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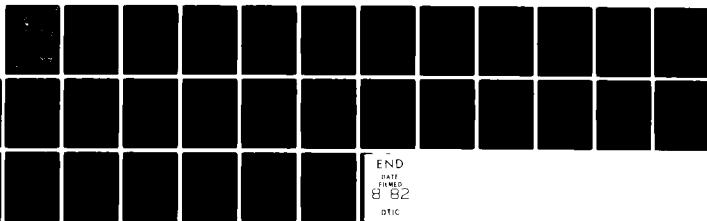
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Sonar In-Situ Mode Assessment System (SIMAS) AN/UYQ-25 Data Processing System Software Life Cycle Support Plan

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Surface Ship Sonar Systems Department



1 February 1980

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NUSC

Naval Underwater Systems Center
Newport, Rhode Island • New London, Connecticut

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PREFACE

This LCM plan is a working document and was prepared assuming the SIMAS development was to have been completed in FY79 with the system entering into the maintenance mode in FY80. The manning and costs shown in Figures 8-3 and 8-4 project what is required to establish and support a stand-alone SIMAS software maintenance activity. The requirements outlined herein are based on the number and schedule for the production systems planned and actual maintenance requirements established for similar existing systems based on complexity, comparison of number of lines of code, and etc. As the required date for initiation of the activity moves further into FY80, a decrease in the FY80 costs still to be provided should be realized. It must be emphasized that SIMAS is the first system to enter into the maintenance mode, and as such, will bear the brunt of the cost to establish the activity. As the other systems (LAMPs, 53I) follow into the maintenance mode, although the total number of people and costs will increase for total LCM, it is expected that some sharing of tasks will result and hence, hopefully, a reduction in the share of the SIMAS contribution will be realized.

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

APP	Acoustic Performance Predictions
CCF	Central Computer Facility
CM	Configuration Management
CMTU	Cartridge Magnetic Tape Unit
DPS	Data Processing Set
DTS	Data Terminal Set
ECP	Engineering Change Proposal
HAC	Hughes Aircraft Company
HEMA	Hardware Engineering Maintenance Activity
I/O	Input/Output
LBITS	Land Based Integrated Test Site
LCS	Life Cycle Support
LCSA	Life Cycle Support Activity
NAVSEA	Naval Sea Systems Command
NTDS	Naval Tactical Data System
NUSC/NL	Naval Underwater Systems Center/New London
QA	Quality Assurance
SCCB	Software Configuration Control Board
SCP	Software Change Proposal
SDF	Software Development Facility
SEMA	Software Engineering Maintenance Activity
SEP	Software Enhancement Proposal
SIMAS	Sonar In-Situ Mode Assessment System
SSS	Surface Ship Sonar
STR	Software Trouble Report

1.0 INTRODUCTION

1.1 Purpose

The purpose of this plan is to describe the structure of the maintenance activity necessary for life cycle support of the AN/UYQ-25 software system; define the scope of this effort; and delineate the requirements for satisfying this effort.

1.2 Objectives

The objectives of this plan are:

- (1) to define the relationships between the Software Life Cycle Support Activity (LCSA) and other Navy organizations;
- (2) to define the requirements to establish the Software Life Cycle Support Activity in all its facets;
- (3) to specify the items of software and hardware that must be maintained;
- (4) to describe the planned Software Life Cycle Support organization, including functional responsibilities and tasks; and
- (5) to project the life cycle cost in terms of personnel, funding, and equipment.

1.3 Scope

The scope of this AN/UYQ-25 Software Life Cycle Support Plan includes providing guidelines for establishing the LCSA and for defining functions, tasks, procedures and requirements for support of the software system during its life cycle.

1.4 Life Cycle Support Plan Updating

This plan will be updated as required to remain a viable basis for continued support of the AN/UYQ-25 software system.

