NAVELEX 0101,101

NAVAL SHORE ELECTRONICS CRITERIA

GENERAL

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

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FOREWORD

PURPOSE

The underlying philosophy behind the NAVELEX 0101, 100 series of handbooks is to provide a compendium of criteria and references which will encourage standardization, to the maximum extent practicable. The goals are to achieve optimum uniformity and compatibility among Shore Electronic Systems and to enhance the realization of effective systems which are responsive to operational requirements. The primary intent of this volume is to consolidate those technical criteria common to all Shore Electronic System applications and administrative criteria in a manner to identify and highlight the "who, what, when and where" of Shore Electronics planning and installation.

SCOPE

The volumes of the series are organized to permit ease of update with minimum total impact through single page changes or use of addenda/appendices. References cited herein are to the currently effective issues of specifications, standards, or instructions.

The NAVELEX 0101, 100 series cancels and supersedes NAVSHIPS 92675.

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

LIST OF ILLUSTRATIONS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1.1 PURPOSE

The purposes of this handbook are:

a. To define the total process for the establishment and support of Navy Shore Electronic Systems

b. To identify the responsibilities and relationships of key commands/activities throughout the process

c. To provide overall criteria pertinent to the planning, design, engineering, installation, turnover, operation and maintenance phases of the process.

It is primarily for the use of the engineering personnel directly involved in the execution of projects and follow-on material support.

1.2 SCOPE

As the lead volume of the Navy Shore Electronics Criteria Handbooks (NAVELEX 0101, 100 series), this handbook presents an overview of the total Naval Shore Electronic System process and provides reference to pertinent policy directives/instructions, criteria and standards. The policies and guidelines promulgated herein are applicable to all Naval Shore Electronic System projects which are in direct response to approved operational requirements.

The criteria presented in the series do not constitute detailed specifications for any particular facility or project, but are in sufficient depth and scope to address the major considerations for selecting, designing, installing, and supporting systems. The subsequent volumes of the Naval Shore Electronic Criteria Series address specific systems and are described briefly in the following subparagraphs.

1.2.1 General

Table 1-1 lists the volumes included in the Naval Shore Electronic Criteria Series and the NAVELEX Headquarters (HQ) code responsible for maintenance of each.

TABLE 1-1. NAVAL SHORE ELECTRONICS CRITERIA

NAVELEX No.	TITLE	RESPONSIBLE NAVELEX CODE
0101, 101	General	056
0101, 102	Naval Communication Station Design	056
0101, 103	HF Radio Propagation and Facility Site Selection	056
0101, 104	HF Radio Antenna Systems	056
0101, 105	Satellite Communication Systems	056
0101, 106	Electromagnetic Compatibility and Electromagnetic Radiation Hazards	051

TABLE 1-1. NAVAL SHORE ELECTRONICS CRITERIA (Cont'd)

NAVELEX NO.	TITLE	RESPONSIBLE NAVELEX CODE
0101, 107	Naval Aeronautical Facilities	057
0101, 108	Naval Security Group Elements, Design and Performance	NSEF
0101, 109	Naval Training Facilities	051
0101, 110	Installation Standards and Practices	056
0101, 111	Digital Computer Systems, Volume I of II	053
0101, 112	Microwave and Troposcatter Communication Systems	056
0101, 113	Navy VLF, LF, and MF Communication Systems	056
0101, 114	NAVELEX Calibration Program	046
0101, 115	Digital Computer Systems, Volume II of II	053

1.2.2 Naval Communication Station Design (NAVELEX 0101, 102)

This volume is intended to establish a basis for standardization of shore communication station systems and is confined to the buildings and installed equipments at the communications center, the transmitter station, and the receiver station. Criteria for the transmitter and receiver stations are oriented toward high frequency (HF) systems herein. The broad subjects addressed are:

a. Station Electronic Systems Planning
b. System Standardization
c. Communications Center
d. The Transmitter Station
e. The Receiver Station
f. Intersite Communications Links
g. General Criteria for Buildings
h. Station Electrical Power
i. Patchboards and Distribution Frames
j. DCS Signal Processing Standards
k. Testing and Design Verification
l. Communications Electronic Groundings
m. Transportable Transmitter Receiver (T/R) Stations
n. References

