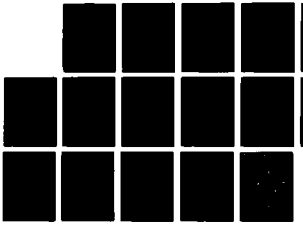
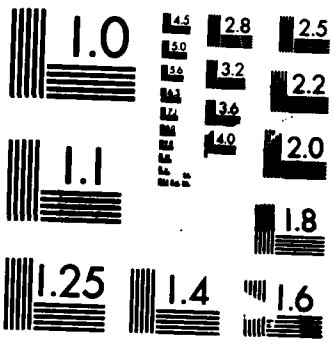
AD-A183 206 INTERIM LOGISTICS SUPPORT POLICY FOR NAVY LOGMARS (LOGISTICS APPLICATIONS..(U) LOGISTICS MANAGEMENT INST BETHESDA MD A J COLAIANNI ET AL. DEC 86 LMI-NA600R1 1/1

UNCLASSIFIED MDA903-85-C-0139 F/G 15/5 NL





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

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

AD-A183 206

DTIC FILE COPY (2)

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION / AVAILABILITY OF REPORT "A" Approved for Public Release; distribution unlimited.
2b. DECLASSIFICATION / DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S) Report NA608R1	5. MONITORING ORGANIZATION REPORT NUMBER(S)
6a. NAME OF PERFORMING ORGANIZATION Logistics Management Institute 6b. OFFICE SYMBOL (*If applicable*)	7a. NAME OF MONITORING ORGANIZATION
6c. ADDRESS (*City, State, and ZIP Code*) 6400 Goldsboro Road Bethesda, Maryland 20817-5886	7b. ADDRESS (*City, State, and ZIP Code*)
8a. NAME OF FUNDING / SPONSORING ORGANIZATION Commander, NAVSUPSYSCOM 8b. OFFICE SYMBOL (*if applicable*) NAVSUP 0613	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER MDA903-85-C-0139
8c. ADDRESS (*City, State, and ZIP Code*) Room 712, Crystal Mall, No. 3 Washington, DC 20376-5000	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO. / WORK UNIT ACCESSION NO.

DTIC ELECTE AUG 13 1987 E

11. TITLE (*Include Security Classification*)
Interim Logistics Support Policy for Navy LOGMARS (U)

12. PERSONAL AUTHOR(S)
Albert J. Colaianni and John B. Handy

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (*Year, Month, Day*)	15. PAGE COUNT
Final	FROM _____ TO _____	December 1986	30

16. SUPPLEMENTARY NOTATION

17. COSATI CODES			18. SUBJECT TERMS (*Continue on reverse if necessary and identify by block number*)
FIELD	GROUP	SUB-GROUP	Bar Coding, LOGMARS, Integrated Logistics Support

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

The bar code systems that the Navy has acquired, for use both ashore and afloat, are supported by more than 7.6 million dollars' worth of equipment. Logistics support for that equipment is currently inadequate. A program is under design to solve the problem for equipment acquired in the future, but an interim policy is needed for equipment already on hand. Four elements require prompt attention: (1) Equipment maintenance, the most critical and costly element, should be performed by contract on a per-incident basis. On that basis, we would expect the annual cost to be $163,000, in contrast to the $590,000 currently incurred by including maintenance in the purchase contract. (2) Future training requirements should be appraised and provided for in the budget. Software training has been given to a few representatives from each installation who have then conducted local training courses. That approach appears effective, and should be continued in the future. Hardware operation and maintenance training should not be necessary. (3) Supply support should be addressed by the LOGMARS Program Management Office to assure that equipment users are aware of available sources of supplies. Most activities now buy parts and supplies locally. In the long term, supplies should be included in the standard Naval supply system. (4) Technical data on individual applications and technical manuals for LOGMARS hardware should be maintained in the Program Management Office. Source codes for software should be kept by application developers.

A fifth matter of importance is software maintenance. The present arrangement of providing software maintenance is well organized and should continue unchanged.

The interim actions recommended will assure the availability of LOGMARS equipment until the permanent logistics support program is implemented.

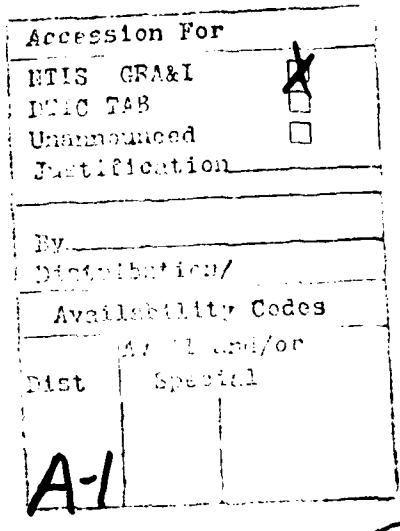
20. DISTRIBUTION / AVAILABILITY OF ABSTRACT	21. ABSTRACT SECURITY CLASSIFICATION	
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT. ☐ DTIC USERS		
22a. NAME OF RESPONSIBLE INDIVIDUAL	22b. TELEPHONE (*Include Area Code*)	22c. OFFICE SYMBOL