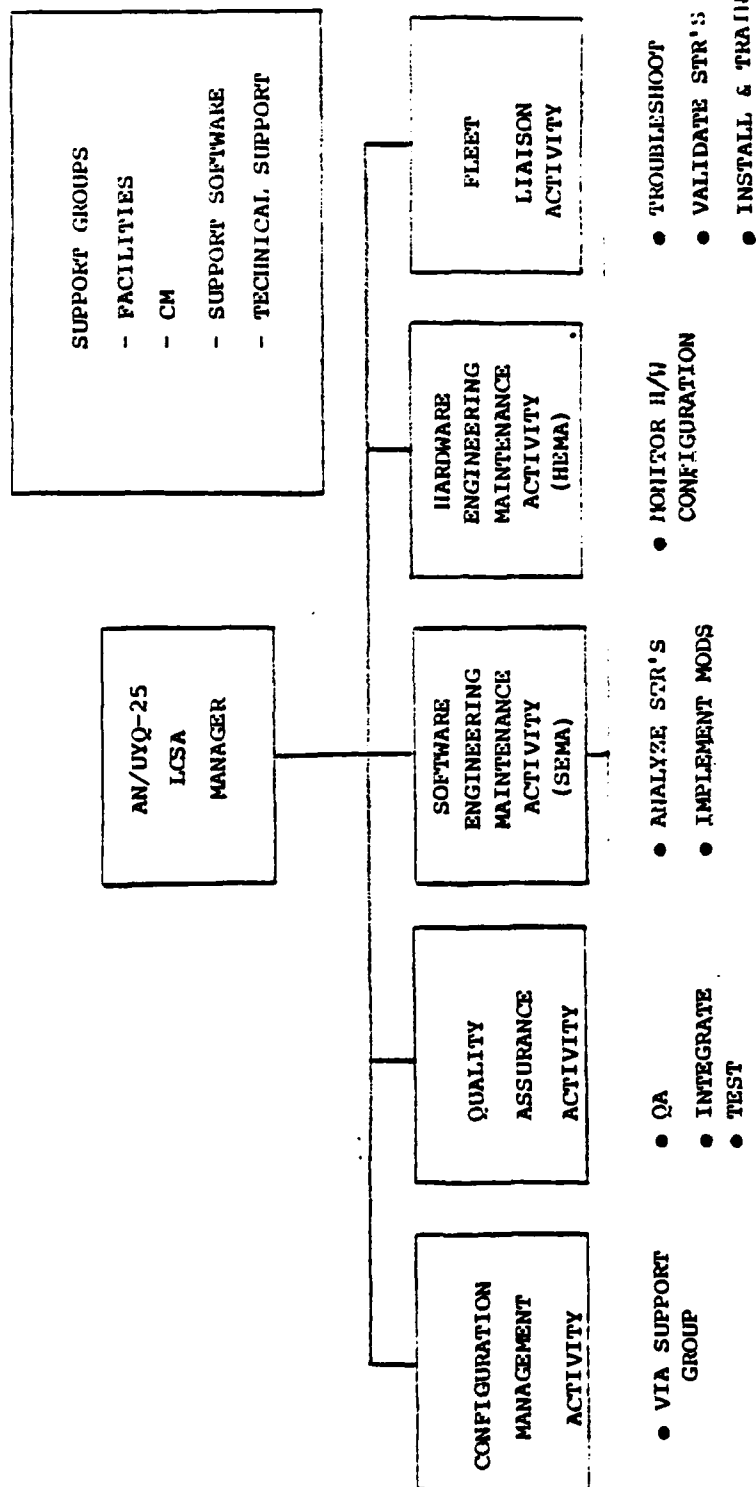
2.0 ORGANIZATIONAL RELATIONSHIPS AND RESPONSIBILITIES

2.1 Structure Overview

Illustrated in Figure 2-1 are the relationships within the Life Cycle Support structure of the AN/UYQ-25 software system.

2.2 Organizational Relationships and Responsibilities

The ultimate responsibility for support of the AN/UYQ-25 software system lies with NAVSEA 63Y1, which has been designated the Project Manager. Technical support is the responsibility of NUSC/NL. Direction and funding for this support will be provided to NUSC/NL by NAVSEA 63Y1, to perform AN/UYQ-25 Software Life Cycle Support. Under the cognizance of NAVSEA 63Y1, AN/UYQ-25 Software Life Cycle Support will be provided by NUSC/NL.



AN/UYQ-25 LCSA STRUCTURE

FIGURE 2-1

2.3

Organization of AN/UYQ-25 LCSA Within NUSC/NL

As Figure 2-1 depicts, the AN/UYQ-25 LCSA will include all necessary functions, both for performance of the LCS task and for satisfaction of requirements of MIL-STD-1679 with respect to Configuration Management and software control. The LCSA Manager will chair the Software Configuration Control Board (SCCB) for the AN/UYQ-25 system. Other members will be two representatives from Technical Support and two from the AN/UYQ-25 LCSA staff. The SCCB will evaluate all prospective changes to AN/UYQ-25 modules on the basis of operational impact, technical design impact, and resource requirements, in seeking the optimal solution to each.

NAVSEA 63Y1 will be given the opportunity to review and approve any modification or enhancement which significantly impacts schedule or budget. NAVSEA 63Y1 will also review and approve revision packages prior to release of a new system revision.

The AN/UYQ-25 LCSA will interface as necessary with the following groups for support:

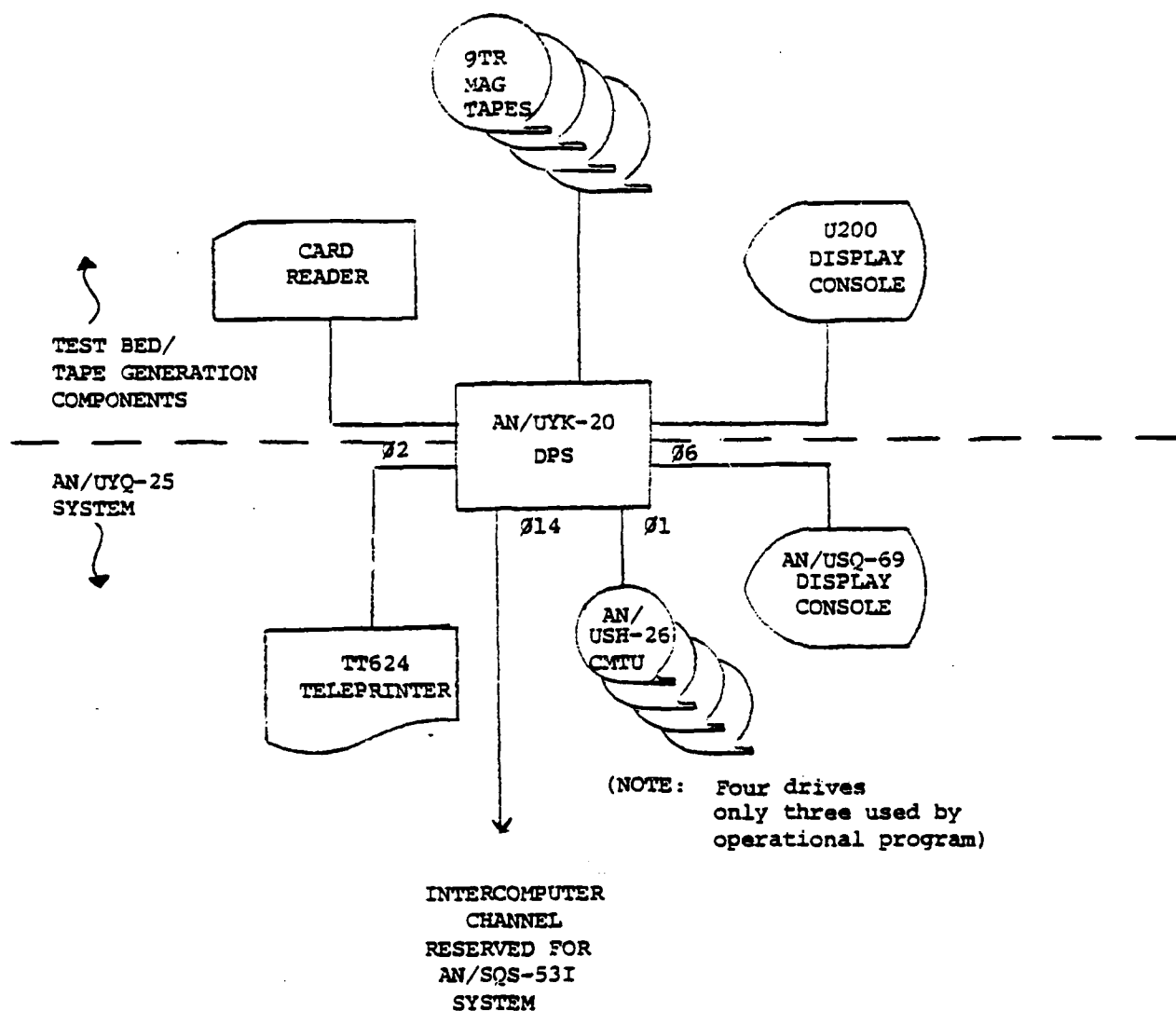
- Surface Ship Sonar facilities group; for use of Central Computer Facility (CCF) and Land Based Integrated Test Site (LBITS) in software maintenance, testing and certification.
- Configuration Management group, for use of control, item tracking and library services.
- Support Software group for assistance in problems related to items of support software; refer to definitions in Section 4.
- NUSC Technical Support groups
 1. Code 331 for assistance with problems related to software performance.
 2. Code 335 for assistance with problems related to scientific functions of the system.
 3. Code 331 for assistance with problems related to system engineering and the interface impact among various systems (e.g., how changes in AN/UYQ-25 affect AN/SQS-53I).