1.2.3 HF Radio Propagation and Facility Site Selection (NAVELEX 0101, 103)

This volume presents planning criteria and judgment factors for propagation path aspects of high-frequency system design. It includes HF radio wave propagation fundamentals, methods of HF propagation prediction, and factors for consideration in site selection for HF systems. The broad topics addressed are:

a. Ionospheric Propagation
b. Ground-wave Propagation
c. Site Selection
d. Sample Manual Prediction Problem
e. Sample HF Receiver Site Survey
f. Sample HF Transmitter Site Survey
g. Sample Communications Center Site Survey
h. References

This volume presents criteria for HF antenna systems used in Navy shore facilities. The broad topics addressed are:

a. Standards and Plans
b. Antenna Principles
c. HF Antenna Performance
d. Antenna Design and Characteristics
e. Antenna Selection
f. Associated Antenna Components
g. HF Antenna Installation
h. Antenna System Performance Tests
i. Matching and Tuning Doublets
j. Definitions
k. References

1.2.5 Satellite Communication Systems (NAVELEX 0101, 105)

This volume presents general indoctrinational information and technical installation criteria for field activity representatives. The broad topics addressed are:

a. Description of Communication Satellite System
b. Site Selection Criteria
c. Site Preparation and Installation
d. Sample Presurvey Data
e. Sample Site Survey Data
f. References

1.2.6 Electromagnetic Compatibility and Electromagnetic Radiation Hazards (NAVELEX 0101, 106)

This volume presents background material, prediction techniques, evaluation and measurement techniques, and design and installation practices to assure equipment electromagnetic compatibility and a radiation hazard-free environment for Navy shore installations. The broad topics are:

a. System Considerations
b. Specifications, Standards, and Documents
c. Utilization of the Frequency Spectrum
d. Fundamentals of EMC/RADHAZ
e. Evaluation Techniques and Measurements
f. Basic Installation Considerations
g. EMC/RADHAZ Program Plan Outline
h. EMC/RADHAZ Measurement Program
i. Reference
j. Glossary

1.2.7 Naval Aeronautical Facilities (NAVELEX 0101, 107)

This volume is directed towards Naval Air Station systems which fall into the following major types:

a. Air Navigation Systems
b. Radar Systems
c. Communications Systems
d. Meteorological Systems
e. Air Traffic Control Systems
f. Special Activities, such as Atlantic Fleet Weapons Range (AFWR), Fleet Air Control and Surveillance Facility (FACSFAC), etc.

The organization of the contents is divided into two broad categories as follows:

a. Functional Electronic Systems - general description of principles of operation of each type system
b. Base Systems Engineering

   (1) System configuration
   (2) Site and Structural Criteria
   (3) Installation Criteria
   (4) Operational and Maintenance Procedures

1.2.8 Naval Security Group Elements, Design and Performance (NAVELEX 0101, 108)

This volume presents the planning and technical criteria with regard to Naval Security Group systems and contains the following:

a. System Planning
b. Mission and Functions of a Naval Security Group
c. Siting Criteria and System Effectiveness
d. Systems Design and Performance
e. Communications
f. Building Criteria
g. Electrical Power
h. Grounding Criteria
i. Physical Security

1.2.9 Naval Training Facilities (NAVELEX 0101, 109)

This volume presents planning and technical criteria for establishing a basis for standardization of Naval training systems design and installation. The broad topics are:

a. The Electronic Training Facilities
b. Standardization
c. General Installation Design Considerations
d. Translation of Operational into Resources Requirements
e. Functional Electronic Training Systems
f. Sample BESEP
g. Structural/Planning Criteria
h. Human Factors Engineering
i. Definitions of Industrial Cable/Wire/Connector Terms
j. Lightning Protection
k. References

