contractor. Insert contractor's name.

Model. Insert model designation of contract end item.

- 2 Next Higher Assembly. Insert the part number and nomenclature of the next higher assembly

- 3 Operating Life Factors. Enter the designed total service life (SVC Life) after which the item must be scrapped and the recommended or established time between overhauls (TBO), if applicable.

- 4 Military Essentiality Code (MEC). The military essentiality code for LSA's will be assigned by selection of one of three digits (2, 1 or 0) for each of three characteristics of the LSA item: mission effect, redundancy and alternatives. Thus a system of highest essentiality is coded 2-2-2 (mission abort if inoperative, no redundant stand-bys, and no alternatives). For purposes of scoring military essentiality the following assumptions pertain:

- (a) The most critical failure mode had occurred.
(b) The effects of redundancy will not be considered beyond the immediate next higher assembly.

The military essentiality code for support equipment LSA's is defined as follows. Where reference is made to mission effect, then: (1) mission success will be assumed to be the ability of the support

MIL-STD-1369(EC)
31 March 1971

BLOCK DATA ELEMENTS

- 4 equipment end item to successfully complete its intended function - test, checkout, fault isolate, etc. (Example: capable of performing its design function, limited functional capability, or inoperative); (2) existence of redundancy, within the support equipment End Item; and (3) alternatives. (Example: if failure of the support equipment item occurred, has the contractor recommended and the procuring activity approved, support equipment items that could suffice as alternatives, e. g. AN/PSM-4, hand pump, etc.)

1. Mission Effect - Consider only the effect of the inoperability of this item on the operation of the next higher assembly for which a LSA is required. On system LSA's, the next higher assembly will, in many instances, be the site (platform) or end article of support equipment. On assembly LSA's, the next higher assembly will usually be the system.

a. Total (2) - Check this block if failure or malfunction of this item would cause the next higher assembly or equipment to be inoperable. For those cases where the next higher assembly is the site (platform) or end item of support equipment, check this block if the site (platform) would be lost, the end article of support equipment inoperative, or the mission aborted because of this failure.

b. Partial (1) - Check this block if failure of the item would significantly affect site (platform) mission; or limit the function of the support equipment; or would limit the ability of the next higher assembly to perform its mission (e.g., communicating, detecting targets, or delivering weapons or failure to give some test readouts).

c. None (0) - Check this block if failure of the item would have a negligible effect on mission capability of the performance of the next higher assembly during combat operations.

2. Redundancy - Consider only the effect of failure of a single unit of the item on the immediate operation of the next higher assembly. Long range or applied effects should not be considered here.

a. None (2) - Check this block if there is no redundancy in the next higher assembly to permit continued functioning.

b. Some (1) - Check this block if redundancy is incorporated in the next higher assembly to permit limited functioning.

c. Complete (0) - Check this block if there are redundant stand-by units within the next higher assembly of which it is a sub-unit such that the next higher assembly can perform its mission just as effectively with the stand-bys.

MIL-STD-1369(EC)
31 March 1971

BLOCK DATA ELEMENTS

- 4 3. Alternatives - Consider that the effect of failure of the item can be compensated by the use of some alternative or emergency unit or system (not an identical stand-by) within the next higher assembly, or by manual operation, or by temporary measures before operation.
- a. None(2) - Check this block if there are no alternatives which could be used to keep the next higher assembly functioning. (note: This is separate and distinct from the mission effect, which asks whether one would need to have it functioning.)
- b. Some (1) - Check this block if there are alternatives that could be used in case of failure in a combat situation, but the next higher assembly could than operate at reduced effectiveness. Example: Failure of the power supply when a battery permits continued functioning at a greater risk.
- c. Equivalent (0) - Check this block if the next higher assembly could continue operating just as effectively, and its function performed just as well, through manual effort, normal ingenuity of maintenance personnel, or substitutions of some alternative or emergency back-up which is usually available.
- 5 Mean-Time-Between-Failure (MTBF). Enter the following data:
- a. Required: The MTBF specified as a design requirement.
- b. Predicted: The best estimate of MTBF.
- c. Demonstrated: The MTBF that has been demonstrated by test or operating experience and to what confidence level.
- 6 Probable Modes of Failure. Briefly describe the primary and secondary modes of failure and their symptoms in order of probability of occurrence.
- 7 Probable Effects of Failure. Indicate effects of failure for each mode of failure listed in Block 6.
- 8 Fail Safe Characteristics. Describe the fail safe characteristics designed into the item.
- 9 Secondary System. Describe secondary/redundant operation (including mode which can be used to perform end function
- 10 Failure history. Enter failure data and information applicable to the item, including but not limited to: test time, number and type of failures, test environment, failure report number.
- 11 Similar or Same Parts in Similar Installations. Pertinent data acquired on items with sufficient technical similarity to be of value for comparison shall be provided in this block.

MIL-STD-1369(EC)
31 March 1971

BLOCK DATA ELEMENTS

- a. Identification Number. Insert the drawing number for part which is similar or the same.
- b. Model Used In. Insert appropriate information such as A/N nomenclature, drawing number, specification number, etc., that will assist in identifying the similar installation.
- c. Service Life. Insert the service life for this item.
- d. MTBF. Insert the mean-time-between-failures determined from experience for this item.
- e. Difference in Part Application. Briefly describe any difference in application of this LSAR item.

LSA
WORKSHEET II
RELIABILITY SUMMARY

1. Nomenclature		Document Control No.	
Reference Designation		Model	
2. Next Higher Assembly:		Part No.	
3. Operating Life Factors		4. MEC ₁	
Svc Life	TBO	Total (2) <input type="checkbox"/>	None (2) <input type="checkbox"/>
5. MTBF		Partial (1) <input type="checkbox"/>	Some (1) <input type="checkbox"/>
Required	Predicted	None (0) <input type="checkbox"/>	Complete(0) <input type="checkbox"/>
Demonstrated/Confid-level			Equiv.(0) <input type="checkbox"/>
6. Probable Modes of Failure		7. Probable Effects of Failure	
8. Fail-Safe Characteristics		9. Secondary System(s)	
10. Failure History		11. Similar or Same Items in Similar Installations	

MIL-STD-1369 (EC)
31 March 1971MAINTAINABILITY AND MAINTENANCE SUMMARY
WORKSHEET III

PURPOSE: This worksheet provides a narrative description of the plan to maintain each maintenance significant item in the system/equipment.

RELATIONSHIP: The maintainability and maintenance summary sheet expresses the qualitative and quantitative maintainability and maintenance requirements influencing design of the item. It describes those design and reliability factors directly influencing the maintenance requirement and associated tasks. In descriptive terms, it relates elements of LSA with other design trade-offs to support the maintenance plan.

BLOCK DATA ELEMENTS

- 1 Nomenclature. Enter appropriate item nomenclature. For a non-standard item the noun name of the item shall be established by the contractor. For standard items, enter the established time.
- Document Control Number. Insert control number per paragraph 5.3.
- Reference Designation. Insert the reference designation of the item covered by the LSA.
- Contractor. Insert contractor's name.
- Model. Insert model designation of contract end item.
- 2 Next Higher Assembly. Insert the part number and nomenclature of the next higher assembly.
- 3 Item Functions and Maintainability Characteristics. Enter a narrative statement of the item's function and maintainability characteristics. Maintainability characteristics such as accessibility, removal and replacement times, built-in test and fault isolation features and other pertinent characteristics shall be identified.
- 4 Maintenance Plan. Describe in an explicit manner, the plan to maintain the item. The plan will form the basis for determining the required maintenance resources and will contain information relating to the depth and frequency of required maintenance, identification of maintenance requirements, and the tasks assigned to each level of maintenance.
- 4A Compatibility. Check appropriate blocks.
- 5 Justification. Justify in an explicit manner the reasons for assignment of the various maintenance requirements and maintenance tasks to the levels of maintenance. Reasons shall indicate the mean-time-to-repair (MTR), support equipment, facility requirements,

MIL-STD-1369(EC)

31 March 1971

BLOCK DATA ELEMENTS

training requirements, cost of the maintenance actions, and the economic evaluation for the support concept. Trade-off considerations shall be explained in sufficient detail to provide a complete record of design decisions relative to logistic support.