3.0 AN/UYQ-25 HARDWARE TO BE MAINTAINED

3.1 Hardware Maintenance Policy

The AN/UYQ-25 system configuration will be installed at NUSC/NL in LBITS as the nucleus of a test bed and alternate Tape Generation Facility. It will be serviced by LBITS technical personnel, under funding from the AN/UYQ-25 program.

The AN/UYQ-25 LCSA will monitor the hardware configuration for its effect on the software system. NAVSEA 63Y1, as a member of the Configuration Control Boards for the hardware configuration items, will participate in decisions regarding ECP's and any associated retrofits. Any retrofits necessary will be routed through NUSC and may be held up until any software modifications necessary can be made.



AN/UYQ-25 SYSTEM CONFIGURATION

FIGURE 3-1

3.1 (Cont'd)

Since further buys of the hardware will have any retrofits already installed, prior routing of retrofits through NUSC will enable the LCSA to keep ahead of the modifications in new buys.

3.2 Configuration

The total hardware configuration for the AN/UYQ-25 system including test bed and tape generation components, is shown in Figure 3-1.

3.2.1 AN/UYK-20(V) Data Processing Set

The AN/UYQ-25 system uses one AN/UYK-20 standard Navy computer as its Data Processing Set. The AN/UYK-20 is a general purpose militarized 16-bit digital computer.

3.2.2 AN/USH-26 Cartridge Magnetic Tape Unit

The vehicle for loading the AN/UYQ-25 system is the AN/USH-26 CMTU.

3.2.3 AN/USQ-69 Data Terminal Set

This peripheral to the AN/UYK-20, also a Navy standard, provides operator control of the AN/UYQ-25 system, as well as of shipboard diagnostic software.

3.2.4 TT624 Teleprinter

The Navy standard TT624 Teleprinter provides hard copy output of tables and predictions generated by the AN/UYQ-25 system.

3.3 Interdependencies

While the AN/UYQ-25 system can be operated as stand-alone, it is intended to interface with the AN/SQS-53I system. This interface is via an intercomputer channel serviced by a special handler.

4.0 AN/UYQ-25 SOFTWARE TO BE MAINTAINED

The discussion of AN/UYQ-25 Data Processing System, Sonar In-Situ Mode Assessment System (SIMAS), software program design and operation contained in this itemization of software is intended to provide insight to the less than intensive user and to form the basis for defining configuration items to be placed under Configuration Management.

4.1 AN/UYQ-25 Software Maintenance Policy

4.1.1 Policy

All AN/UYQ-25 operational, diagnostic, and support software will be supported for the life cycle of the AN/UYQ-25 system by NUSC/NL in accordance with this Detailed AN/UYQ-25 Software Life Cycle Support Plan.

NUSC/NL is directly responsible for all items of software except those so noted. Items of software which are not the direct responsibility of NUSC/NL will still be configuration items, and their performance will be monitored during use and problems processed through channels already provided for them.

4.1.2 Definitions

This policy is based on the following definition, as they are expressed in MIL-STD-1679.

4.1.2.1 Operational Software

Operational software are those computer programs provided to a unit of the operating forces which contribute to the performance of the unit's mission. They include executive, peripheral drivers, functional modules, and loaders.

4.1.2.2 Support Software

Support software are those programs used in development, testing, and support of operational software. They include compilers, linkage editors, system generators, and debugging programs.

4.2 AN/UYQ-25 Software Items

4.2.1 Operational Software

1. Nucleus (SN) - the controller routine of the SIMAS operational software.
2. Prompter (SE) - performs system operator interfaces via the DTS console to establish environmental conditions and control sequence.
3. SQS-26 Active (SQ) - schedules surface direct (SS), bottom bounce (SB), and convergence zone (SZ) predictions as appropriate.
4. Surface Duct Predictions (SS) - performs surface duct mode predictions for AN/SQS-26 Active Sonar.

4.2.1 (Cont'd)

5. Bottom Bounce Predictions (SB) - performs bottom bounce predictions for the AN/SQS-26 Active Sonar.
6. Convergence Zone Predictions (SZ) - performs convergence zone predictions for the AN/SQS-26 Active Sonar.
7. Propagation Loss (SX) - computes propagation loss versus range to a target at a specified depth.
8. DIMOS Predictions (SM) - computes expected detection range for two integration times versus ship's speed for DIMOS system.
9. LAMPS Active Prediction (SL) - performs processing of signals from LAMPS Sonobuoys.
10. Passive Systems Predictions (SP) - performs processing to determine probability of detection of own ship.
11. Ray Trace (ST) - performs processing to plot ray traces, three rays to a beam, up to five beams.
12. Output Processor (SO) - produces all hard copy output to line printer and recommended values to the CMTU.
13. Changeable System Parameters (SC) - performs system operator interfaces via ADD console to update changeable system parameters.
14. Initialization (SI) - registers SIMAS tasks with the Executive; obtains CMTU drive assignments; updates function key list.
15. Abort (SA) - permits orderly shutdown of SIMAS software when requested via selection of function key on ADD.
16. Errors (SR) - provides all processing for system error.
17. AMOS (SW) - determines propagation loss in surface isothermal layer by use of AMOS equations.
18. 53 Interface (SV) - sends recommended values to the AN/SQS-53I upon request or when updated; this module will be integrated June 1980.
19. Prompter Data Base (GSANYCHG)
20. Configuration Control Data Base (GSCCTDBS)
21. Changeable System Parameters Data Base (GSCSPDBS)
22. Environmental Data Base (GSENVDBS)
23. Prediction Control Data Base (GSPCTDBS)
24. Sound Speed Data Base (GSSSPDBS)
25. Intrinsic Functions Data Base (GSIFSDBS)

4.2.1 (Cont'd)

26. SIMAS Executive (LBIT) - SIMAS version of SNDEX, the AN/SQS-53I executive.
27. Initialization (SDINF) - performs initialization of executive data base; sets computer to initial processing state; links I/O handlers to proper channels.
28. Time-Out Processor (SDMO) - at 100 ms intervals, determines whether I/O requests have timed out and takes appropriate action.
29. ADD Interface Service (IAIS) - performs I/O for AN/USQ-69.
30. Line Printer Interface Service (IPRTI) - performs I/O for TT624.
31. CMTU Interface Service (ICIS) - performs I/O for AN/USH-26.
32. Overlay Processor (SNOVL) - performs all overlay handling functions.
33. Intercomputer Interface Service (I) - performs all intercomputer message functions; this module will be integrated in June 1980.
34. CMTU-to-Core Loader (SLCC) - once bootstrapped, this loads the core-resident SIMAS code and then transfers control to a predesignated point.
35. Intrinsic Function Package (ZIPP) - provides mathematical functions to user.