INTERIM LOGISTICS SUPPORT POLICY FOR NAVY LOGMARS

Report NA608R1

December 1986

Albert J. Colaianni
John B. Handy



Prepared pursuant to Department of Defense Contract MDA903-85-C-0139. The views expressed here are those of the Logistics Management Institute at the time of issue but not necessarily those of the Department of Defense. Permission to quote or reproduce any part must – except for Government purposes – be obtained from the Logistics Management Institute.

LOGISTICS MANAGEMENT INSTITUTE
6400 Goldsboro Road
Bethesda, Maryland 20817-5886

87 8 11 043

Executive Summary

INTERIM LOGISTICS SUPPORT POLICY FOR NAVY LOGMARS

The bar code systems that the Navy has acquired,[1] for use both ashore and afloat, are supported by more than 7.6 million dollars' worth of equipment. Logistics support for that equipment is currently inadequate. A program is under design to solve the problem for equipment acquired in the future, but an interim policy is needed for equipment already on hand. Four elements require prompt attention:

- Equipment maintenance, the most critical and costly element, should be performed by contract on a per-incident basis. On that basis, we would expect the annual cost to be $163,000, in contrast to the $590,000 currently incurred by including maintenance in the purchase contract.
- Future training requirements should be appraised and provided for in the budget. Software training has been given to a few representatives from each installation who have then conducted local training courses. That approach appears effective, and should be continued in the future. Hardware operation and maintenance training should not be necessary.
- Supply support should be addressed by the LOGMARS Program Management Office to assure that equipment users are aware of available sources of supplies. Most activities now buy parts and supplies locally. In the long term, supplies should be included in the standard Naval supply system.
- Technical data on individual applications and technical manuals for LOGMARS hardware should be maintained in the Program Management Office. Source codes for software should be kept by application developers.

A fifth matter of importance is software maintenance. The present arrangement of providing software maintenance is well organized and should continue unchanged.

The interim actions recommended will assure the availability of LOGMARS equipment until the permanent logistics support program is implemented.

---

[1]Under DoD's Logistics Applications of Automated Marking and Reading Symbols (LOGMARS) program.

CONTENTS

	Page
Executive Summary	iii
Chapter 1. Background	1
Equipment Characteristics	2
Management Structure	3
Chapter 2. Logistics Support Elements	5
Equipment Maintenance	6
Maintenance Options	8
Software Maintenance	12
Training	12
Supply Support	13
Technical Data	14
Chapter 3. Recommendations	15
Equipment Maintenance	15
Software Maintenance	15
Supply Support	16
Technical Documentation	16
Chapter 4. Other ILS Considerations	17
Appendix A. LOGMARS Contract, Section C.7 Maintenance	A-1 – A-4
Appendix B. Logistics Support Responsibilities	B-1 – B-1

CHAPTER 1

BACKGROUND

In support of the Logistics Applications of Automated Marking and Reading Symbols (LOGMARS) program of the Department of Defense, an indefinite-delivery, indefinite-quantity contract was awarded in May 1982 to the IBIS Corporation for a standard family of LOGMARS equipment. The contract, issued by the U.S. Army Computer Systems Selection and Acquisition Agency, provides a central delivery order from which all Services may procure the necessary equipment and services to support continuing LOGMARS efforts.

The contract includes hardware, hardware maintenance, software, software maintenance, training, and documentation. It expires in May 1987. By 27 August 1986, the Navy had bought 4,786 items, valued at $7.6 million, from the current contract to support its numerous systems. Portable bar code readers account for 86 percent of the items (Figure 1-1).

Because of the dollar value and criticality of the bar code systems being installed throughout the Navy, the Naval Supply Systems Command (NAVSUP) has decided to improve support of these systems, both at shore installations and aboard ship. The command has therefore entered into a contract with American Management Systems Inc. (AMS) for two purposes: an analysis of requirements/ procurement strategy and development of procurement specifications for a Navy LOGMARS contract that is to be awarded when the present IBIS contract expires.