This information may be in a summary form or graphically portrayed with the details retained in the contractor's records to be made available upon request for review.

- 6 Maintainability Design Considerations. Enter MTTR required, predicted and demonstrated values.
- a. MTTR will be expressed quantitatively and the method of its derivation identified.
 - b. Critical Maintenance Requirement - Identify those maintenance tasks critical to meeting the maintainability requirement. Describe reason for their criticality and the alternatives that may be used to reduce the level of criticality.
- 7 Maintainability Values. Enter the contractor allocated and predicted values of the following maintainability parameters. Allocated values are base line values assigned by the contractor to this particular item. Predicted values are those values resulting from the detailed maintainability engineering analysis of this particular item.
- MTTR - MEAN TIME TO REPAIR (MIL-STD-721B)
- MDETR - MEAN DIRECT EFFORT TO REPAIR - The total direct maintenance effort (expressed in man minutes or man-hours) divided by the total number of corrective maintenance actions.
- MTBMA - MEAN TIME BETWEEN MAINTENANCE ACTIONS (MIL-STD-721B)
- MDT/OH - MEAN DOWN TIME PRE OPERATING HOUR - The total downtime (for both preventive and corrective maintenance) divided by the total equipment operating time during a one year period expressed in percent. (DOWN TIME - per MIL-STD-721)
- DMT/OH - DIRECT MAINTENANCE TIME (HOURS) PER OPERATING HOUR - The total direct maintenance time (for both preventive and corrective maintenance) divided by the total equipment operating time during a one year period expressed in percent.
- 8 Approval: Enter name of individual(s) who prepared Worksheets II and III. Enter name of individual(s) who revised Worksheets II and III. Signature of approval by designated government reliability and maintainability activity.

LSA
WORKSHEET III
MAINTAINABILITY AND MAINTENANCE SUMMARY

<u>1</u> NOMENCLATURE		DOCUMENT CONTROL NO. _____	
REFERENCE DESIGNATION _____		MODEL _____	
<u>2</u> NEXT HIGHER ASSEMBLY: _____		PART NO. _____ NOMENCLATURE _____	
<u>3</u> Item Functions and Maintainability Characteristics			
<u>4</u> Maintenance Plan	4a. Compatibility - Does this plan support: yes no The maint. plan for next higher assembly? <input type="checkbox"/> <input type="checkbox"/> The maintenance concept for the contract end item? <input type="checkbox"/> <input type="checkbox"/>		
<u>5</u> Justification	6 <u>M</u> Design Considerations Required Predicted Demonstrated A. MTTR _____ B. Critical Maintenance Requirement _____		
7 <u>M</u> VALUE ALLOCATED PREDICTED MTTR _____ MDETR _____ MTBMA _____ MDF/OH _____ DMT/OH _____			

8 Prepared By _____ Revised By _____ Approved By _____

MIL-STD-1369(EC)
31 March 1971MAINTENANCE ANALYSIS
WORKSHEET IV

PURPOSE: The purpose of the Maintenance Analysis Worksheet is to describe the procedure and to identify and establish skill levels and task time for performing each task involved in accomplishing the individual maintenance requirements pertaining to the item. In meeting this purpose, the Maintenance Analysis Worksheet becomes the key to the LSAR in that:

1. The best method of performing the maintenance requirement is determined.
2. The need for special tools and test equipment is determined.
3. Supply Support requirements are established.
4. Source information for the preparation of technical manuals and maintenance requirement cards (MRC's) is developed.
5. Human factors engineering pertinent to the task are developed.
6. Potential personnel hazards and safety precautions are identified.

RELATIONSHIP: A separate Worksheet IV shall be completed for each Maintenance Requirement identified with the item analyzed. The Maintenance Identification Code initiated in Block 3 of this worksheet links and logistic support element requirements amplified on Worksheets V through VIII and summarized on Worksheet I, to each identified Maintenance Requirement.

BLOCKDATA ELEMENTS

- | | |
|---|--|
| 1 | <p><u>Nomenclature.</u> Enter appropriate item nomenclature. For a non-standard item the noun name of the item shall be established by the contractor. For standard items, enter the established name.</p> <p><u>Document Control Number.</u> Insert control number per paragraph 5.3.</p> <p><u>Reference Designation.</u> Insert the reference designation of the item covered by the LSA.</p> <p><u>Contractor.</u> Insert contractor's name.</p> <p><u>Model.</u> Insert model designation of contract end item.</p> |
| 2 | <p><u>Next Higher Assembly.</u> Insert the part number and nomenclature of the next higher assembly.</p> |
| 3 | <p><u>Maintenance Identification Code.</u> The Maintenance Identification Code identifies the maintenance level, requirement, and frequency in the support of the particular item. It serves as the link between the logistic support initially identified on this Maintenance Analysis Worksheet and the data amplified on appropriate Worksheets V through VIII and summarized on Worksheet I.</p> |

MIL-STD-1369 (EC)
31 March 1971

BLOCK DATA ELEMENTS

3 The first three characters (letters) of the Maintenance Identification Code will indicate (1) the lowest maintenance level at which the requirement can be accomplished, (2) what the requirement is, and (3) when it is to be done (frequency). Select these three alphabetic characters from the code legend on Worksheet IV. A fourth character is utilized in the eventuality that the first three characters are not sufficient to uniquely identify each maintenance requirement on a particular item. Alpha numeric characters will be used to make this indication and will be selected in the sequence 1 through 9 and A through Z. For example, if two or more different maintenance requirements are identified on the same item, and coincidentally, the level codes, requirement codes, and frequency codes are the same for each of these maintenance requirements; then a fourth character is suffixed to each of the three-character codes so that each maintenance requirement is uniquely identified.

a. Maintenance Identification Codes

(1) Maintenance Level (1st character)

O - Organizational

I - Intermediate

D - Depot

(2) Maintenance Requirement (2nd character)

A. Fault Isolate. Is used when the basic intent is to identify the specific item which caused the failure symptom. The fault isolation procedure may include operation of built-in test equipment, self-check, or peculiar ground support equipment testers.

Note: The complete fault isolation procedure is to be prepared, so that each repair requirement can reference pertinent steps of the procedure.

B. Remove & Replace. Remove is stated as a requirement whenever the removal is a scheduled removal. Remove is not stated as a requirement whenever the removal is required to gain access, to facilitate maintenance, or any other reason where a defect is not involved. Scheduled removals include all forced removals. Establish install requirements to couple with each remove requirement.

MIL-STD-1369 (EC)
31 March 1971BLOCK DATA ELEMENTS

3

- C. Repair. There will be a repair requirement for each malfunction symptom. Repair is used when the basic intent or objective is to return the LSA item to a serviceable status. The kind or type of work that the word "Repair" infers will not be the same in the system LSA as it is in the assembly LSA. The basic difference is that system repair normally involves isolation of a fault to a LRU (Line Replaceable Unit), replacement of the LRU, and such verification of repair as is necessary. Assembly repair normally involves isolation of a fault to the replaceable module or part, replacement of the module or part, repair of the module or part of such other work required to make the assembly serviceable, and verification that the repair is satisfactory.
- D. Inspect. Inspect is used when the basic intent is the determination that a requisite condition exists. Always amplify the requirement statement to fully describe what the inspection will prove.
- E. Test. Is used when the basic intent is to insure proper system, subsystem, assembly, or module operation. At the assembly or module level, functional test includes bench check to verify the need for repair, repair level, or to determine serviceability after repair is completed.
- F. Overhaul. Is used when a complete disassembly, inspection, rework and reassembly of an item is required to restore the item to a "like-new" condition.
- G. Lubricate. Lubricate is used when the basic intent is the application of lubricants by any device on a scheduled basis. Lubricate is not stated as a requirement when it is a part of or the result of other maintenance requirements - e.g., lubricating a hinge pin prior to its installation, or lubricating the bearings of an antenna pedestal prior to installation.
- H. Adjust/Align. Is used when any of these represent the basic intent or objective, or the verification of any of these is the basic intent or objective.
- I. Calibrate. Comparison of a standard or measuring equipment instrument with a standard of higher accuracy to insure that the former is within specified limits throughout its entire range.