4.2.2 Support Software

1. Debug (DEBUG, DBUGS) - provides interactive program control for purposes of testing and debugging.
2. SSP Maintenance Program (SSP Maint) - provides vehicle for updating sound speed profile tape which is part of the AN/UYQ-25 software system.
3. Level 2 - operating system, used in SDF, hosted on AN/UYK-20, under which the AN/UYQ-25 system was developed. NAVELEX 570 is the official maintenance activity. UNIVAC handles all related problems under NAVELEX direction. The AN/UYQ-25 LCSA will interface with NUSC personnel who are responsible for NAVELEX interface.
4. MTASS - Machine Transferrable AN/UYK-20, AN/AYK-14 Support Software which runs on host mainframe; installed at NUSC on 1108 facility which is accessed from SDF by modem, and on VAX 11/780 in Code 40. When the Code 33 VAX is installed, AN/UYQ-25 will utilize MTASS for all software maintenance. MTASS responsibility is of the same structure as (2) Level 2.

5. CMS-2M Navy standard high level language, in which AN/UYQ-25 software is written. Responsibilities are of same structure as (3) Level 2.
6. Diagnostics listed here are under NAVELEX 570's direction.
 - AN/UYK-20
 - AN/USH-26
 - AN/USQ-69

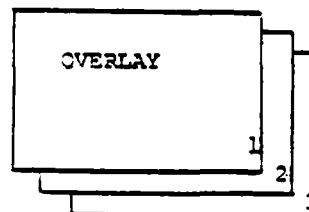
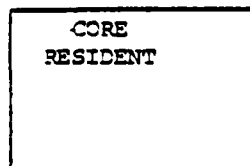
There is no software diagnostic for the TT624 teleprinter which utilizes a diagnostic card (hardware) instead.

7. CMS Preprocessor (CMSPR) - processes CMS-generated object modules to be used in system generation, resolving forward references and masked presets. This program is used in conjunction with SSSMPGEN and is to be used on an interim basis until implementation of the POST PROCESSOR with the MTASS System Generator.
8. System Generator (SSSMPGEN) - produces a bootable system tape from (1) a library of modules which have been processed through CMSPR, and in conjunction with (2) a deck of cards specifying load instructions.
9. Master/Copy Validation (MATCHEM) - compares master tape to copy, block by block, and indicates failures to match.
10. Cartridge Certification (CARTCERT) - validates cartridges for tape errors.
11. Output Selections (SOFIXDF) - data file of print buffers used in hard copy output of AN/UYQ-25.
12. Post Processor () - converts output of MTASS system generator to format of input to loaders; written in Fortran. These two programs will replace CMSPR and SSSMPGEN when delivered by Hughes Aircraft Company.

4.3

Software Configuration and Core Requirements

Figure 4-1 illustrates the software configuration of the AN/UYQ-25 system, showing the core resident elements, overlays, and the core requirements of all (given in decimal).



		CORE RESIDENT				OVERLAY	
		ELEMENT	SIZE (DEC)			ELEMENT	SIZE (DEC)
		SO	4,610			#1 SE	<u>13,430</u>
		SX ✓	8,534				13,430
		SW ✓	1,157				
		LBIT	5,912				
		IPRTI	377				
		LAIS	753			#2 SQ ✓	2,585
		SDMO	805			SS ✓	3,607
		ICIS	702			SB ✓	8,299
		SNOWL	498			SZ ✓	<u>4,285</u>
		ZIFP ✓	1,379				18,776
		SN	1,261				
OVERLAY AREA	{	SI	1,239	{	12,156	#3 SM	1,887 -
		SDINF	2,756			SL	2,465 -
		SC	8,161			ST	2,545 -
		SR	2,624			SP	<u>3,999</u>
		SA	795				10,896
		GSANYCHG	404				
		GSCCTDBS	9				
		GSCSPDBS	181				
		GSENVDBS	307			SLCC LOADER	1,342
		GSIFSDBS	9			DEBUG77	5,432
		GSPCTDBS	75				
		GSSSPDBS	<u>415</u>				
		30,807 W/O OVERLAY AREA					
		+ <u>18,776</u> LARGEST OVERLAY					
		49,583 MAXIMUM IN CORE (75.7%)					

AN/UYQ-25 SOFTWARE CONFIGURATION
AND CORE REQUIREMENTS

FIGURE 4-1

5.0 EQUIPMENT AND FACILITY REQUIREMENTS

5.1 Software Maintenance Requirements

5.1.1 Requirements for software maintenance for the AN/UYQ-25 system are:

1. Capability to store and edit large source files.
2. Capability to store large object files.
3. Capability to generate AN/UYK-20 object code via CMS-2M compiler or Macro assembler.
4. Capability to generate loadable (bootstrap or linking loader) system or library tapes.
5. Capability to simulate AN/UYK-20 code execution to facilitate testing and debug efforts.
6. Capability to validate blank cartridges for tape errors.
7. Capability to duplicate cartridge masters of system software for installation in the fleet.

5.1.2 Requirements 1 through 5 can be satisfied by the department's Central Computer Facility's (CCF) VAX 11/780 hosting MTASS; 6 and 7 by augmenting AN/UYQ-25 test bed and by augmenting the VAX.

5.2 System Certification and Testing Requirements

5.2.1 Requirements for system certification and testing are:

1. Capability to test fully integrated systems in a shipboard configuration with all components and interfaces in place.
2. Capability to test individual modules in a unit debug mode.

5.2.2 System Certification and Testing requirement 1 can be met by the AN/UYQ-25 test bed in LBITS, with the addition of a U200 display console and 9 track mag tape drives; 2 can be satisfied by the Central Computer Facility VAX with MTASS.

5.3 Configuration Management Requirements

5.3.1 Requirements of the AN/UYQ-25 system for Configuration Management are as follows:

1. Configuration Item Identification - The capability to collect and define, with the LCSA, all information which is to be controlled, thereby controlling the total identity and integrity of the computer program configuration item and its associated documentation.