1.2.10 Installation Standards and Practices (NAVELEX 0101, 110)

This volume is directed primarily to the installation planner and leading man at the Electronic Field Activity (EFA) and compiles recommended installation practices. The broad subjects covered herein are:

a. Safety
b. Miniaturized Circuit Equipment
c. Mutual Joining and Cutting
d. Hardware
e. Surface Protection
f. Wire and Cable
g. Cabling and Fabrication Methods
h. Cable and Conductor Terminations

i. Coaxial Connectors
j. Coaxial Cables
k. Aerial RF Transmission Lines
l. Installation of Direct-Buried Cable
m. Waveguides
n. Transportable and Mobile Installations
o. Equipment, Equipment Handling and Cabinets
p. Power Systems
q. Antennas
r. Electronic Grounding
s. Installation Checkout
t. Appendices
u. Glossary

1.2.11 Digital Computer Systems, Volume I of II (NAVELEX 0101, 111)

This volume provides a basic source of information on the practical aspects of Navy digital computer systems and technical information to aid in site planning, installation, test and acceptance of digital computer systems. It contains the following broad subjects:

a. Navy Computer Systems
b. Militarized Computer Systems
c. Facility Planning Considerations
d. Computer Testing and Acceptance
e. References
f. Sample Base Electronic Systems Engineering Survey Report
g. BESEP for LDMX
h. ADP Review and Evaluation Program
i. Integrated Programmed Operational Functional Analysis

1.2.12 Microwave and Tropo-Scatter Communication Systems (NAVELEX 0101, 112)

The purpose of this volume is to provide information and criteria to enable key personnel to:

a. Acquire Data for Site Selection
b. Predict Transmission Path Performance
c. Provide Criteria for Hardware Selection
d. Provide Information About Unique Installation Problems
e. Provide Index of Essential Installation Criteria

The contents are organized as follows:

a. Line-of-sight Microwave Communications Systems
b. Propagation Characteristics
c. Equipment Description
d. Station Configuration (Terminal and Repeater)
e. Initial Planning
f. Line-of-Sight
g. Installation Criteria
h. Tropospheric Scatter Microwave Communications Systems
i. Troposcatter Propagation Characteristics
j. The Tropospheric Scatter Microwave Communications Station
k. System Design
l. Reference Curves, Nomographs, and Equations
m. Sample Calculations

1.2.13 Navy VLF, LF, and MF Communication Systems (NAVELEX 0101, 113)

This volume contains the following:

a. VLF, LF, MF Communications
b. VLF, LF, MF Signal Propagation
c. VLF Communication System Components
d. VLF Site Evaluation and Selection
e. VLF Station Evaluation and Acceptance
f. LF/MF Communication Equipment
g. LF/MF Site Evaluation and Selection
h. LF/MF Installation - Evaluation and Station Acceptance
i. Atmospheric Noise Data
j. References

1.2.14 NAVELEX Calibration Program (NAVELEX 0101, 114)

This volume has the following purposes:

a. To determine environmental requirements - temperature, humidity, vibration
b. To determine optimum configuration to achieve mission goals
c. To select and/or design equipment, support material, etc.
d. To implement environmental and measurement/calibration

The contents are organized as follows:

a. Navy Calibration Program Structure
b. Laboratory Planning Considerations
c. Environmental Requirements and Control
d. Electrical Power Considerations
e. Additional Laboratory Requirements
f. EMC Considerations
g. Human Factors Engineering
h. Fleet Electronic Calibration Laboratories
i. Qualification Segment of the NAVELEX Calibration Program

1.2.15 Digital Computer Systems, Volume II of II (NAVELEX 0101, 115)

This volume provides an explanation of how a digital computer functions and addresses the following:

a. Central Processing Unit
b. I/O Devices
c. I/O Controls
d. Peripheral Remote Communications
e. Computer Programming in General
f. Stored Program Instruction
g. Elements of Programming
h. Program Routines
i. Standardized Programs
j. Command Information System Design Considerations
k. References

1.3 KEY RELATED PROGRAMS

This series is not intended to stand alone, but is designed as a source of pertinent criteria not promulgated elsewhere and as a ready reference to other related sources. The following subparagraphs describe briefly those programs/documents considered directly related to Shore Electronics Systems Development and execution.