MIL-STD-1369 (EC)
31 March 1971

BLOCK DATA ELEMENTS

3

- J. Clean. Is used to include washing, acid bath, buffing, sand blasting, degreasing, etc., to facilitate inspection and to control corrosion. Cleaning accomplished during repair will be accounted for in the repair requirement.
- K. Service. Service is used when the basic intent is the replenishment of consumables; e.g., fuel, oil, air, LOX, etc. Service is also a requirement when consumables must be drained and filled, or replenished at specified intervals, or the vessel or site or its systems must be prepared to perform a specified mission, such as service (loading) film magazines on cameras. Service is not stated as a requirement when it is the result of or a part of other maintenance requirements, such as service of a hydraulic system subsequent to the replacement of a hydraulic line.
- L. De-Preserve/Preserve. Is used when the basic intent is to apply preservatives or to remove preservatives.
- M. Other - ANY REQUIREMENT NOT LISTED ABOVE

(3) Maintenance Frequency (3rd character)

- P - Programmed (ATE)
- E - Each watch (4 hours)
- D - Daily
- W - Weekly
- M - Monthly
- Q - Quarterly
- S - Semiannually
- A - Annually
- B - Biennially
- O - Overhaul Cycle
- U - Unscheduled

(4) Reference (4th character)

- I through 9 and A through Z - As required to uniquely identify each maintenance requirement of the LSAR.

MIL-STD-1369(EC)
31 March 1971

- | <u>BLOCK</u> | <u>DATA ELEMENTS</u> |
|--------------|---|
| 4 | <u>Maintenance Requirement.</u> State the maintenance requirement (e.g., repair the video amplifier). If the maintenance requirement is related with a higher, lower or matched assembly, describe the relationship. |
| 5 | <u>Facility Requirement.</u> Enter the nature of the facility required to accomplish the maintenance requirement (e.g., shop, operating space, etc.). Include special facilities such as clean room or shielded room. |
| 6 | <p><u>Training Requirement Code.</u> Using the code system below, indicate the extent of training required for each task.</p> <p>X Requires no training.</p> <p>A Requires informal familiarization through local demonstration and discussion.</p> <p>B Information (knowledge) related to the work skill is required. An information type training course will be required.</p> <p>C Work skills are required to meet the job requirement. A job skills type course will be required.</p> |
| 7 | <p><u>Special Task Considerations Code.</u> Indicate by code consideration.</p> <p>A Restrictive environment</p> <p>B Special tools, jigs and fixtures</p> <p>C Unusual physical demands</p> <p>D Hazard exposure</p> <p>E Task criticality to successful mission</p> <p>X No problems.</p> |
| 8 | <u>Maintenance Requirement Frequency Per Year.</u> Enter the estimated number of times maintenance requirement will be accomplished during one year. |
| 9 | <u>Task Number.</u> Enter the sequential number for each discrete task described in Block 10. For sequential maintenance tasks necessary to meet an unscheduled maintenance requirement at the organizational level only, each task will be further identified by letter to the following definitions: (This information will be used in support of the maintainability verification program) |

MIL-STD-1369(EC)
31 March 1971

BLOCK DATA ELEMENTS

- L Localization - Determining the location of a failure to the extent possible, without using accessory test equipment.
- A Isolation - Determining the location of a failure to the extent possible, by the use of accessory test equipment.
- D Disassembly - Equipment disassembly to the extent necessary, to gain access to the item that is to be replaced.
- B Interchange - Removing the defective item and installing the replacement.
- R Reassembly - Closing and reassembly of the equipment after the replacement has been made.
- H Alignment - Performing any alignment, minimum tests and/or adjustment made necessary by the repair action.
- E Check Out - Performing the minimum checks or tests required to verify that the equipment has been restored to satisfactory performance.

Note: Except for L, D, R these letter designations correspond to the second character of the Maintenance Identification Code (Block 3).

- 10 Sequential Maintenance Task. State in a concise technical manner the tasks which must be performed to accomplish the maintenance requirement. Include technical details relative to the task (e.g., tolerances, safety precautions, alignments, support equipment, tools and test equipment, excluding common hand tools). Tasks will be related in sufficient technical detail for ready transposition into appropriate publications. Procedures and engineering data related to the task should be properly referenced (e.g., heat treating, welding, etc.).

If a sequential disassembly and reassembly is required, a sketch of an exploded view of the item shall be appended to Worksheet IV.

If a task applied to several requirements, it will be listed and numbered anew for each requirement application. The description of the task need not be repeated - only referenced, e.g., "Prepare - See task____, LSA____:"

- a. Do not describe "how" the task is to be performed - only "what" must be done - e.g., remove door 36L; connect external 208 volt, 400 cycle phase power.

MIL-STD-1369(EC)
31 March 1971

<u>BLOCK</u>	<u>DATA ELEMENTS</u>
10	<p>b. Describe troubleshooting tasks in detail, noting all decision points, and defining the applicable parameters, measurements, values, limits, and tolerances of each.</p> <p>c. Describe the tasks that pertain to scheduled maintenance in sufficient detail for ready transposition into any appropriate publication.</p> <p>d. Describe a complete end-to-end troubleshoot task that will isolate probable failures to a faulty replaceable assy, or replaceable module/part.</p> <p>e. Always indicate the major actions relating to support equipment: e.g., positioning, starting, connecting, disconnecting, repositioning, etc.</p> <p>f. For those tasks where the required support equipment has been approved, the task will be described as it should be performed using the approved support equipment.</p> <p>g. Describe all precautions; e.g., CAUTION: "Allow equipment to warm-up at least 5 minutes prior to transmitting."</p> <p>h. Describe any special environmental controls that are necessary during the task performance, e.g., Temperature, humidity, clean room by class, rf. shielding.</p> <p>i. Note all ground safety precautions that must be observed when preparing for or conducting the task. Include the use of protective clothing or protective apparatus.</p> <p>j. The need for support equipment should be sufficiently descriptive to establish the support equipment requirement: e.g., connect voltmeter to test point, read voltage, etc.</p> <p>k. Plainly describe all measurements and indications that are essential to the task; for example, measure 23VDC + 0.5 volt, torque attach fitting to 250 + 25 inch pounds minus zero. Also, identify the junction, pin, fitting, and so forth, to which the measurement or indication applies; for example measure 28 VDC + 1 volt between pins A and D of connector J-28. The measurements and indications should be based on the "Specific maintenance measurement or LRU shop repair data" requirements of MIL-STD-1345(EC).</p>
11	<p><u>Repair Parts Identification.</u> Enter the manufacturer's part number (FSCM) and the CSN (Circuit Symbol Number) for all repair parts and spares required to accomplish the maintenance task resulting from both primary and secondary failures.</p>

MIL-STD-1369(EC)

31 March 1971

BLOCK DATA ELEMENTS

- 12 Consumable Materials. List the consumable materials needed to perform the task. If consumable materials are specified by the designer, drawings or specifications, describe these materials in sufficient detail so that procurement can be made directly (i.e., 40-60 rosin core solder, SAE 60 lubricating oil, etc.). List those consumable materials needed but not described in detail, in general terms (i.e., solder, lock wire, sandpaper, etc.).
- 13 Quantity Used. Enter the quantity of each spare, repair part or consumable material identified in Blocks 11 or 12, required to accomplish the maintenance task.
- 14 Support Equipment. List support equipment required to accomplish each task. Total support equipment requirements will be summarized on worksheet VI.
- 15 Logistic Support Personnel Resource Requirements.
- a. Task Time. Enter the time required to complete each task in hours, tenths and hundredths.
- b. Number of Men. Enter the number of personnel in each skill level required to accomplish each task.
- c. Rating and Skill Level. Determine the rating, occupation and skill of the personnel performing the task. Military skill levels at the organizational and intermediate levels of maintenance may be interpreted as follows:
- B(Basic) Qualifications of pay grade E-4 and below.
 Preventive maintenance is generally performed by operator personnel rather than maintenance personnel.
- I(Intermediate) Qualifications of pay grade E-5 or experienced E-4.
- S(Supervisory) Qualifications of pay grade E-6 and above.
- Note: Consult NAVPERS 18068 for technical military qualifications.
- Civilian/Industrial skill levels (only at depot level maintenance activities) may be interpreted as follows:

MECH Electronic mechanic

MIL-STD-1369(EG)
31 March 1971

BLOCK DATA ELEMENTS

15 TECH Electronic technician
 ENGR Electronic engineer

For military, enter the rating first, then the skill level in parenthesis, e.g. RM(I), ET(B), or ET(S).