2. Configuration Baseline Identification - The capability to establish an officially recognized configuration, with all associated specifications and technical documentation, as a control point.
3. Configuration Change Control - The capability to coordinate changes to an item that is under configuration control, including tracking status of all STR's.
4. Configuration Accounting - The capability to implement and maintain all activities necessary for keeping track of the current status of configuration items.

5.3.2 Configuration Management requirements can be satisfied by the existing Configuration Management organization in Code 331.

5.4 Tape Generation Requirements

5.4.1 Requirements of the AN/UYQ-25 system for generation of system tape packages are:

1. Capability to certify blank cartridges as error-free.
2. Capability to duplicate system tape packages for distribution.
3. Capability to validate copies as authentic.
4. Capability to generate system masters on an interim basis until the Hughes Aircraft Company postprocessor is in place on the VAX.

5.4.2 Requirements 1 through 4 can be satisfied by including 4 mag tape drives, a card reader, and a Level 2 system on the AN/UYQ-25 test bed; or by adding an AN/USH-26 with controller and driver to the Central Computer Facility, converting certification and validation software, and adopting the Hughes postprocessor.

6.0 AN/UYQ-25 LCMA ORGANIZATION

Reference Figure 2-1 for illustration of this organization.

6.1 Organization Overview

The Life Cycle Support Activity for the AN/UYQ-25 will perform the following functions:

- configuration control of operational software and documentation
- maintenance of operational software and documentation
- system certification and testing of software modifications
- review of hardware modifications as they affect the operational software and documentation
- quality assurance review of operational software and documentation
- fleet liaison

6.2 Detailed Functions and Responsibilities

6.2.1 LCSA Manager

Responsibilities of the LCSA Manager are as follows:

1. Chair the SCCB and monitor its activities to ensure prompt action.
2. Direct and monitor the various activities within the LCSA.
3. Perform administrative tasks, such as tasking and contracting external to the LCSA.
4. Determine release schedule for updated system baselines and notify CM.
5. Maintain budget accounting.
6. Submit new versions of system modules to CM.
7. Write and implement the AN/UYQ-25 Management Plan and Operating Plan.
8. Implement the LCSA organization.
9. Establish and maintain the interface with NAVSEA 63Y1 as a normal station in the review cycle on ECP's and system revision packages.
10. Establish and maintain the interfaces with the agencies responsible for hardware configuration management, training and installation.

6.2.2 SCCB

Responsibilities of the SCCB are as follows:

1. Review SEMA recommendations for SCP's and SEP's, determine which should be implemented, and request an ECP be completed for each.
2. Review SCP's, SEP's and associated ECP's and evaluate for system impact and feasibility, including performance, design and economic criteria. Forward all approved items to NAVSEA 63Y1 for their review.
3. Ensure the integrity, viability, reliability, and maintainability of the software.

The guidelines given in DOD-STD-480A for Engineering Changes, Class I and II, describe a change as Class I, generally, when cost, configuration identification, interface, and/or schedule impacts exist. Any other change is considered Class II.

The objective of reclassification of STR's as SCP's or SEP's is to sort out Class I changes and ensure that they receive NAVSEA review, in view of their impacts, while minimizing the burden on NAVSEA by leaving STR's, as Class II changes, to the NUSC organization.

6.2.3 Software Engineering Maintenance Activity (SEMA)

Responsibilities for maintenance of all software and documentation belongs to SEMA.

1. Evaluate all STR's, assigning category and priority to each; recommending reassignment as SCP's or SEP's as appropriate.
2. Analyze all STR's, SCP's and SEP's, and design modifications to satisfy each.
3. Forward STR's/SCP's/SEP's with recommendations to Software Configuration Control Board for review and approval.
4. On return of STR's/SCP's/SEP's from SCCB, take appropriate action: implement necessary software modifications as approved, or redesign modifications if not approved, and perform unit tests.
5. Prepare ECP for each SCP or SEP approved by SCCB, providing cost and schedule impact data.
6. Submit modified modules to QA for integration and testing.
7. Correct any problems or errors found by QA.
8. Submit documentation modifications to QA.

6.2.4 HEMA

Responsibilities of the HEMA activity are as follows:

1. Monitor hardware configuration changes, including all retrofits (ECP's) for their effect on the software, to ensure continued system operability aboard all installations.
2. Monitor STR's/SCP's/SEP's for hardware considerations; if a hardware problem evidences itself, follow up as necessary with NAVSEA.
3. Review maintenance of AN/UYQ-25 test bed in LBITS to ensure conformance to current baseline/version configuration.
4. Test any configuration modifications made to ensure continuity in AN/UYQ-25 test bed capability.

6.2.5 Quality Assurance

Detailed responsibilities of the Quality Assurance activity are as follows:

1. Ensure that all software modifications conform to established program standards and to design specifications.
2. Ensure that all documentation modifications conform to established program and accuracy standards.

6.2.5 (Cont'd)

3. Integrate and test modifications to operational software, as received from SEMA, ensuring operability of system software, accuracy of modifications, and reliability of system performance.
4. Certify that the modification being tested does, in fact, satisfy the STR/SCP/SEP in question.
5. Return problems to SEMA for correction.
6. Perform system wide severity testing and certification testing.

6.2.6 Fleet Liaison

1. Serve as contact point for fleet personnel with questions or problems regarding system operation or performance.
2. Validate all STR's to ensure reproducibility.
3. Resolve problems and, with assistance from other LCSA personnel, provide workarounds when possible to fleet personnel; recommend submission of STR's as appropriate.
4. In the event an STR or a problem is not reproducible in-house, travel as necessary to the ship for further investigation.
5. Maintain log of all fleet contacts, questions and answers, problems and suggested workarounds for reference by LCSA personnel.
6. Coordinate distribution and delivery of new system versions with NAVSEA.
7. Provide on-board training as necessary during installations.

6.3 Conformance to MIL-STD-1679

The organization of the LCSA is intended to satisfy the requirements of MIL-STD-1679, with respect to Configuration Management and Life Cycle Support. In general terms, these requirements are as follows:

1. Identify configuration items requiring control.
2. Define and control change implementation processes.
3. Track development and change status.
4. Ensure documentation is changed to reflect current status of the software.

7.0 OPERATIONAL PROCEDURES OF AN/UYQ-25 LCSR.

7.1 Definitions

The following definitions, taken from MIL-STD-1679, are assumed in this plan.