An important part of the procurement strategy is development of a Logistics Support Plan (LSP) to define the logistics support requirements for bar coding equipment. NAVSUP has also recognized an urgent need to develop an interim Integrated Logistics Support (ILS) policy that can be implemented soon because the AMS study will not be finished until 20 weeks after contract award (approximately February 1987) and will not deal with the equipment that has been bought under the

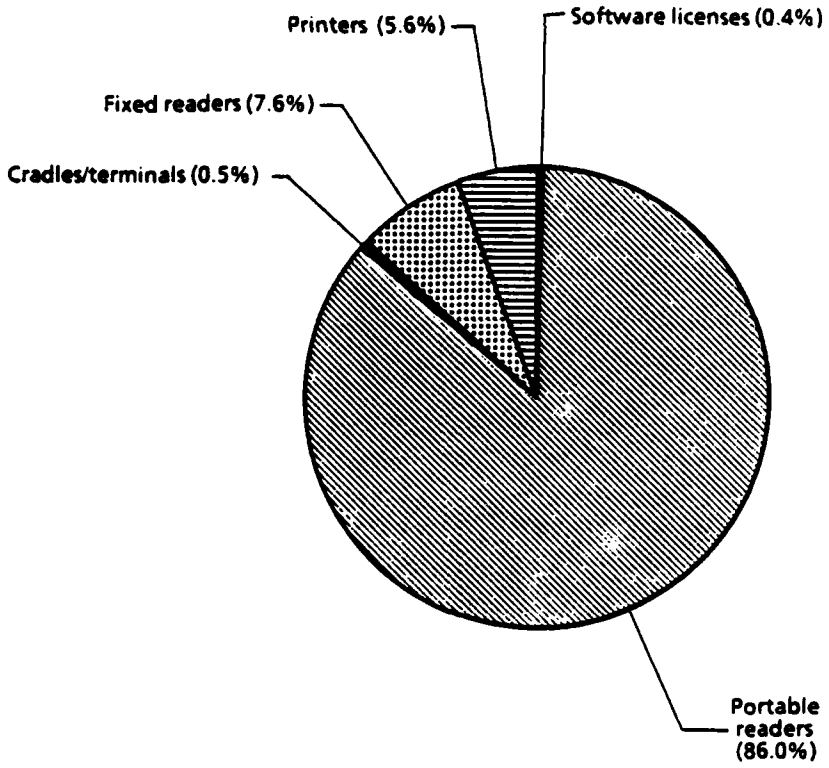


FIG. 1-1. NAVY LOGMARS EQUIPMENT PURCHASES (NUMBER OF ITEMS)

IBIS contract. In response to this concern, the Logistics Management Institute has been tasked to formulate an interim ILS plan.

EQUIPMENT CHARACTERISTICS

The equipment in the current IBIS contract is typical of commercially available bar code readers, scanning devices, and printers. In general, the equipment is quite reliable; mean-time-between-failure (MTBF) data are shown in Table 1-1. The bar code readers and other electronic equipment are largely of solid-state construction and have few moving parts. This design lends itself to a high degree of reliability and relatively few maintenance tasks that can be performed at the organizational or intermediate level. The label printers are impact-type printers and, because they are mechanical, require more maintenance. On the basis of discussion with users and suppliers, we estimate the average life expectancy of the aggregate of this equipment to be 10 years.

TABLE 1-1

RELIABILITY OF LOGMARS EQUIPMENT

Line item #	Item	Make and model	Quantity purchased	MTBF (hours)
1AA	Portable reader/wand	TELXON 701/TW2	585	14,493
1AB	Portable reader/laser	TELXON 701/LS700II	3,529	7,280
2AA	Fixed reader/wand	TELXON 7900/TW2	6	8,772
2AB	Fixed reader/laser	LS7200 w/LS201	359	6,410
3AA	Impact printer	IM TEC 2013	91	2,000
3AB	Impact printer	INTERMEC 8413	101	3,000
4	Dot-matrix printer	FACIT 4528D	72	2,500
11	Letter-quality printer	FUJITSU SP830	3	4,000
8	Terminal	FREEDOM 200	1	14,925
13	Cradle	TELXON 984	21	7,692

Source: IBIS Corporation Proposal.

The portable bar code readers are programmed in Telxon Common Application Language (TCAL), which is proprietary software of the Telxon Corporation. The Navy has acquired 18 TCAL licenses.

MANAGEMENT STRUCTURE

The Navy LOGMARS program is managed by the LOGMARS Program Management Office at NAVSUP 0613. This office is responsible for the development of Navy LOGMARS policy and deals with the LOGMARS Coordinating Group at the DoD level. The LOGMARS system program and project managers from the various field activities develop LOGMARS applications. The software is developed by both Central Design Agencies (CDAs) and using activities that function as CDAs. Both will be referred to in this report as "LOGMARS Application Program Developers."

CHAPTER 2

LOGISTICS SUPPORT ELEMENTS

ILS is basically a management function, providing the initial planning, funding, and controls that help make sure that the ultimate user receives a system that will not only meet performance requirements but will also be expeditiously and economically supported throughout its programmed life cycle. The objective of ILS is to ensure the integration of various elements of support. The specific elements of support vary among Services and among systems within Services. DoD Directive 4100.35, *"Development of Integrated Logistic Support for Systems/Equipments"* outlines standard logistics elements as:

- Maintenance plan
- Support and test equipment
- Supply support
- Transportation and handling
- Technical data
- Facilities
- Personnel and training
- Logistics support resource funds
- Logistics support management information.