1.3.1 Shore Electronic Facilities Projects Handbook (NAVFAC P-417/ NAVELEXINST 10550.4)

This handbook is a joint instruction which provides policy guidance and establishes compatible procedures for the Naval Electronic Systems Command, the Naval Facilities Engineering Command, and the respective field activities of each in the accomplishment of assigned shore electronic facilities project functions. The responsible code is ELEX 014.

1.3.2 NAVELEX Technical Policies and Procedures Manual (NAVELEX 100,000)

This volume is a compendium of all NAVELECSYSCOM policies, procedures, and directives pertinent to responsibilities for material under the cognizance or technical control of NAVELEX. NAVELEXINST 5215.5 (current issue) explains the purpose and handling of the manual and contains a matrix referencing directives in the manual to paragraphs in Chapter 9670 of the NAVSHIPS Technical Manual. The responsible code is ELEX 00T.

1.3.3 Standard Plans Program

This program is designed to provide maximum use of available assets in consonance with commonality of equipment, systems, and procedures. The use of standard plans under the guidelines promulgated in NAVELEXINST 5200.11 will result in improved and simplified logistic support, reduced training requirements, reduced engineering planning time, and reduced overall costs. The Standard Plans Program Masters are retained at NAVELECSYSCOM WASHDIV. Distribution to the EFA is automatic. The format and coding of aperture cards for engineering drawings and the NAVELEX document numbering system are addressed in NAVELEXINST 5230.2

1.3.4 Standard Hardware Program (SHP)

This program defines and controls the mechanical characteristics and electronic functions of plug-in circuit module assemblies. It is aimed at limiting unnecessary proliferation of different electronic assemblies to perform identical or similar functions with resultant improvement in system effectiveness and reduction of life-cycle costs. The use of SHP shall be considered in the initial development or redesign of all electronic equipment and systems under NAVELEX cognizance. Pertinent documents are NAVELEXINST 4120.8, NAVELEX 0101,051 through 0101,075, and MIL-STD-1378. The responsible code is ELEX 00T.

1.3.5 Engineering Data Register (EDR)

This series of documents consolidates characteristics, standards, and technical parameters of various types of electronic systems/equipments for shore and afloat facilities. It is designed to provide the data necessary to translate operational requirements into the information necessary to develop Section III of equipment and system performance specifications. Its goal is the acquisition of uniform systems/equipments for the Operating Forces and a reduction in the proliferation of equipment types to perform a given function. It is a document used at headquarters and is maintained by ELEX 00T and the cognizant technical codes.

1.4 DEFINITIONS

The following subparagraphs contain definitions of key terms considered significant in an overview of the Shore Electronic Facilities Projects.

1.4.1 Facility

A facility is a separate, individual building, structure, or other form of real property, including land, which is subject to separate reporting under the Department of Defense (DOD) real property inventory (NAVFAC).

1.4.2 Functional Electronic System

A functional electronic system is the electronic equipment(s) designed and integrated to perform a specific function or functions, such as HF communications system, message processing system, digital computer system, etc. (NAVELEX).

1.4.3 Base Electronic System

A base electronic system is a functional electronic system plus facility fully capable of accomplishing an operational requirement, such as communication station, local digital message exchange, operational control center (OPCONCEN), etc. (coordinated effort).

1.4.4 Engineering Survey

An engineering survey is a joint operational, facility and electronic survey at prospective site(s) conducted by user, NAVFAC, and NAVELEX personnel with particular regard to operational, personnel space, environmental, electronic/electrical support, security, and other pertinent requirements for the purpose of early establishment of recommended approaches and alternatives. The results are primarily for inputs to the Base Electronic System Engineering Plan (BESEP) and key facility planning documents.

1.4.5 Beneficial Occupancy Date (BOD)

The date when the facility is sufficiently complete that installation of the electronic system can commence.

1.4.6 Base Electronic System Engineering Plan (BESEP)

The BESEP is the basic technical reference governing electronics and related phases of Shore Electronics Projects planning and implementation. It translates operational requirements into technical description of equipment/systems to be used, their pertinent technical parameters, physical characteristics, environmental and interface requirements, system performance objectives, and methods of performance verification (NAVELEXINST 11000.1).