For civilian/industrial, enter the abbreviation which includes a skill connotation.

- d. NEC. Indicate the Navy Enlisted Code (NEC) appropriate for the task according to the classifications prescribed in NAVPERS 15105. If classifications listed are inadequate, enter four x's (xxxx).

MIL-STD-1369(EC)
31 March 1971

LSA

MAINTENANCE TASK ANALYSIS

WORKSHEET IV

1.

NOMENCLATURE _____ CONTRACTOR _____ DOCUMENT CONTROL NO. _____

REFERENCE DESIGNATION _____ MODEL _____

2. NEXT HIGHER ASS'Y: PART NO. _____ NOMENCLATURE _____						
MAINTENANCE IDENTIFICATION CODE FOR BLOCK 3						
1st CHARACTER-MAINT. LEVEL O-ORGANIZATIONAL I-INTERMEDIATE D-DEPOT	2nd CHARACTER MAINT. REQ. A-FAULT ISOLATE H-ADJ/ALGN B-REMOVE & REPLACE I-CAL C-REPAIR J-CLEAN D-INSPECT K-SERVICE E-TEST L-DEPRESERVE F-OVERHAUL & PRESERVE M-OTHER	3rd CHARACTER MAINT. REQ. P-PROG(ATE) S-SEMIANNUALLY E-WATCH A-ANNUALLY D-DAILY B-BIENNIALLY W-WEEKLY O-OVERHAUL M-MONTHLY CYCLE Q-QUARTERLY U-UNSCHEDULED	4th CHARACTER SEQUENTIAL IDENTIFIER WHERE 1st THREE CHARACTERS ARE THE SAME (1-9 and A-Z)			
3. MAINTENANCE IDENTIFICATION CODE	4. MAINTENANCE REQUIREMENT	5. FACILITY REQUIREMENT	6. TRAINING REQ CODE	7. SPECIAL TASK CONSIDERATIONS	8. MAINT. REQ FREQ/YEAR	
9. TASK NO.	10. SEQUENTIAL MAINTENANCE TASK IDENTIFICATION	11. REPAIR PART IDENTIFICATION	12. CONSUMABLE MATERIALS	13. QTY USED	14. SUPPORT EQUIPMENT	15. LOGISTIC SUPPORT PERSONNEL RESOURCE REQUIREMENTS
						a. TASK TIME b. No. OF MEN c. RATING d. AND NEC SKILL LEVEL

MIL-STD-1369(EC)
31 March 1971PERSONNEL SUPPORT SUMMARY
WORKSHEET V

PURPOSE: The information on the Personnel Support Summary, Worksheet V, aids the analysis of projected maintenance manhour requirements for each rating and summarize the contractor's recommendations pertaining to personnel support allowance, and together with Worksheet IV provides a basis for developing the training plans and programs.

RELATIONSHIP: Worksheet V summarizes the personnel requirements Blocks entered on Worksheets I and IV. Summarized information appears in Worksheet I for ready review. The Maintenance Identification Codes shall be organized by maintenance level to facilitate quantification. This worksheet summarizes the personnel requirements applicable to the contract End Item deliverable.

BLOCK DATA ELEMENTS

- 1 Nomenclature. Enter appropriate item nomenclature. For a non-standard item, the noun name of the item shall be established by the contractor. For standard items, enter the established name.
- Document Control Number. Insert control number per paragraph 5.3.
- Reference Designation. Insert the reference designation of the item covered by the LSA.
- Contractor. Insert contractor's title and date.
- Model. Insert model designation of contract end item.
- 2 Maintenance Level Identification Code. List in order of maintenance levels: Organizational, Intermediate, Depot.
- 3 Personnel
- a. Rating and Skill Level. Determine the rating, occupation and Skill of the personnel performing the task. Military skill levels at the organizational and intermediate levels of maintenance may be interpreted as follows:
- B(Basic) Qualifications of pay grade E-4 and below. Preventive maintenance is generally performed by operator personnel rather than maintenance personnel.
- I(Intermediate) Qualifications of pay grade E-5 or experienced E-4.
- S(Supervisory) Qualifications of pay grade E-6 and above.
- Note: Consult NAVPERS 18068 for technical military qualifications.

MIL-STD-1369(EC)
31 March 1971

BLOCK DATA ELEMENTS

Civilian/Industrial skill levels (only at depot level maintenance activities) may be interpreted as follows:

MECH	Electronic mechanic
TECH	Electronic technician
ENGR	Electronic engineer

For military, enter the rating first, then the skill level in parenthesis, e.g. RM(I), ET(B), or ET(S).

For civilian/industrial, enter the abbreviation which includes a skill connotation.

b. NEC. Indicate the Navy Enlisted Code (NEC) appropriate for the task according to the classifications prescribed in NAVPERS 15105. If classifications listed are inadequate, enter four x's (xxxx).

- 4 Number of Men. Enter the number of men in each occupational designation required to accomplish the maintenance requirement.
- 5 Participation. Subdivide the number of men indicated in block 4 to show whether full or part time participation is required.
- 6 Total MMH Per Year. Enter the total maintenance manhours required to accomplish the maintenance requirement on a yearly basis (product of Blocks 5 and 6).
- 7 Training Course Requirements. Enter the training course requirements necessary to qualify personnel to perform the identified tasks for each level of maintenance. Use the training requirement code, Worksheet IV, block 6, to establish the type of training course. After the code letter, enter the estimated course length in weeks.

LSA

PERSONNEL SUPPORT SUMMARY
WORKSHEET V

1. _____

NOMENCLATURE _____

DOCUMENT CONTROL NO. _____

MODEL

2. Maint. Level Identification Code	3. Personnel		4. Number of Men	5. Participation		6. Total MMH/Year	7. Training Course Requirements by Type and Course Length		
	a. Rating, Occupation, and Skill Level	b. NEC		Part Time	Full Time		a. Oper	b. Maint/Repair	c. Eng.

MIL-STD-1369(EC)
31 March 1971

SUPPORT EQUIPMENT REQUIREMENTS SUMMARY
WORKSHEET VI

Worksheet VI is a summary of the applicable functions, parameters, measurements, values, tolerances, and limits of the Sequential Maintenance Tasks listed in Block 10 of Worksheet IV. It is also, a summary of the support equipment listed in Block 14 of Worksheet IV. These data should be readily transferrable to the appropriate technical manuals and data banks.

PURPOSE: The purpose of the Support Equipment Requirements Summary, Worksheet VI, is to provide lists of support equipments required at all levels of maintenance and to permit early acquisition of the necessary support equipment.

RELATIONSHIP: Worksheet VI summarizes the support equipment requirements for the end item shown in Block 1 of Worksheet I. A separate LSAR is required for each item of support equipment not listed in NAVSHIPS 0969-125-0250. This is also a summary of the data developed in accordance with MIL-STD-1345(EC).

BLOCK

INSTRUCTIONS

- 1 Nomenclature. Enter appropriate item nomenclature. For a non-standard item the noun name of the item shall be established by the contractor. For standard items, enter the established name.
- Document Control Number. Insert control number per paragraph 10.3.
- Reference Designation. Insert the reference designation of the item covered by the LSA.
- Contractor. Insert contractor's name.
- Model. Insert model designation of contract end item
- 2 Support Equipment Performance Specifications. Summarize the range of parameters included in the Sequential Maintenance Tasks, Block 10 of Worksheet IV. Block 10 of Worksheet IV lists the parameters of each individual maintenance task to be performed. This block requires that these individual parameters be summarized to determine the overall requirements for support equipment. List only the extreme limits and most critical tolerances of the parameter being summarized. (e.g. Block 10 of Worksheet IV will list a range of voltage measurements to be made and the tolerances of each measurement. List the lowest and the highest voltage to be measured and the tolerance of the measurement (10.0 to 300.0 VDC, [3%]). If the tolerances vary, list the measurement with the most critical tolerance.

MIL-STD-1369 (EC)

31 March 1971

BLOCK INSTRUCTIONS

- 3 Support Equipment. List by noun name and nomenclature or commercial model number the support equipment recommended to meet the performance specifications of Block 2 and listed separately in Block 14 of Worksheet IV.