7.1.1 Software Change Proposal (SCP)

A Software Change Proposal (SCP) is a proposed change to the weapon system software or its documentation which would alter the approved baseline software or documentation which is under configuration control. An SCP is intended to be equivalent to a Class I Engineering Change (ref DOD-STD-480A).

7.1.2 Software Trouble Report (STR)

A Software Trouble Report (STR) is a report that the weapon system software is not in conformance with the approved baseline documentation which is under configuration control. An STR is equal to a Class II Engineering Change (ref DOD-STD-480A).

7.1.3 Software Enhancement Proposal (SEP)

A Software Enhancement Proposal (SEP) is a proposed change to the weapon system software or its documentation or its interfaces which is not an STR or SCP and is functionally transparent to all portions of the weapons system that are not directly addressed by the SEP. An SEP is intended to be equivalent to a Class I Engineering Change (ref DOD-STD-480A).

7.2 Software Trouble Report (STR)

The Software Trouble Report (STR) is a formal document generated by system users to communicate to the maintenance activity the existence of software-related malfunctions or inadequacies.

The information provided by the STR form and accompanying support material constitute the primary data base for the SEMA.

Figure 7-1 is the AN/UYQ-25 STR form in use.

7.2.1 STR Categories

These categories, per MIL-STD-1679 definition, are to be used in classifying AN/UYQ-25 STR's.

- Software Trouble (S)
- Documentation Trouble (D)
- Design Trouble (E)
- Logic Trouble (L)

7.2.2 STR Priorities

These priorities, per MIL-STD-1679 definition, are to be used in classifying AN/UYQ-25 STR's.

- Priority 1: prevents accomplishment of mission.
- Priority 2: adversely affects accomplishment of mission, with no work around.
- Priority 3: adversely affects accomplishment of mission, with work around.
- Priority 4: operator inconvenience.
- Priority 5: all other errors.

7.3 Software Change Proposal (SCP)

The Software Change Proposal (SCP) is a request, submitted via STR channels, to modify the system software, documentation, or operational procedures. This reclassification will be effected by the AN/UYQ-25 LCSA.

The SCP will be handled via the same procedures as STR's, using the same categories and priorities.

Figure 7-2 is the AN/UYQ-25 SCP form in use.

7.4 Software Enhancement Proposal (SEP)

The Software Enhancement Proposal (SEP) is a request, submitted via STR channels, to enhance the system software, documentation, or operational procedures. This reclassification will be affected by the AN/UYQ-25 LCSA.

The SEP will be handled via the same procedures as STR's, using the same categories and priorities.

Figure 7-2 is the AN/UYQ-25 SEP form in use.

7.5 Engineering Change Proposal (ECP)

In conformance with MIL-STD-1679, an Engineering Change Proposal (ECP) (DD1692) will be generated for and attached to each SCP or SEP which has cost, interface, or schedule impact.

Figure 7-3 is the form DD1692 in use.

7.6 Operational Runstream

Figure 7-4 illustrates the flow of activity for STR's/SCP's/SEP's from submission to resolution.

7.6.1 Procedures Narrative

Following is a discussion of Figure 7-4 which illustrates the flow of activity of the STR from its inception to resolution.

1. An STR is generated, either by fleet personnel or by a user within the LCSA.
2. The STR, when submitted to NUSC, is received in Configuration Management, where it is logged and routed to the AN/UYQ-25 LCSA. CM maintains status accounting on all STR's that enter the system.
3. The AN/UYQ-25 LCSA receives the STR; Fleet Liaison personnel validate each STR to ensure it is reproducible. Reference should be made to Fleet Liaison's trouble log for information relevant to the STR.
4. If the STR is not reproducible, Fleet Liaison will interface with the originator, and if no resolution can be made by telephone, it may be necessary to travel to the originator's location to resolve the problem. In any event, when the STR is determined to be invalid, it will be closed and the user notified.
5. SEMA will assign priority and category to each STR that has been validated.
6. If SEMA determines that the STR pertains not to a problem in conforming to existing design specification, but rather to a prospective change to design specifications, they recommend the STR be made an SCP.

If the STR is judged to pertain to an enhancement to existing design specifications, SEMA recommends the STR be made an SEP.
7. SEMA analyzes the STR for possible causes, and proposes design changes/software modifications as appropriate.
8. The AN/UYQ-25 LCSA notifies CM of the status of each STR/SCP/SEP; CM maintains status accounting to that effect.
9. The SCCB reviews SEMA recommendations and requests an ECP for each SCP or SEP approved.
10. SEMA prepares an ECP for each SCP or SEP, and proposes design changes to implement each.
11. The SCCB reviews all SCP's and SEP's, with associated ECP's and design change proposals, and authorizes or disapproves their implementation. Proposals disapproved are returned to SEMA. Proposals authorized are subject to NAVSEA 63Y1 approval.

7.6.1 (Cont'd)

12. SEMA implements authorized modifications, and returns rejected ones through Fleet Liaison to CM to be closed and the originator notified.
13. Quality Assurance integrates and tests modifications and reviews documentation.
14. Any item rejected by Quality Assurance is returned to SEMA for rework. Items approved by QA are submitted by the AN/UYQ-25 SCCB to CM.
15. When the LCSA Manager determines a new system baseline to be appropriate, he forms a package of all changes and forwards to NAVSEA 63Y1.
16. NAVSEA 63Y1 reviews the revision package and returns with approval to the LCSA Manager.
17. CM generates new system tapes as necessary to satisfy existing fleet installations and/or the Navy supply system.
18. CM updates status accounting to reflect disposition of the STR's/SCP's/SEP's.
19. At this point the life of an active STR/SCP/SEP terminates.

8.0 COST AND PHASING OF PERSONNEL AND EQUIPMENT

8.1 Personnel

Phasing and costs of AN/UYQ-25 personnel are shown in Figure 8-3. The figure includes recommendation for the source of the personnel, NUSC or contractor.

Costs are extended at \$55K per man, both for NUSC and Contractor personnel. This is based on a projection that contracts can be negotiated at this rate.