1.4.7 Master Electronic and Equipment System Engineering Plan (MEESEP)

The MEESEP is similar to the BESEP, except that it addresses all technical training systems/equipment for installation at Naval Reserve Facilities which will provide Naval Reserve Training under the team training concept. The Standard Guidance MEESEP is maintained by NAVELEX MIDWESTDIV.

1.4.8 Sponsor

The sponsor is the individual or office responsible for determining program objectives, time-phasing and support requirements, and the overall formulation, guidance and administration of a program.

1.4.9 Customer

The customer is the Command which determines and consolidates the material support needs (requirements and priorities) of activities and units over which said Command exercises administrative cognizance. The major customers are generally Echelon Two Commands (major claimants).

1.4.10 User/Custodian

The user/custodian is the activity or unit responsible for the operation, maintenance, and reporting functions of the equipment provided; the ultimate recipient.

1.4.11 Shore Electronic Facilities Project

A Shore Electronic Facilities Project is either a Navy shore facilities project having sufficient electronic involvement, or a Navy shore electronic project having sufficient facilities involvement to merit special consideration and handling to assure its successful completion. Only when electronic considerations affect facilities design or schedule should a project be considered a shore electronic facilities project. Table 1-2 contains a brief overview of construction project categories. For detailed explanation and criteria, it is encumbent upon all personnel involved in Shore Electronic Facilities Projects to review periodically the Facilities Projects Manual, OPNAVINST 11010.20, and NAVELEXINST 10550.4

1.5 SHORE ELECTRONIC FACILITIES PROJECT CYCLE

Material support for Naval shore electronic systems covers the complete spectrum from major programs including new system complexes to minor update/modification of a single piece of equipment. These projects are complicated by the essential involvement of sponsors, user activities, NAVELEX/EFAs, and NAVFAC/EFDs and by interfacing with other system commands and activities. Because of overall project dependency upon the successful accomplishment of portions thereof by diverse groups, continuous effective communications among all participants is paramount. The process is a dynamic process which is iterative, as shown in Figure 1-1. Continuous analysis and evaluation leads to repair, improvements of capabilities by alterations/modifications, or to complete replacement. Expanding or new operational requirements necessitate development and acquisition of more advanced functional systems and new modifications or design and construction of new facilities. Each of these may place constraints on one another in terms of time, money, and capability. Ultimately, the electronic systems and facility are integrated into a base system, whose capabilities/limitations are continuously appraised, thereby closing the loop and leading to improvement or to major replacement programs.

1.5.1 Overview

Figure 1-2 expands the cycle and shows the broad functions essential to a project. The figure depicts a single, independent project only for illustration purposes. It must be understood that, in practice, many other projects, in different phases of accomplishment will be underway and must be considered in terms of impact upon a given project. Some of the functions may be unnecessary, dependent upon the urgency or complexity of a specific task. Key constraining dates, events, or decisions are included in the figure. More detailed illustrations are contained in subsequent chapters.

TABLE 1-2. FACILITIES PROJECTS

CATEGORY	DESCRIPTION	AUTHORITY	FUNDING		APPROVAL
			CLASS	LIMITS	
(1) Military Construction (MCON)	Line Item	Annual MCON Authorization and appropriations act Same	MCON	$25,000	Congress
(2) Emergency Construction	Vital to Security of U.S.; Not in Annual MCON Prog.	Same as (1), [1] Section ____	MCON	$300,000 (Reprogram)	ASD (I&L) OMB & Congress
(3) Restoration/ Replacement of Damaged Facilities	Complete Replacement or "Major Restoration" [2]	Title 10 USC 2673; Title 10 USC 2674	MCON MCON	$300,000 $300,000 (Reprogram)	Same as (2) Same as (4)
(4) Minor Construction	Urgent Requirement	Title 10 USC 2674	MCON MCON	Active 25K-100K 100K-300K Reserves 10K-25K 25K-50K	Active ASN (I&L) ASD (I&L) Reserves ASN (I&L) ASD (I&L)
(5) Special Project/ Minor Construction	Urgent Requirement	Title 10 USC 2674	O&MN/ RDT&E O&MN/	Active 10K 10K-25K Reserves 5K 5K-10K	Active COs&OICs COMNAVFAC Reserves COs&OICs COMNAVFAC
(6) Repairs	Restoration (Not Major)		O&MN/ RDT&E	10K 10K-200K	CO. COMNAVFAC
(7) Shore Electronics Equipment Installation Projects	See Part 9, Chapter 7 OPNAVINST 11010.20				

[1] Section devoted to emergency. (Section number may change in each appropriations act.)