- 4 Technical Characteristics of Support Equipment. Describe pertinent technical characteristics of the support equipment listed in Block 3. If support equipment is selected from NAVSHIPS 0969-125-0250, NAVELEX PREFERRED GENERAL PURPOSE ELECTRONIC TEST EQUIPMENT, the notation "NAVSHIPS 0969-123-0250" is sufficient.

- 5 Quantity Recommended. Enter quantity of support equipment identified in Block 3 recommended to accomplish the maintenance requirements at each level of maintenance.

LSA

SUPPORT EQUIPMENT REQUIREMENTS SUMMARY

WORKSHEET VI

1. _____

NOMENCLATURE _____

CONTRACTOR _____

DOCUMENT CONTROL NO. _____

REFERENCE DESIGNATION

MODEL

2. Support Equipment Performance Specifications	3. Support Equipment	4. Technical Characteristics of Support Equipment	5. Quantity Recommended		
			Org.	Int.	Depot

MAINTENANCE FACILITY SUMMARY
WORKSHEET VII

PURPOSE: The purpose of the Maintenance Facility Summary, Worksheet VII, is to describe precisely the nature of the maintenance and support facilities required as identified by the maintenance analysis. The information on the worksheet will be used to substantiate the facility recommendation made by the contractor. Worksheet VII is a complete summary of facilities required at the three levels of maintenance.

RELATIONSHIP: Worksheet VII presents the detailed information to support facility requirements indicated in Worksheet IV, Block 6, and further identified in Worksheet I. This worksheet summarizes the facilities required applicable to the contract END ITEM deliverable.

BLOCK DATA ELEMENTS

- 1 Nomenclature. Enter appropriate item nomenclature. For a non-standard item, the noun name of the item shall be established by the contractor. For standard items, enter the established name.

Reference Designation. Insert the reference designation of the item covered by the LSA.

Document Control Number. Insert control number per paragraph 5.3.

Contractor. Insert contractor's name.

Model. Insert model designation of contract end item.
- 2 Maintenance Level Identification. List in order of maintenance levels: Organizational (O), Intermediate (I) and Depot (D).
- 3 List of Facilities. The contractor shall list the proposed facilities required to perform the maintenance actions at the different levels of maintenance grouped together under the successive headings of block 2, such as operating space, shop space (module and/or end item).
- 4 Facility Requirements. These statements shall describe the facility in terms such as: space requirements, shielding requirements, hoist requirements, electronic, electric, hydraulic or gaseous requirements and special handling, installation, storage and environmental requirements.
- 5 Justification. Indicate the technical factors considered in recommending the specific facility requirements. The contractor will precisely describe in technical terms, the functions to be accomplished within the facility. He shall describe the characteristics of the facility necessary to meet the required functions. Reference will be made to the maintenance requirement generating a special facility requirement such as clean room or other environmental controls. The reference will be indicated by LSA Document Control Number and Maintenance Identification Code.

MIL-STD-1369 (EC)
31 March 1971

LSA
WORKSHEET VII
MAINTENANCE FACILITY SUMMARY

1. _____
NOMENCLATURE

_____ DOCUMENT CONTROL NO.

_____ REFERENCE DESIGNATION

_____ CONTRACTOR

_____ MODEL

2. Maintenance Identification Code	3. List of Facilities	4. Facility Design Criteria	5. Justification

MIL-STD-1369(EC)

31 March 1971

MAINTENANCE/PROVISIONING DECISION LIST
WORKSHEET VIII

PURPOSE: During the Logistic Support Analysis process, spares and repair parts required to accomplish the various maintenance tasks will be identified. The contractor will list in worksheet VIII all materials, spares and repair parts identified in blocks 11 and 12, worksheet IV. If none are identified in Worksheet IV, no Worksheet VIII is required. For each item listed, the contractor will enter data and decisions determined during the Logistic Support Analysis. The information entered in worksheet VIII will be utilized by the Program Support Inventory control Point (PSICP) in the establishment of range and depth of spares and repair parts and preparation of an Allowance Parts List (APL) for support of the item addressed by the LSAR.

RELATIONSHIP: All provisioning determinations and APL preparation for support of the item addressed by the LSAR shall be based on the maintenance decisions documented in the LSAR, especially those documented in this worksheet and worksheet IV. The data recorded in this worksheet (with the exceptions of Blocks 1, 2, 3, and 4) will be key-punched into 80 column EAM cards. The resulting EAM cards (called Maintenance/Provisioning Decision EAM cards for identification purposes) produced by this method, although a product of the Logistic Support Analysis, will be delivered to the PSICP concurrently with Provisioning Technical Documentation as specified by the CDRL. See paragraph titled "Preparation of Maintenance/Provisioning Decision EAM cards."

INSTRUCTIONS FOR COMPLETION OF WORKSHEET VIII

NOTE: The first item listed on Worksheet VIII shall be the assembly addressed by the LSAR.

BLOCK DATA ELEMENTS

- 1 Nomenclature. Enter appropriate item nomenclature. For a non-standard item the noun name of the item shall be established by the contractor. For standard items enter the established name.
- Reference Designation. Insert the assembly reference designation of the item covered by the LSA.
- Document Control Number. Insert control number per paragraph 5.3.
- Contractor. Insert contractor's name.
- Model. Insert model designation of contract end item.
- 2 Circuit Symbol Number (CSN). Enter the CSN assigned to each individual maintenance part (Worksheet IV, Item 11) of the assembly covered by the LSAR including assemblies not subject to further disassembly (A1, C1, R1, T1, etc.).

MIL-STD-1369 (EC)
31 March 1971

BLOCK DATA ELEMENTS

- 3 Manufacturer's Part Number. Enter the actual manufacturer's part, drawing, or catalog number assigned to the item (Worksheet IV, Item 11). For purposes of this block, the manufacturer is the company or government activity exercising design control over the item.
- 4 Federal Supply Code for Manufacturers (FSCM). Enter the five-digit numeric code which identifies the manufacturer of the part number, Block 3. Assigned codes are contained in Cataloging Handbooks H4-1 and H4-2.
- 5 Source, Maintenance and Recoverability (SM&R) Code. Enter the SM&R Code assigned to the item in accordance with the guidelines contained in Exhibit 1 as supplemented by the following instructions. Maintenance level determinations established on Worksheet IV, block 3, are to be used.
- (a) Source (1st and 2nd code positions) codes are determined for the "first appearance" of a component, assembly or part in an equipment. That is, these codes are assigned to the item itself and are not altered by the application of the item in the equipment. Select from the source codes defined in Exhibit I.
- (b) Maintenance (3rd, 4th and 5th code positions) codes indicate to maintenance and supply personnel the lowest levels authorized to replace, repair and condemn items. Select from the maintenance levels defined in Exhibit I and insert in the following positions:
1. Replace Maintenance Code - Indicate in the third code position the lowest maintenance level authorized to remove and replace the item. This code is assigned to each application (RSM) of the item in an equipment.
 2. Repair Maintenance Code - Indicate in the fourth code position the lowest maintenance level authorized to repair the item. This code is assigned to each application (RSN) of the item in an equipment.
 3. Condemn Maintenance Code - Indicate in the fifth code position the lowest maintenance level authorized to condemn the item. This code is assigned to the "first appearance" of the item in the equipment and is not altered by the item application.
- 6 Replacement Factor (RF). The RF is the best available annual replacement factor based upon engineering judgement. It is a rate which represents this average annual usage which can be expected for a unit of installed population. Assign to the "first appearance" of an item in an equipment. This factor is expressed

MIL-STD-1369(EC)
31 March 1971

BLOCK DATA ELEMENTS

- 6 as a six digit numeric (2 whole and 4 decimal). Assign factors in accordance with the following guidelines:
- (a) Consumable Items (repair maintenance Code Z). The RF is the probability that an item will fail and require replacement from the supply system and is expressed as replacements per year per application of the item. The RF for a non-repairable or consumable item is equal to the failure rate where the failure rate is expressed as failures per year per application.
- (b) Repairable Items (repair maintenance code non-Z). RF is the estimated average number of supply system replacement requirements of the item per year per application. If the item is repairable on-site for all failures, the supply system RF is zero. If the site can repair the item in 9 out of 10 failures, the supply system RF is 1/10 of the item failure rate where the failure rate is expressed as failures per year per application. Items that are not repairable on-site have an RF equal to the failure rate.
- 7 Operating Space Item (OSI). Enter an "X" in this block for a spare or repair part that is required to be located in an equipment operating space in addition to, or in lieu of, the storeroom, and is in the custody of the equipment maintenance/operating personnel (see Block 14).
- 8 Wearout Rate (WR). Wearout Rate is assigned only to repairable items and represents the percentage of items that fail, which will not, through rework, be returned to a serviceable condition. It is expressed as a three digit number (1 whole and 2 decimal).
- 9 Military Essentiality Code₂ (MEC₂). When a Military Essentiality Code (MEC₁) is assigned to an equipment, component or assembly in block 4 of Worksheet II, it shall be converted to MEC₂ in accordance with the following table.