SEP/SCP SYSTEM FORM (AND-ALSC 3322 1A-18-79) (EXPERIMENTAL)		
1. SYSTEM PROJECT NAME:	2. DATE PREPARED:	3. CROSS OUT ONE: SCP NUMBER SEP NUMBER:
4. TITLE OF SCP/SEP:		
5. ORIGINATOR:	6. COMPONENT AFFECTED:	
7. DESCRIPTION OF PROBLEM/NEED FOR SCP/SEP:		
8. DESCRIPTION OF RECOMMENDED SCP/SEP:		
9. ALTERNATIVE IMPACT IF NOT APPROVED:		
10. BASELINE AFFECTED:	11. DOCUMENTATION/SPECIFICATIONS AFFECTED:	
12. OTHER SYSTEMS CONFIGURATION ITEMS:		
13. EFFECT OF SCP/SEP ON SYSTEM EMPLOYMENT, ILS, TRAINING, EFFECTIVENESS, ETC.:		
14. NET EFFECT ON SYSTEM RESOURCES (E.G. PROCESSING, MEMORY/DISKSPACE):		
15. DEVELOPMENTAL REQUIREMENTS:		
16. SCP/SEP EFFECTIVITY POINT:	17. DATE APPROVAL NEEDED BY:	
18. THIS SCP MUST BE ACCOMPLISHED BEFORE/WITH/AFTER THE FOLLOWING ECP/SCP/SEP/STRIS:		
19. SUPERSEDES OR REPLACES ECP/SCP/SEP/STRIS:		
20. COST, SCHEDULE OR INTERFACE IMPACT: NO: COST, SCHEDULE OR INTERFACE IMPACT: YES: SEE ATTACHED DD FORM 1692 ECP		
21. CONTRACTOR SCCS ACTION:		
APPROVE: ☐	DISAPPROVE: ☐	ECP ☐ DEFERRED UNTIL: ☐
AUTHORIZING SIGNATURE:	TITLE:	DATE:
22. GOVERNMENT SCCS ACTION:		
NO ACTION REQUIRED:	APPROVE:	DISAPPROVE:
RETURNED TO CONTRACTOR FOR:		
GOVERNMENT AGENCY TITLE:	SIGNATURE:	DATE:
REMARKS:		

ENGINEERING CHANGE PROPOSAL, PAGE 1
(SEE MIL-STD-480 FOR INSTRUCTIONS)

DATE PREPARED

PROCURING ACTIVITY NO.

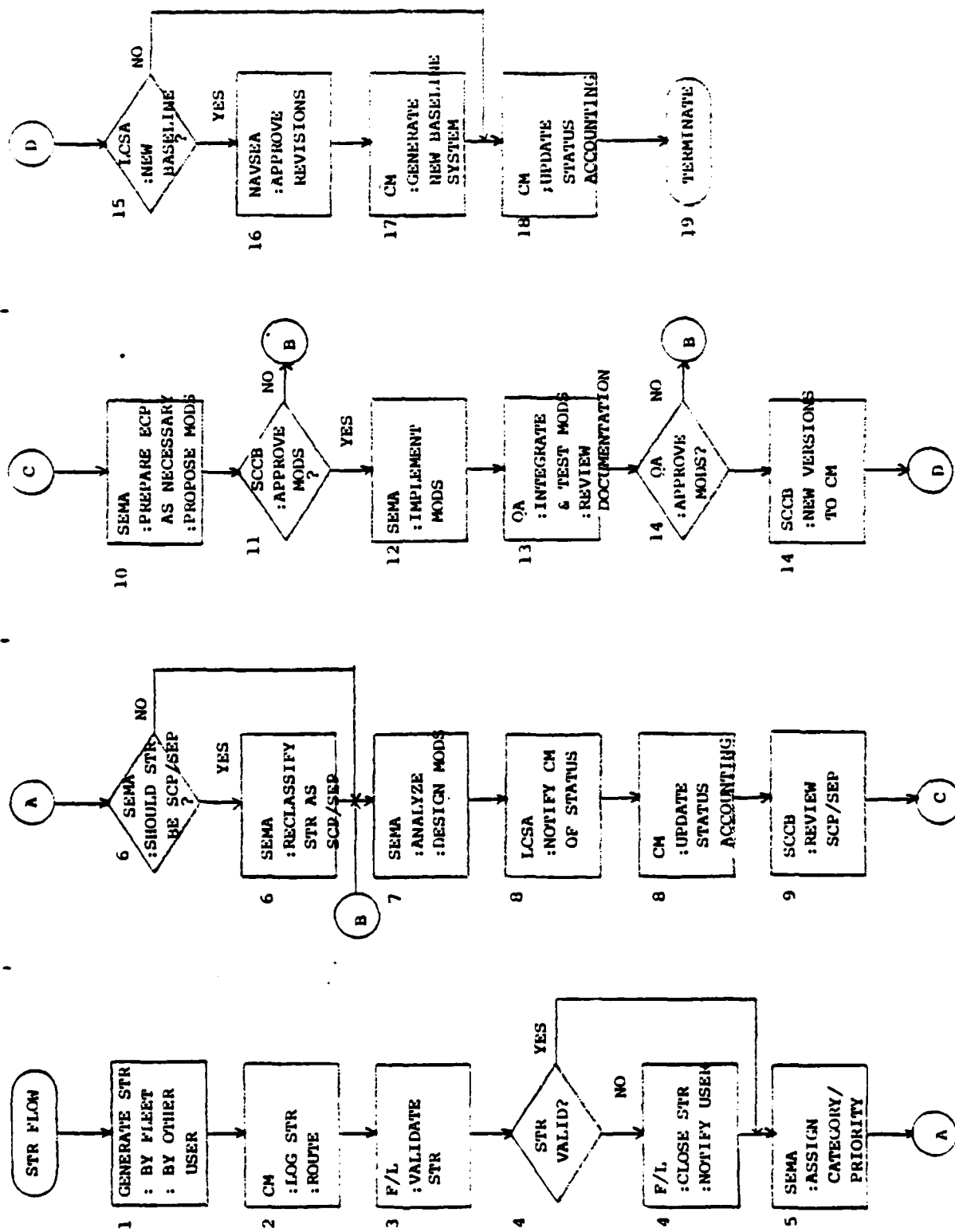
1. ORIGINATOR NAME AND ADDRESS				2. CLASS OF ECP		3. JUST. CODE		4. PRIORITY	
5. ECP DESIGNATION						6. BASELINE AFFECTED			
a. MODEL/TYPE		b. MFR. CODE	c. SYS. DESIG.	d. ECP NO.	e. TYPE	f. REV.	g. CORR.	☐ FUNCTIONAL	☐ ALLOCATED
								☐ PRODUCT	
						7. OTHER SYS./CONFIG. ITEMS AFFECTED			
						☐ YES ☐ NO			
8. SPECIFICATIONS AFFECTED - TEST PLAN					9. DRAWINGS AFFECTED				
	MFR CODE	SPEC./DOC. NO	SCN	MFR CODE	NUMBER	REV.	NOR NO.		
a. SYSTEM									
b. ITEM									
c. TEST PLAN									
10. TITLE OF CHANGE								11. CONTRACT NO. & LINE ITEM	
12. CONFIGURATION ITEM NOMENCLATURE								13. IN PRODUCTION	
								☐ YES ☐ NO	
14. NAME OF PART OR LOWEST ASSEMBLY AFFECTED						15. PART NO. OR TYPE DESIGNATION			
16. DESCRIPTION OF CHANGE									
17. NEED FOR CHANGE									
18. PRODUCTION EFFECTIVITY BY SERIAL NUMBER					19. EFFECT ON PRODUCTION DELIVERY SCHEDULE				
20. RETROFIT									
a. RECOMMENDED ITEM EFFECTIVITY					c. SHIP/VEHICLE CLASS AFFECTED				
b. ESTIMATED KIT DELIVERY SCHEDULE					d. LOCATIONS OR SHIP/VEHICLE NUMBERS AFFECTED				
21. ESTIMATED COSTS/SAVINGS UNDER CONTRACT					22. ESTIMATED NET TOTAL COSTS				
23. SUBMITTING ACTIVITY AUTHORIZING SIGNATURE					TITLE				
24. APPROVAL/DISAPPROVAL									
a. CLASS I			b. CLASS II						
☐ APPROVAL RECOMMENDED			☐ APPROVED	☐ DISAPPROVED	☐ CONCUR IN CLASSIFICATION OF CHANGE		☐ DO NOT CONCUR IN CLASSIFICATION OF CHANGE		
c. GOVERNMENT ACTIVITY					SIGNATURE			DATE	