[2] Major Restoration - Costs 50% of cost for complete replacement.

NOTE: This table is only a quick overview; it is imperative that OPNAVINST 11010.20 be reviewed in depth for particular details and criteria.

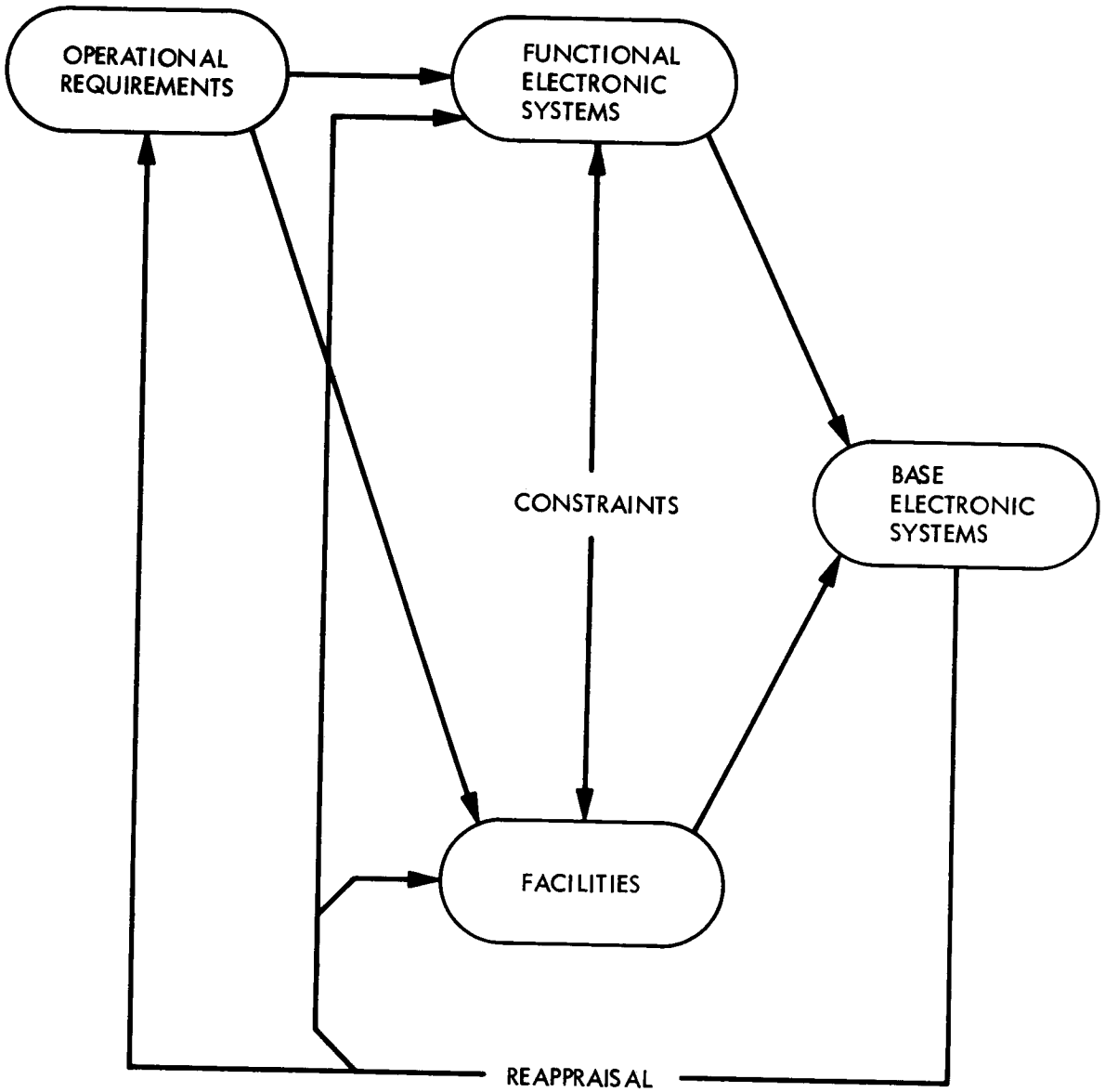


Figure 1-1. Shore Electronic Facility Project Cycle

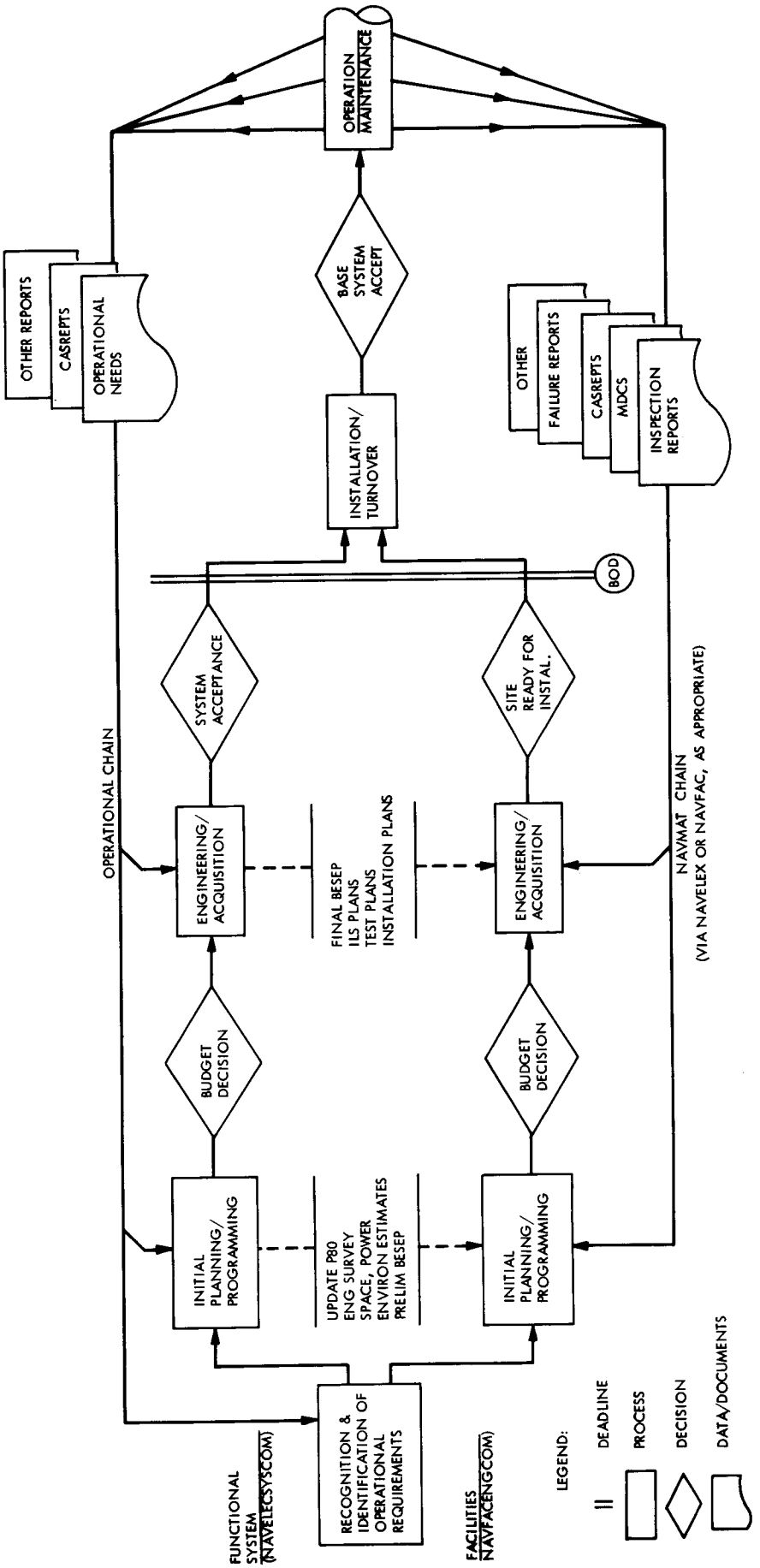


Figure 1-2. Broad Shore Electronic Facilities Project Functions

1.5.2 Broad Management Criteria

The following broad management criteria are self-evident but are essential to overall project success:

a. Identify and define operational requirements
b. Identify key activities/personnel and fix responsibility
c. Establish and maintain timely, accurate communications
d. Define the problem
e. Develop a realistic, defendable solution (OPNAVINST 11010.20, Art. 6301)
f. Establish the program; that is, GET IT IN THE BUDGET (OPNAVINST 11010.20, Art. 6401 to 6403)
g. Develop a realizable plan
h. Implement and execute within the plan
i. Anticipate
j. Control

1.5.3 Constraints

The major constraints are:

a. Incomplete, untimely or inadequately stated operational requirements
b. Contingencies or exigencies which promote unbridled haste in any portion of the process
c. MONEY - limited funds
d. BOD - failure to deliver a system within this deadline can critically inhibit or impair operations