MEC₁ from block 4 Worksheet II

<u>Mission Effect</u>	<u>Redundancy</u>	<u>Alternatives</u>	<u>Convert to MEC₂</u>
2	2	2	1
2	2	1	1
2	1	2	1
2	1	1	1
2	2	0	1
2	0	2	1
2	1	0	1
2	0	1	1
2	0	0	1
1	2	2	1

MIL-STD-1369(EC)
31 March 1971

MEC₁ from block 4 Worksheet II (continued)

<u>Mission Effect</u>	<u>Redundancy</u>	<u>Alternatives</u>	<u>Convert to MEC₂</u>
1	2	1	1
1	1	2	1
1	1	1	3
1	2	0	3
1	0	2	3
1	1	0	3
1	0	1	3
1	0	0	3
0	2	2	3
0	2	1	3
0	1	2	3
0	1	1	3
0	2	0	3
0	0	2	3
0	1	0	3
0	0	1	3
0	0	0	3

Insert the converted MEC₂ in block 9 of Worksheet VIII. For an item that does not have an MEC₁ assigned in block 4 of Worksheet II, assign an MEC₂ in accordance with the following instructions. Determine from a technical viewpoint whether the failure of a component, assembly, or part in each application within the equipment would have a "Major" or "Minor" effect on the function of the next higher assembly (NHA).

A judgement of "Major" would indicate that the NHA cannot function satisfactorily if the item fails; a judgement of "Minor" would indicate that the performance of the NHA would not be significantly degraded if the item fails. These judgements will be recorded as follows:

- (a) Assign "1" to indicate a "Major" judgement.
- (b) Assign "3" to indicate a "Minor" judgement.

10 Allowance Note Code (ANC). Assign a single digit alpha code to any item that requires a note or remark to appear in the APL. Do not use "A" or "X" as they are assigned by ESO. Use "J" in conjunction with Security Classification in block 10 (classified association). Attach a complete definition for each code used.

11 Allowance Override Quantity (AOQ) and Allowance Override Designator Code (AODC). Assign an AOQ to each critical item as required to support the maintenance plan. This designator will override other factors to assure that this quantity will be the minimum carried on allowance. The AODC is assigned

MIL-STD-1369 (EC)
31 March 1971BLOCK DATA ELEMENTS

- 11 as a prefix to the AOQ. It describes the AOQ and controls the use of the override quantity through the allowance computation programs. These codes are as follows:

<u>Code</u>	<u>Explanation</u>
-------------	--------------------

- | | |
|---|---|
| P | Planned Maintenance Requirement. The AOQ is required to support a definite maintenance plan for a specified equipment/component. |
| R | Requisition as required. The AOQ is indicated as zero since the correct quantity must be determined by the allowance user. |
| T | Technical override. The AOQ is required by the technical command to be in allowance in support of an equipment as a vital insurance item. |
| Z | Zero override. The AOQ assigned is to insure that the item is not a candidate for allowance. |
- 12 Minimum Replacement Unit (MRU). Enter the minimum quantity of an item to be replaced to perform a maintenance action. This quantity is normally one (1); i.e., replacement of a resistor; however, replacement of brushes or bearings in a motor or generator may require a quantity greater than one.
- 13 Production Lead Time (PLT). The computed/estimated value (in quarters) of the time interval between the placement of a new contract and receipt of material. Not applicable to items already stocknumbered and managed by a Defense Supply Activity (DESC, DISC, etc.) or a Navy Activity (ESO, SPCC, etc.).
- 14 Operating Space Item Quantity (OSI Qty). Enter the quantity of spares or repair parts required in the equipment operating space for all items assigned "X" in Block 7.
- 15 Shelf Life (SL). Assign a shelf life code for each item with a shelf life of less than 120 months. Select the code which indicates the interval of expected shelf life, based on a technical evaluation, beyond which an item will not be satisfactory for use. For non-deteriorative items, leave blank.

<u>Code</u>	<u>Definition</u>	<u>Code</u>	<u>Definition</u>
∅	Non-Deteriorative	T	21 Months
A	1 Month	2	24 Months
B	2 Months	U	27 Months
C	3 Months	V	30 Months
D	4 Months	W	33 Months

MIL-STD-1369 (EC)
31 March 1971

BLOCK DATA ELEMENTS

15	<u>Code</u>	<u>Definition</u>	<u>Code</u>	<u>Definition</u>
	E	5 Months	3	36 Months
	F	6 Months	X	42 Months
	G	7 Months	4	48 Months
	H	8 Months	Y	54 Months
	J	9 Months	5	60 Months
	K	10 Months	&	66 Months
	L	11 Months	6	72 Months
	I	12 Months	7	84 Months
	M	13 Months	8	96 Months
	N	14 Months	9	108 Months
	P	15 Months	Z	120 Months
	Q	16 Months		
	R	17 Months		
	S	18 Months		

16 Security Classification (SC). Designates the degree of physical security assigned to the item.

- (a) Classified item- Security classification of the item itself (i.e., Confidential (C), Secret (S), etc.).
- (b) Classified Association - An item may, by its nature, be unclassified but when the item is listed on a provisioning parts list, on a drawing, or other technical document, it may divulge classified information. (i.e., an unclassified magnetron when associated with an equipment whose operating frequency is classified). The classified association is to be recorded as an Allowance Note Code "J" (Block 10).

LSA
MAINTENANCE/PROVISIONING DECISION LIST
WORKSHEET VIII

1. NOMENCLATURE DOCUMENT CONTROL NO.

REFERENCE DESIGNATION CONTRACTOR MODEL

2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CSN	MFG. PART NO.	FSCM	SM&R	RF	OSI	WR	MEC	ANC	AODC/AOQ/	MRU	PLT	QTY	SL	SC

MIL-STD-1369 (EC)
31 March 1971PREPARATION OF MAINTENANCE/PROVISIONING DECISION

EAM CARDS: Upon completion of review and final approval of the LSAR by the ILSMT, Items 5 through 16 of Worksheet VIII shall be key-punched into 80 column EAM cards in accordance with the following key-punching instructions. The deck of EAM cards produced by this method shall consist of all first appearance and all "same as" appearance maintenance significant items. Item Sequence Numbers (ISN) assigned to all items in the deck of EAM cards shall be identical to those in the Provisioning Technical Documentation. All data key-punched into the cards shall be interpreted.

INSTRUCTIONS FOR KEY-PUNCHING MAINTENANCE/PROVISIONING DECISION
EAM CARDS.

<u>Description</u>	<u>Card Column(s)</u>	<u>Punching Instructions</u>
Card No.	1	Leave Blank.
CCN	2-5	Punch CCN assigned by ESO.
ISN	6-11	Punch ISN assigned to same (Reference Symbol Number) item in the PTD.
SM & R	12-16	See Instructions for Block 5, Worksheet VIII.
Key CCN	17-20	Punch for "same as" items only.
RF	21-26	See Instructions for Block 6, Worksheet VIII. Justify Right. Not required for "same as" items.
Key ISN	21-26	Punch for "same as" items only.
	27	Leave Blank.
OSI	28	Punch for first appearance items only.
WR	29-31	Punch for first appearance items only.
MEC	32	Punch for all applications.
ANC	33	Punch for all applications, if applicable.
AOQ/AODC	34-37	See instructions for block 11, Worksheet VIII. Punch for all applications, if applicable. Justify left Alpha; right Numeric.
MRU	38-39	Punch for all applications.- Justify Right.
	40	Leave Blank.
PLT	41-42	Punch for first appearance items only. Justify Right.
	43-49	Leave Blank.
OSI QTY	50-51	Punch for first appearance items only. Justify Right.
SL	52-53	Punch for first appearance items only. Justify Right.
SC	54	Punch for first appearance items only.
	55-80	Leave Blank.