To maximize the availability and minimize life cycle costs of large, newly developed systems, such as major weapon systems and major Automated Data Processing (ADP) systems acquisitions, a comprehensive life cycle support plan is needed. Generally, ILS elements are considered early in the life cycle of a system, during the requirements determination or conceptual phases, and are maintained throughout the system until retirement. LOGMARS equipment is not designed or developed to a system specification, but procured "off-the-shelf" to fill a system requirement. Although an ILS plan for off-the-shelf equipment is generally

formulated in the absence of maintainability, reliability, and other support data that are documented during a major system acquisition, the objective of logistics support remains the same: maximizing availability within resource constraints.

Since LOGMARS equipment is designed for commercial application and support, the scope of our analysis is focused on those elements that can be addressed at this point in the life cycle:

- Equipment maintenance
- Software maintenance
- Training
- Supply support
- Technical data.

EQUIPMENT MAINTENANCE

A maintenance plan establishes the responsibilities, support levels, and repair policies required to maintain a desired level of equipment or system availability. In general terms, there are three basic levels of maintenance.

- Organizational maintenance: Tasks that are performed at the user level and are normally limited to component replacement, preventive maintenance, and simple corrective maintenance.
- Intermediate maintenance: Tasks that are beyond the organizational capability and usually include removal and replacement of major assemblies or parts.
- Depot maintenance: Tasks that usually include restoration, overhaul, or rebuilding of equipment.

Equipment maintenance is now included in the IBIS contract, Contract Line Item Numbers (CLIN) 00014AA-00015FD. The contract implies that there are only two levels of maintenance for LOGMARS equipment: (1) the organizational level of maintenance, which is prescribed in the vendor's literature and performed by the user, and (2) depot level maintenance, which is performed by the contractor, at either the Government site or the contractor's site.

Contract maintenance costs are listed by unit as a monthly charge. Section C.7 of the IBIS contract describes maintenance support and the location of the maintenance to be performed (Appendix A). The current maintenance contract is renewable until 1992. According to the Army's program manager for the IBIS contract, IBIS Corporation has estimated the Navy's FY87 maintenance costs to be $238,000. As more items reach the end of their warranty periods, the total annual Navy contract maintenance costs for equipment purchased through August 1986 will amount to $590,000. Table 2-1 shows contract maintenance costs for each item.

TABLE 2-1

ANNUAL MAINTENANCE CONTRACT COSTS

Line item #	Item	Make & model	Cost of maintenance/ unit/month	Annual maintenance contract costs
1AA	Portable reader/wand	TELXON 701/TW2	$ 5.50	$ 38,610
1AB	Portable reader/laser	TELXON 701/LS700II	9.40	398,071
2AA	Fixed reader/wand	TELXON 7900/TW2	4.50	324
2AB	Fixed reader/laser	LS7200 w/LS201	10.15	43,726
3AA	Impact printer	IM TEC 2013	37.80	41,278
3AB	Impact printer	INTERMEC 8413	37.80	45,814
4	Dot matrix printer	FACIT 4528D	23.10	19,958
11	Letter quality printer	FUJITSU SP830	37.80	1,361
8	Terminal	FREEDOM 200	23.10	277
13	Cradle	TELXON 984	2.10	529
Total				$589,948

MAINTENANCE OPTIONS

The maintenance options for the equipment on the current contract are:

- Maintaining equipment with in-house resources
- Relying on the contract maintenance agreement
- Paying the contractor to maintain equipment on a per-incident basis.

In-House Maintenance

In-house maintenance cannot be supported now for two reasons: (1) there are not enough repair cost data on which to estimate in-house resource needs, and (2) fielded systems are now maintained adequately under contract.

Mean repair time data regarding LOGMARS equipment under the IBIS contract has not been established, and we could not obtain the information from the equipment manufacturers. We estimated the mean repair time for our maintenance analysis but could not determine the costs of parts, equipment, personnel, and training, costs necessary to a comparison of in-house and contract maintenance.

Because contract maintenance provides fielded LOGMARS equipment with satisfactory support, there is little incentive for an in-house effort, particularly in the absence of evidence that savings would result.

Converting from contract to in-house maintenance could take as long as 4 years, including the time needed for collecting repair cost data, determining manpower needs, establishing positions, and providing training and equipment. With an anticipated service life of 10 years, the equipment purchased under the IBIS contract will have too little remaining useful life to justify such an effort. Actual maintenance data, repair cost experience, and equipment purchases may suggest that in-house maintenance will be appropriate in the future, especially if the next contract provides similar equipment. Until such information is available, however, LOGMARS equipment can continue to be maintained by contract.