DD FORM 1692

S/N 0102-LF-020-8000

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D-26320



AN/UYQ-25 LCSA OPERATIONAL RUNSTREAM
FIGURE 7-4

8.2 Test Bed

Funding for the AN/UYQ-25 test bed is required in the amounts reflected in the following table.

<u>ITEM</u>	<u>INITIAL EXPENDITURE</u>	<u>EACH YEAR FOLLOWING</u>
1. CONFIGURATION		
- AN/UYK-20*	\$60,000	-
- AN/USH-26*	28,000	-
- AN/USQ-69*	19,000	-
- TT624*	25,000	-
- U200 CRT	5,000	-
- MAG TAPE 9TR (4) #	-	-
- CABLES & ENCLOSURE*	5,500	-
- CARD READER#	-	-
2. SPARES*	40,000	\$15,000
3. MAINTENANCE (.5 MAN/YR-CONTRACTOR)	27,500	27,500
	\$210,000	\$42,500
LESS PROGRAMMED FUNDS	-177,500	
TOTAL	\$ 32,500	

*These items already programmed.

#These items available from SDF after VAX installation.

TEST BED CONFIGURATION

FIGURE 8-1

8.3 Tape Generation Facility

Funding to impliment a tape generation capability is necessary in the following amounts.

<u>ITEM</u>	<u>INITIAL EXPENDITURE</u>	<u>EACH YEAR FOLLOWING</u>
AN/USH-26 (4 DR)	\$28,000	-
AN/USH-26 Controller	1,000	-
AN/USH-26 Driver	10,000	-
Convert Software to VAX	10,000	-
Maintenance	-	13,750
Level 2 System	10,000	-
Installation of MT's, CR	2,000	-
Spares/Cartridges	-	<u>15,000</u>
	61,000	28,750

TAPE GENERATION FACILITY

FIGURE 8-2

This will enable a double capability - both the Central Computer Facility and the SIMAS Test Bed.

8.4 Services

The AN/UYQ-25 system will be required to support the departmental services it uses: CCF, CM, Support Software, and Technical Support. The estimates for these items are shown in Figure 8-4.

CCF support is estimated on the basis of a flat rate per user charge of \$10K annually. CM support is estimated at approximately one man/yr for the first two years and .5 man/yr after that.

8.5 Total Costing Estimates

Figure 8-4 itemizes total costs, projected through FY84, of funding the AN/UYQ-25 LCSA.

FUNCTION	NUSC/ CONTR	FY80	FY81	FY82*	FY83*	FY84*	FY85*
LCMA Mgr	NUSC	1	1	1	1	1	1
SEMA	NUSC	1	1	1	1	1	1
	CONTR	1	2	2	2	2	2
HEMA	CONTR	.5	.5	.5	.5	.5	.5
QA	CONTR	1	3	3	3	3	3
Fleet Liaison	CONTR	.5	1.5	2.5	2.5	2.5	2.5

TOTALS	NUSC	1	2.0	2.0	2.0	2.0	2.0
	CONTR	<u>4</u>	<u>7.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>	<u>8.0</u>
		5	9.0	10.0	10.0	10.0	10.0

COST (\$555K)	\$275K	\$495K	\$550K	\$550K	\$550K	\$550K
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*Requirements for SEMA may increase with inclusion APP enhancements.

MINIMUM CONFIGURATION
PHASING AND COST OF AN/UYQ-25 PERSONNEL

FIGURE 8-3

ITEM	FY80	FY81	FY82	FY83	FY84	FY85
PERSONNEL	\$275K	\$495K	\$550K	\$550K	\$550K	\$550K
TEST BED	210K	\$ 42.5K	\$ 42.5K	\$ 42.5K	\$ 42.5K	\$ 42.5K
	<u>- 177.5K</u> ⁽¹⁾					
	\$ 32.5K					
TAPE GENERATION FAC.	\$ 61K	\$ 29K	\$29K	\$ 29K	\$ 29K	\$ 29K
SERVICES						
-CCF	\$ 50K ⁽²⁾	\$ 90K ⁽³⁾	\$100K ⁽⁴⁾	\$100K ⁽⁴⁾	\$100K ⁽⁴⁾	\$100K ⁽⁴⁾
-CM	\$ 50K	\$ 50K	\$ 25K	\$ 25K	\$ 25K	\$ 25K
-SUPPORT SOFTWARE	\$ 10K	\$ 10K	\$ 10K	\$ 10K	\$ 10K	\$ 10K
-TECHNICAL SUPPORT	\$ 10K	\$ 10K	\$ 10K	\$ 10K	\$ 10K	\$ 10K
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
TOTAL	\$641K	\$726.5K	\$766.5K	\$766.5K	\$766.5K	\$766.5K
	<u>- 177.5K</u> ⁽¹⁾					
	\$463.5K					

- (1) ITEMS ALREADY PROGRAMMED
 (2) 5 USERS - 1/2 YEAR
 (3) 9 USERS
 (4) 10 USERS

TOTAL COST PROJECTIONS
 FOR AN/UYQ-25 LCSA

FIGURE 8-4