MIL-STD-1369(EC)
31 March 1971

EXHIBIT 1
UNIFORM SOURCE AND MAINTENANCE LEVEL CODES

1. Source Codes

<u>CODE</u>	<u>DEFINITION AND APPLICATION</u>
<u>P SERIES</u>	<u>ITEMS TO BE PROCURED AND STOCKED OR SUPPLIED BY THE SUPPLY SYSTEM</u>
P1	Assigned to items which are procured and stocked for anticipated or known usage and which are either impractical or uneconomical for military service manufacture.
P2	Assigned to items which are procured and stocked for insurance purposes because the combat or military essentiality of the end item dictates that a minimum quantity be available in the supply system.
P3	Assigned to items which are procured and stocked and which otherwise would be coded P1 except that they are deteriorative in nature. These items have a predicted shelf life and may require special storage conditions.
P4	Assigned to items which are procured for initial issue or outfitting and are carried in stock only for subsequent or additional issues or outfittings and are not subject to automatic replenishment.
P5	Assigned to tools, test and support equipment items which are procured and which may be stocked for initial issue or outfitting to specified maintenance repair activities.
P6	Assigned to items which are procured and stocked for anticipated or known usage and which are simple for military service manufacture or fabrication.
P7	Assigned to items which do not meet the established criteria for stockage but which will be centrally procured by the supply system on demand.
	<u>KITS TO BE PROCURED AND STOCKED BY THE SUPPLY SYSTEM</u>
PC	Assigned to cure-dated ("C") kits which provide cure-dated items such as diaphragms, packings, etc. A "C" kit may contain soft goods not subject to age controls such as gaskets and seals, plus consumable metallic items such as screws, nuts and washers required to be removed and replaced when cure-dated items of soft type material are replaced. Any metallic item placed in the "C" kit will not be duplicated in the "D" kit. When mixed categories of cure-dated parts are packaged in a single container, the cure-date, or control shall be that of the oldest cure-dated part contained therein. Also the range of cure-dated items shall not exceed one quarter. A calendar quarter is defined as being one quarter old only at the end of the succeeding quarter.

MIL-STD-1369 (EC)
31 March 1971

CODE DEFINITION AND APPLICATION

PD Assigned to rework ("D") kits which provide hard goods repair parts required at the time of rework and repair and are available to activities capable of performing component rework. Does not contain cure-dated parts.

PF Assigned to Maintenance ("F") kits which provide items to be replaced at organizational or intermediate levels of maintenance and are available to all maintenance activities. Replacement of "F" parts normally does not require special tools or equipment. Does not contain cure-dated parts.

COMPONENTS OF KITS - NOT PURCHASED SEPARATELY

KC Component of C-Kit
KD Component of D-Kit
KF Component of F-Kit

M SERIES ITEMS TO BE MANUFACTURED AND OBTAINED AT INDICATED MAINTENANCE LEVELS AND NOT PROCURED OR STOCKED IN THE SUPPLY SYSTEM

MO Assigned to items to be manufactured or fabricated at organizational level.

MF Assigned to items to be manufactured or fabricated at intermediate maintenance levels (afloat).

MH Assigned to items to be Manufactured or fabricated at intermediate maintenance levels (ashore).

MG Assigned to items to be mnaufactured or fabricated at intermediate levels (both ashore and afloat).

MD Assigned to items to be manufactured or fabricated at depot maintenance level, i.e., specialized repair activity, overhaul and repair department, shipyard, or ordnance and avionics facility.

A SERIES ITEMS TO BE ASSEMBLED AND NOT PROCURED OR STOCKED IN THE SUPPLY SYSTEM

A SERIES codes are assigned to items which are not procured or stocked as such but when required are to be assembled at indicated maintenance levels. At least one of the items in the assembly must be a "P" or "N" coded item.

AO Assigned to items to be assembled at organizational level.

AF Assigned to items to be assembled at intermediate maintenance levels afloat.

MIL-STD-1369(EC)

31 March 1971

<u>CODE</u>	<u>DEFINITION AND APPLICATION</u>
AH	Assigned to items to be assembled at intermediate maintenance levels ashore.
AD	Assigned to items to be assembled at depot maintenance level, i.e., specialized repair activity; overhaul and repair department, shipyard, ordnance or avionics facility.
AG	Assigned to items to be assembled at intermediate levels both ashore and afloat.
N SERIES	<u>ITEMS TO BE LOCALLY PROCURED AND NOT STOCKED IN THE SUPPLY SYSTEM</u>
NN	Assigned to items which are authorized for local procurement because they do not meet the established criteria for centralized management and stockage in the supply system. These items normally are readily available from commercial sources. If not obtainable from local procurement, such items will be requisitioned through normal supply channels. An initial outfitting quantity of NN coded items may be purchased by the Inventory Control Point for afloat and overseas activities.
X SERIES	<u>ITEMS NOT TO BE PROCURED AND NORMALLY NOT PRACTICAL FOR STOCKAGE, MAINTENANCE OR MANUFACTURE</u>
XX	Assigned to items which are not procured or stocked in the supply system because the replacement or repair of these items is uneconomical or impractical. The failure or need for these items will normally result in recommendations for overhaul or retirement of the end item.
X1	Assigned to items which are not procured or stocked in the supply system because the requirements for these items will result in the use of the next higher assembly.
X2	Assigned to items which are not procured or stocked in the supply system but when required should be obtained through salvage or cannibalization. If not available through the above means such items will be requisitioned with supporting justification through normal supply channels.
X3	Assigned to items which are not procured or stocked during the initial support period but based on demand criteria may later be procured for supply or stockage during the life of the end item.

MIL-STD-1369 (EC)
31 March 1971

<u>CODE</u>	<u>DEFINITION AND APPLICATION</u>
U SERIES	<u>DRAWINGS, SPECIFICATIONS AND DATA PROCURED AND NOT STOCKED IN THE SUPPLY SYSTEM</u>
UU	Assigned to installation drawings, diagrams, instruction sheets, field service drawings, etc., that are identified by manufacturers' part numbers.

2. Maintenance Codes

<u>LEVEL</u>	<u>CODE</u>	<u>DEFINITION AND APPLICATION</u>
Organizational		<p><u>Definition:</u> Organizational Maintenance is that maintenance which is the responsibility of and performed by a using organization on its assigned equipment. Its phases normally consist of inspecting, servicing, lubricating, adjusting, and the replacement of parts, minor assemblies and sub-assemblies.</p> <p><u>Application:</u></p> <p>USN - Using Organization</p> <p>To distinguish between the varying organizational maintenance capabilities on different classes of ships within the Navy, the following organizational maintenance codes will be used:</p>
	2	Minesweeper, Yardcraft, Patrol Gunboat
	3	Submarine
	4	Auxiliary-Amphibious Ships, e.g., APA, AKA, AO, etc.
	5	Minor Combatant (Destroyer, Frigate, Escort)
	6	Major Combatant (Cruiser, Carrier)
Intermediate		<p><u>Definition:</u> Intermediate Maintenance is that maintenance which is the responsibility of and performed by designated maintenance activities for direct and general support to using organizations. Its phases normally consist of calibration, repair or replacement of damaged or unserviceable parts, components or assemblies; the emergency manufacture of non-available parts; and providing technical assistance to using organizations. Intermediate maintenance is normally accomplished in fixed or mobile shops.</p>

MIL-STD-1369(EC)
31 March 1971

<u>LEVEL</u>	<u>CODE</u>	<u>DEFINITION AND APPLICATION</u>
	F	<u>Application:</u> USN - Shipboard Intermediate Maintenance Department
	G	<u>Application:</u> USN - Shipboard and Shorebased Intermediate Maintenance Department
	H	<u>Application:</u> USN - Shorebased Intermediate Maintenance Department
Depot		<u>Definition:</u> Depot Maintenance is that maintenance which is the responsibility of and performed by designated maintenance activities, to augment stocks of serviceable material, and to support organizational maintenance and intermediate maintenance activities by the use of more extensive shop facilities, equipment and personnel of higher technical skill than are available at the lower levels of maintenance. Its phases normally consist of repair, modification, alteration, modernization, overhaul, reclamation, or rebuild or parts, assemblies, sub-assemblies, components and end items; the emergency manufacture of non-available parts; and providing technical assistance to using activities and intermediate maintenance organizations. Depot maintenance is normally accomplished in fixed shops, ship yards and shore based facilities.
	D	<u>Application:</u> USN - Overhaul and Repair Department, Shipyard, Ordnance and Avionics Facility, and Special Repair Facility.
Contract (Not a level of Maintenance)	C	<u>Definition:</u> Contract Maintenance is the maintenance of material by commercial organizations (including prime contractors) on a one-time or continuing basis, without distinction as to the level of maintenance accomplished. The application of this code to a specific item may be modified at a later date due to establishment by the Navy of an in-house maintenance capability.