Contract Maintenance Agreement

The contract maintenance agreement requires the contractor, the IBIS Corporation, to assume full responsibility for repair costs. If an item fails, the Government simply notifies the contractor, and the contractor does whatever is

needed to restore the equipment to working order The price for this service is considerable, as has been shown in Table 2-1. The benefit is also considerable, in that it allows the Government to divest itself of any risk of failure for the life of the maintenance agreement.

Per-Incident Repairs

This option calls for the contractor to perform repairs and to charge the Government for each repair according to an agreed-upon hourly rate. Such a rate has already been established in the IBIS contract as CLIN 0023, at a cost per hour of $80. The rate includes travel expenses. NAVSUP has informed us that a separate agreement has been reached for items that are returned to the contractor's site for repair. For such items, the cost per hour is one-third of the standard hourly repair rate.

Our analysis – which is based on mean-time-between-failure data from the IBIS Corporation proposal, mean-repair time data based on our own estimates, and an average operating time per year of 2,080 hours for all types of equipment – shows that this option, per-incident repairs, provides equipment maintenance at lowest cost to the Navy. The Navy must, of course, assume the risk that the number of repairs will exceed the engineered estimates. Our analysis has made provision for this possibility by estimating worst-case failures (and associated worst-case repair costs) by increasing the engineered failure data by three standard deviations (assuming a poisson distribution). Even with this high estimate of failure rate, per-incident repairs cost less than maintenance-contract repairs. Table 2-2 summarizes the results of our analysis.

Sensitivity analysis shows that per-incident repairs cost less, even if mean-times-between-failures are halved, mean-repair times are doubled, or both.

Administrative costs for per-incident repairs will exceed those under a maintenance contract. But reasonable control over such costs can be established by central funding of repairs (to preclude the proliferation of purchase orders) and by a requirement that the contractor submit a complete record of each repair, including:

- Date of failure
- Date received

TABLE 2-2

COMPARISON OF REPAIR COSTS: MAINTENANCE CONTRACT VS. PER-INCIDENT

Line item #	Item	Make and model	Quantity purchased	Mean time between failures (hours)	Mean (hours)	Engineered failures per year	Worst-case failures per year	Repair cost per incident	Engineered repair cost per year	Worst-case repair cost per year	IBIS maintenance contract cost per year	Per-incident savings per year
1AA	Portable reader/wand	TELXON 701/TW2	585	14,493	2	84	111	$ 69	$ 5,821	$ 7,727	$ 38,610	$ 30,883
1AB	Portable reader/laser	TELXON 701/LS700II	3,529	7,280	2	1,008	1,104	75	75,958	83,134	398,071	314,937
2AA	Fixed reader/wand	TELXON 7900/TW2	6	8,772	2	1	5	69	99	347	324	(23)
2AB	Fixed reader/laser	LS7200 w/LS201	359	6,410	2	116	149	75	8,776	11,215	43,726	32,511
3AA	Impact printer	IM TEC 2013	91	2,000	3	95	124	324	30,663	40,119	41,278	1,158
3AB	Impact printer	INTERMEC 8413	101	3,000	3	70	95	324	22,689	30,823	45,814	14,991
4	Dot-matrix printer	FACIT 4528D	72	2,500	3	60	83	304	18,211	25,269	19,958	(5,311)
11	Letter-quality printer	FUJITSU SP830	3	4,000	3	2	5	388	605	2,059	1,361	(698)
8	Terminal	FREEDOM 200	1	14,925	3	0	1	270	38	340	277	(63)
13	Cradle	TELXON 984	21	7,692	2	6	13	69	394	889	529	(360)
Total annual cost									$163,252	$201,922	$589,948	$388,026

- Model and serial number
- Nature of failure
- Total cost of the repair (labor and material)
- Date of completion.

The LOGMARS Program Management Office can analyze this data at least monthly, to make sure that repair costs are appropriate, establish repair time and cost data, and identify repair trends. The malfunction reports called for in paragraph C.7.6 of the IBIS contract should also be analyzed. Such an analysis would enable the LOGMARS Program Management Office to formulate an acquisition strategy for maintenance of LOGMARS equipment, establish economic repair limits, and provide insight into reliability data as bases for future procurements.

Maintenance Policy

Maintenance policy should be structured to provide for the most efficient means of maintenance support, the using activity communicating directly with the vendor for equipment maintenance. Two levels of maintenance are appropriate for LOGMARS equipment:

- Organizational maintenance: This includes diagnosis, replacement, calibration, and adjustments, as outlined in the vendor's literature. The user will utilize the contract's telephone consultation service to confirm and diagnose malfunctions and identify possible solutions. Items identified as not repairable at the organizational level will be either returned to the contractor or repaired on site by the contractor. Items determined after consultation with the contractor to be unrepairable will be disposed of at the organizational level.
- Depot maintenance: Major component repair or calibration beyond the capability of organizational maintenance will be performed by the contractor. Decisions about condemnation should be made by the contractor.