MIL-STD-1369 (EC)
31 March 1971

<u>LEVEL</u>	<u>CODE</u>	<u>DEFINITION AND APPLICATION</u>
Non-Repairable	Z	<u>Definition:</u> No repair to the item is authorized. <u>Application:</u> To be assigned in Column 3 of the Uniform Code Format for items that are not to be replaced at any level, and in Column 4 for items which are never to be repaired at any level.

MIL-STD-1369(EC)
31 March 1971

APPENDIX C

ILS VERIFICATION AND DEMONSTRATION

10. SCOPE

10.1 Scope. This appendix sets forth the requirements for the preparation of a plan which shall govern the formal ILS verification and demonstration of the system or equipment as required by paragraph 4.8 of the basic part of this standard.

20. PREPARATION AND APPLICATION. The contractor shall prepare the ILS Verification and Demonstration Plan to meet the criteria established herein for demonstrating whether or not the system or equipment support requirements, including those for maintainability, have been attained. This ILS Verification and Demonstration Plan shall be mutually agreeable to the contractor and the Navy. The demonstration will be conducted by the government in a typical operational environment with contractor participation as necessary to assure mutual acceptability of test data and the analysis thereof. The plan shall provide for assessment of system maintainability characteristics as well as support factors related to item down time, i.e., technical manuals, personnel, tools, support equipment, maintenance concept and the availability and adequacy of required spares and repair parts.

30. MANAGEMENT. The ILS verification and demonstration shall be managed by the government. A Demonstration Control Board will be established to provide on-site management of those aspects of the verification and demonstration under the direct control of the demonstration activity. The Board will be established early enough in the System life cycle to provide Board members with a thorough familiarity and understanding of the ILS program requirements, objectives and progress. The Board will consist of 3 to 5 government members one of whom will be designated as the Demonstration Director and an equitable number of contractor personnel to be provided at contractor option and expense. The Board will be responsible for assuring that maintainability, maintenance and support data is collected and documented in accordance with established Navy policy (or an approved modification thereof as may be necessary), determining the validity of data reporting and making initial determinations as to whether demonstration objectives have been satisfied and contractual requirements have been met.

40. DEMONSTRATION LOCATION AND DURATION. The ILS demonstration will preferably be conducted at the Naval activity which will be required to operate and support the first deliverable production system. The demonstration will commence approximately six months after delivery of the system/equipment to the demonstration site and may continue for about six month period. This will allow for operational and maintenance familiarization prior to the demonstration and will provide for a demonstration of sufficient scope to evaluate maintenance and support requirements for a broad operational spectrum of the system/equipment.

50. DEMONSTRATION TEST TEAM. The demonstration test team shall consist of members of the demonstration activity and the Demonstration Control Board.

MIL-STD-1369(EC)
31 March 1971

60. DEMONSTRATION SYSTEM EQUIPMENT. The system/equipment to be used in the demonstration will be that regularly assigned to the activity in support of its assigned mission. No attempt will be made to segregate a specific group of systems/equipments for demonstration purposes. All assigned systems/equipments will be used, regardless of detailed configuration, provided that such systems/equipments are production configured and delivered to the Navy for fleet training and operations. No specially configured test system/equipment will be used for demonstration purposes.

70. MAINTENANCE AND SUPPORT. All maintenance performed on the demonstration system/equipment will be accomplished by demonstration site personnel or by personnel attached to the supporting intermediate level maintenance activity. Organizational and intermediate level maintenance will be performed in accordance with the approved/validated technical manuals and data and the support resources provided by the system/equipment ILS program. Depot level maintenance will, however, be performed in accordance with contractual requirements as may be applicable during the period in which the demonstration is performed. No organizational or intermediate maintenance will be performed by contractor personnel during the demonstration unless specifically requested by the demonstration control authority. Similarly, no contractor advice or guidance will be given to personnel performing maintenance unless so requested by the control authority.

80. MAINTENANCE PERSONNEL. The composition of the demonstration test team and the extent of training of the personnel involved cannot be specified except by broad parameters. It is anticipated that the activity involved will be manned with a typical mix of maintenance personnel, such mix to follow as closely as possible the maintenance and operating factors established for the system/equipment. It is also anticipated that a large portion of the organizational and intermediate level maintenance personnel will have received either factory or Navy training. Also, time will be allocated for on-the-job training, as required, prior to commencement of the demonstration.

90. DEMONSTRATION SUPPORT MATERIAL. Initial demonstration site surveys for verification of the adequacy of logistic support status shall be conducted by the Demonstration Control Board not later than 60 days prior to the scheduled commencement of the demonstration. Items to be furnished by both contractor and government, based on the approved Support Material List (SML), will be delivered to the test site at least 60 days prior to commencement of the demonstration. Thirty days prior to the start of the demonstration, the Demonstration Control Board, shall survey the availability and serviceability of support material and initiate action through the program management office to fill shortages and replace unserviceable material. The Demonstration Control Board shall also make recommendations for add-on quantities of spares and repair parts. Basis for such recommendation shall be to reduce potential program delays. Upon completion of this survey and all possible corrective actions, a report of remaining deficiencies and a recommendation concerning program start/delay will be furnished to the Program Manager who will decide the advisability of program start or delay.

100. MAINTENANCE DATA COLLECTION. The collection of accurate data and the analysis thereof are prerequisites for a successful demonstration program. The data must have a high degree of accuracy with a broad base for analysis.

MIL-STD-1369(EC)

31 March 1971

The data system utilized to collect the DMMH requirements will be the Navy 3M Data System. An allowance of 15% or that percentage agreed to by the government and the contractor during contract negotiation, for PF&S (Personal, Fatigue and Supplementary) time will be used as the factor to convert all reported DMMH time to actual DMMH required time.

110. ANALYSIS/EVALUATION AND REPORT RESULTS. Data derived from the Demonstration Program shall be screened thoroughly for accuracy, classification of data, and verification of mathematical calculation. Maintainability measurements shall be computed as specified in the demonstration plan. A final demonstration report shall be prepared by the Demonstration Director and submitted to the government Program Manager within 90 days after completion of the demonstration.

120. CHANGE INCORPORATION. In the event a change is incorporated during the demonstration period that affects the maintainability, reliability or supportability of the system/equipment the contractor may request a reevaluation of the applicable demonstration results to that point in time, provided the change is incorporated and demonstrated prior to preparation and submission of the demonstration report.

NOTE: Data obtained from demonstrations or evaluations conducted under conditions other than those set forth in the demonstration plan will not be used by either the contractor or the procuring activity to determine guarantee compliance.

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

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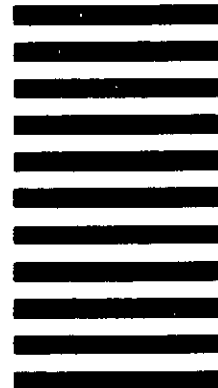
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5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

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7a. NAME OF SUBMITTER *(Last, First, MI) – Optional*b. WORK TELEPHONE NUMBER *(Include Area Code) – Optional*c. MAILING ADDRESS *(Street, City, State, ZIP Code) – Optional*8. DATE OF SUBMISSION *(YYMMDD)*

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