An intermediate level of maintenance may be established when appropriate (for example, for shipboard applications). This determination should be made by the LOGMARS Application Program Developer based on equipment criticality, the impact that non-operating equipment has on a system, availability of timely support and the cost of training and maintaining intermediate level maintenance.

SOFTWARE MAINTENANCE

A modification of the IBIS contract enabled DoD to use the TCAL programming language in the development of LOGMARS applications. The Government was thus enabled to acquire multiple copies of the TCAL compiler, allowing for more flexibility in the acquisition and support of LOGMARS. The modification includes application support, 1 week of training, and license maintenance (renewable annually). At present, LOGMARS Application Program Developers maintain licenses and are responsible for software support of their respective systems. The present system can continue without change. It enables the LOGMARS Application Program Developers to be responsive to the needs of the system users.

TRAINING

Because LOGMARS equipment is designed for the commercial environment, it is supported by adequate operating manuals. Training that goes beyond that in the manufacturers' literature should not be necessary. Operator training may be provided by the LOGMARS Application Program Developer, either from in-house assets or by contract. To date, NAVSUP has trained 40 people in TCAL programming: two from each NSC, two from the Navy Regional Data Automation Centers (NARDAC) in Pensacola and Jacksonville, two from the Aviation Supply Office (ASO), two from the Naval Forms and Publications Center (NPFC), one from the Ships Parts Control Center (SPCC), five from the Fleet Management Support Office (FMSO), five from the Navy Management System Support Office (NAVMASSO) and five from other Systems Commands.

The main purpose of this training was to create a cadre of programmers to instruct and program TCAL at each using installation; each installation was then to be responsible for subsequent training. Activities would make sure that they had enough programmers to allow for employee turnover and to meet future programming requirements. Though the concept of a cadre appears sound, it is too early in the program for a measurement of its effectiveness. Steps can be taken to make sure that the program is monitored and that the required level of TCAL programmers is maintained.

Subsequent TCAL training can continue to be funded centrally by the LOGMARS Program Management Office, with expanded training remaining the responsibility of the LOGMARS Application Program Developers. The LOGMARS

Application Program Developers need to project their training requirements for 3 years and submit them to the Program Management Office for budget preparation.

SUPPLY SUPPORT

Supply support consists of all materiel and catalog data required to sustain a system's operations and support. It includes repair parts, spares, provisioning, storage, cataloging, maintenance float, and consumable supplies. In the case of LOGMARS equipment, supply support is largely confined to consumable supplies, such as print wheels, ribbons and repair parts. Though the organic maintenance support for LOGMARS equipment is limited, items listed in the manufacturers' literature as replaceable by the user (at the organizational level) can be stocked by the using activity. These activities are now supplied largely from local procurement and the General Services Administration (GSA) schedule.

Ideally, the LOGMARS Program Management Office should take steps to catalog and capture demand for these supplies and submit them for inclusion in the standard Navy supply system. Standardizing supplies within the wholesale supply system would enhance availability and reduce processing time. Since a contract is pending for a new family of LOGMARS equipment which may be awarded to a different manufacturer, it would be helpful as an interim measure for the LOGMARS Program Management Office to publish a list of acceptable supplies and sources of supply for distribution to the users.

To ensure availability of equipment for shipboard and other critical LOGMARS systems, an equipment maintenance float should be considered. A maintenance float stock is a quantity of spares or components kept as a standby to prevent downtime when primary equipment is evacuated from the using activity for repair. The LOGMARS Program Management Office should assist the Application Program Developers in determining the float requirement. An initial float stock level can be determined on the basis of engineered failure data. Criticality, population, reliability, and repair cost must be considered in the requirements for composition of float stock levels. Assistance from the Operations and Analysis Staff (NAVSUP 042) can be requested in the formulation of the requirements for float stocks and the stockage levels for consumable supplies. This float stock should be managed by the Application Program Developers.

TECHNICAL DATA

Technical data is the documentation for operation, maintenance, and support of a system. There is no central repository of this information for Navy LOGMARS systems.

The LOGMARS Program Management Office can establish a database of information for all LOGMARS systems and maintain technical manuals for all LOGMARS equipment. The LOGMARS Application Program Developers can be tasked to provide the Program Management Office with data concerning the systems application, equipment configuration, equipment documentation, support methodologies, and points of contact. Establishing and maintaining a central office for this data would provide a single source of information for all system users and system designers. It would also increase the Program Manager's visibility of LOGMARS applications. In addition to the previously mentioned technical data, LOGMARS Applications Program Developers should maintain software documentation for the applications they control. Current source code and operating instructions can be maintained in such a manner that they may be referred to by other Navy activities with similar requirements.

CHAPTER 3

RECOMMENDATIONS

In view of the increasing numbers of LOGMARS systems and the growing dollar investment in LOGMARS equipment, we strongly recommend that the LOGMARS Program Management Office issue a logistics support policy for all existing application systems. Responsibilities for the execution of the recommended policy are detailed in Appendix B. Our recommendations in the five support areas—equipment maintenance, software maintenance, training, supply, and technical data—are summarized below.

EQUIPMENT MAINTENANCE

In the absence of actual data concerning maintenance and repair costs, the LOGMARS Program Management Office should contract for maintenance on a per-incident basis. The IBIS contract should be modified: IBIS should be required to furnish more detailed data about the costs of maintenance and repair. The LOGMARS Program Management Office should analyze the information to support future decisions about maintenance, float stock level, and procurement. The maintenance structure, except in those cases outlined in this report, should consist of two levels of support: (1) organizational maintenance, limited to the maintenance prescribed in the vendor's literature; (2) depot maintenance, all the maintenance required beyond the organizational level (performed by the contractor). Intermediate level maintenance should be established where required by criticality and support considerations such as shipboard systems.

SOFTWARE MAINTENANCE

Systems training should remain the responsibility of the LOGMARS Application Program Developer. Most LOGMARS Application Program Developers now have in-house TCAL programming capability as a result of centrally funded training. We recommend that TCAL training remain decentralized and that the LOGMARS Program Management Office monitor the TCAL programming

capabilities in the field as an item of interest during site visits. We also recommend that the Program Manager task the LOGMARS Application Program Developers to identify 3-year TCAL training requirements so that further TCAL training can be budgeted for.

SUPPLY SUPPORT

We recommend that the LOGMARS Program Management Office prepare a standardized list of consumable supplies in support of LOGMARS systems. We also recommend that the LOGMARS Program Management Office determine the requirements for maintenance float stocks for critical LOGMARS systems. The maintenance float should be managed at the LOGMARS Application Program Developer level.

TECHNICAL DOCUMENTATION

We recommend that the LOGMARS Program Management Office establish a central data base of information and a documentation library for all LOGMARS systems. This data base would include functional descriptions, descriptions of system configurations, and support methodologies for each LOGMARS system. A point of contact for each system should be appointed and should maintain current source codes, programs and other technical documentation.

CHAPTER 4

OTHER ASPECTS OF AN INTEGRATED LOGISTICS SUPPORT (ILS) POLICY

Though the purpose of this study is to recommend an interim ILS policy for the equipment lines offered in the IBIS contract—and the recommendations in this report will help improve overall availability—there is still a need for an ILS policy for future Navy LOGMARS systems. The policy should be developed around the total system and should be considered during system design. It should include prototype systems, such as radio frequency, acoustical wave, and other automatic identification technologies. It should also include factors peculiar to LOGMARS systems, such as light reflectance, radio frequencies, label and equipment environments, and human engineering factors. Retrofitting an ILS plan to an existing system can provide continued support but cannot influence the system design or management structure without considerable effect on existing operations.

APPENDIX A

LOGMARS CONTRACT
SECTION C.7, MAINTENANCE

C.7.0 MAINTENANCE.

C.7.1 SCOPE. The Contractor shall perform maintenance on all equipment delivered under this contract. Maintenance shall be performed in accordance with these requirements and the Contractor's maintenance plan.

C.7.1.1 RESERVED.

C.7.2 DEFINITION.

Official Operating Hours.
The official operating hours shall be 10 hours per day, 5 days per week between 0700 and 1700 hours local time, Monday thru Friday. The official operating hours shall be consistent with the operating requirements of the Government at each site. The Government shall provide 30 days written notice to the Contractor, if a change in the official operating hours is required.

C.7.3 TYPES OF MAINTENANCE.

C.7.3.1 Two types of maintenance are required.

a. Government Site Maintenance. Wherein the Contractor will perform maintenance at the Government's site.

b. Contractor Site Maintenance. Wherein the Government will return the item to the Contractor for repair or replacement.

C.7.3.2 Table A indicates which items of equipment require Government Site maintenance and which items require Contractor Site maintenance.

TABLE A

ITEM DESCRIPTION	GOVERNMENT SITE MAINTENANCE	CONTRACTOR SITE MAINTENANCE
Portable Bar Code Readers (PBCR) (Ref. C.3.2.4)		X
PBCR with Optical Wand		X
PBCR with Hand Held Laser		X
Fixed Bar Code Readers (FBCR) (Ref. C.3.2.5)		X
FBCR with Optical Wand		X

ITEM DESCRIPTION	GOVERNMENT SITE MAINTENANCE	CONTRACTOR SITE MAINTENANCE
FBCR with Hand Held Laser		X
Serial Impact Bar Code Printers (BCP) (Ref. C.3.2.6)	X	*
Serial Impact BCP - Type A	X	*
Serial Impact BCP - Type B	X	*
Dot Matrix Bar Code Printer (Ref. C.3.2.7)	X	*
Data Collection Device /w Magnetic Tape Unit (Ref. C.3.2.8)	X	*
Acoustic Coupler (Ref. C.3.2.10)		X
Terminals (Ref. C.3.2.11)	X	
Modems (Ref. C.3.2.12)		X
Printer Converters (Ref. C.3.2.13)	X	*
Letter Quality Printer (Ref. C.3.2.14)	X	*
Data Communications Controller (Ref. C.3.2.15)	X	*
Portable Bar Code Reader (PBER) Cradle (Ref. C.3.2.16)		X

* See paragraph C.7.4.2

C.7.3.3 Telephone Consultation Service. The Contractor shall provide a telephone consultation service for the purpose of discussing the nature of any equipment malfunction with Government personnel to confirm that the malfunction is due to the failure of Contractor supplied equipment rather than improper operation of the equipment by Government personnel. In the event it can be determined that the malfunction was simply due to improper operation by Government personnel, the Contractor shall advise Government personnel of any corrective action to take. The Contractor shall make arrangements to receive calls during the official operating hours (see para.

C.7.2) of any site to which equipment deliveries are made under this contract. In those cases where Government personnel are unable to make the equipment operational, maintenance will be performed in accordance with para. C.7.4 or C.7.5. This telephone consultation service shall be provided by the Contractor at the same telephone numbers as those provided in accordance with the requirements of para. C.7.5.3.

C.7.4 CONTRACTOR SITE MAINTENANCE.

C.7.4.1 When maintenance is to be performed at the Contractor's site:

a. The Government will return the item of equipment to the Contractor's site using the packaging recommendations and the mail/delivery instructions provided by the Contractor.

b. The Contractor shall notify the sending Government site of the date of the receipt of the item of equipment.

c. The Contractor shall return the repaired item of equipment, or provide a like item of equipment as replacement to the Government's site within four (4) working days for CONUS sites and within six (6) working days for OCONUS sites after the Contractor's receipt of the item. The Contractor will use the mail/delivery instructions provided by the Government in returning the equipment.

C.7.4.2 The Government requires that the Contractor provide Contractor Site Maintenance as specified above for all items of equipment delivered to the following overseas locations:

a. Guam
b. Japan
c. Korea
d. Panama
e. Puerto Rico
f. Virgin Islands

C.7.5 GOVERNMENT SITE MAINTENANCE.

C.7.5.1 When maintenance is to be performed at the Government's, CONUS and OCONUS (overseas) sites.

a. Contractor personnel will arrive at the Government's site within two (2) working days after receipt of Government notification of the need for maintenance.

b. Contractor personnel shall repair the item of equipment within ten (10) Official Operating Hours as defined under C.7.2 after arrival at the Government site.

C.7.5.2 OVERSEAS LOCATIONS. The following are the overseas locations which require Government site maintenance:

a. Alaska
b. Germany
c. Hawaii
d. Italy

C.7.5.3 POINT OF CONTACT. The Contractor shall provide the Government with primary points of contact with associated telephone numbers and addresses and make arrangements to receive requests for maintenance service during the official operating hours (paragraph C.7.2). The Contractor will also provide secondary points of contact in event the primary points of contact are not available.

C.7.6 MALFUNCTION REPORTS. The Contractor shall provide the Government with an incident report each time an item of equipment is repaired. As a minimum, these reports will include:

a. Type, model, and serial number of item worked on.

b. Status of item before performing maintenance.

c. Status of item after performing maintenance.

d. Comments as to the cause of the malfunction (non-technical).

e. Nomenclature and stock number of any part repaired or replaced.

f. Name and signature of personnel making repairs.

C.7.6.1 The Contractor shall provide the report containing all of the information in paragraphs a through f above to the COR, whenever an item of equipment is repaired. When an item of equipment is replaced rather than repaired, the Contractor shall provide with that replacement item a statement specifying which item of equipment (type, model, and serial number) is being replaced.

C.7.7 REPLACEMENT PARTS. Only new parts or parts which the Contractor warrants as equal to new parts shall be utilized for replacement when repairs are made.

APPENDIX B

LOGISTICS SUPPORT RESPONSIBILITIES

APPENDIX B

LOGISTICS SUPPORT RESPONSIBILITIES

LOGMARS PROGRAM MANAGEMENT OFFICE

- Provide LOGMARS ILS policy
- Modify contract, collect and analyze maintenance data
- Establish economic repair limits
- Maintain reliability data future procurements
- Distribute a list of acceptable supplies and sources of supply
- Assist in determining requirements for maintenance float stock.

LOGMARS APPLICATION PROGRAM DEVELOPER

- Provide software support
- Provide TCAL Program training
- Manage maintenance float stocks
- Provide and maintain systems documentation to LOGMARS Program Management Office.

USER – ORGANIZATIONAL LEVEL

- Perform organizational maintenance
- Maintain maintenance float stocks.

CONTRACTOR

- Provide maintenance data
- Provide telephonic maintenance consultation
- Provide depot level support.

END

9-87

DTIC