e. MILCON dates - NAVELEX must have inputs to NAVFAC in sufficient time for construction program deadlines
f. Slippage in any path or process can wipe out a project/program
g. Lack of timely tasking
h. Lack of timely BESEP approval

CHAPTER 2

ORGANIZATION

2.1 DEPARTMENT OF THE NAVY

The assignment and distribution of authority and basic responsibilities for the administration of the Department of the Navy are contained in SECNAVINST 5400.13. Figure 2-1 illustrates the basic organizational structure of the Department of the Navy.

2.2 THE CHIEF OF NAVAL OPERATIONS

The Chief of Naval Operations (CNO) is the senior military officer of the Department of the Navy and is a member of the Joint Chiefs of Staff (JCS). He commands the Operating Forces of the Navy, the Naval Material Command (NMC), the Bureau of Naval Personnel (BUPERS), the Bureau of Medicine and Surgery (BUMED), and such shore activities and other commands as may be assigned by SECNAV. Figure 2-1 shows the principal assistants to the CNO and the commands/bureaus.

2.2.1 Operating Forces

The Operating Forces of the Navy include the Commander-in-Chief, Atlantic Fleet (CINCLANTFLT), Commander-in-Chief, Pacific Fleet (CINCPACFLT), Commander-in-Chief U.S. Naval Forces, Europe (CINCUSNAVEUR), the numbered fleets (such as SIXTH and SEVENTH Fleets), seagoing forces, sea frontier forces, district forces, Fleet Marine Forces (FMF), and other forces/activities as may be assigned by the President or the SECNAV. The primary mission of the remainder of the Department of the Navy is the support of the Operating Forces of the Navy and of the Marine Corps. Relationships between the Commandant of the Marine Corps (CMC) and the Chief of Naval Material (CNM) are contained in SECNAVINST 5400.13.

2.2.2 Commands and Bureaus

The echelon two commands/bureaus shown in Figure 2-1, reporting to CNO, are the major commands in the Shore Establishment. The Chiefs of NMC, BUMED, and BUPERS are responsible for material, medical, and personnel support, respectively. The other commands are essentially responsible for operational requirement consolidation and validation and for sponsoring programs in a specific functional area. The Naval Electronic Systems Command has heavy electronic material support involvement with all of these commands.

2.3 THE CHIEF OF NAVAL MATERIAL

The Chief of Naval Material (CNM), under the command of the CNO, commands the Naval Material Command (NMC). He is responsible for the material support of the Operating Forces of the Navy, Marine Corps, and other Navy organizations as required. Figure 2-2 shows the organization of the NMC. Detailed organization and charters are contained in NAVMATINST 5460.2, Naval Material Command Organization Manual.

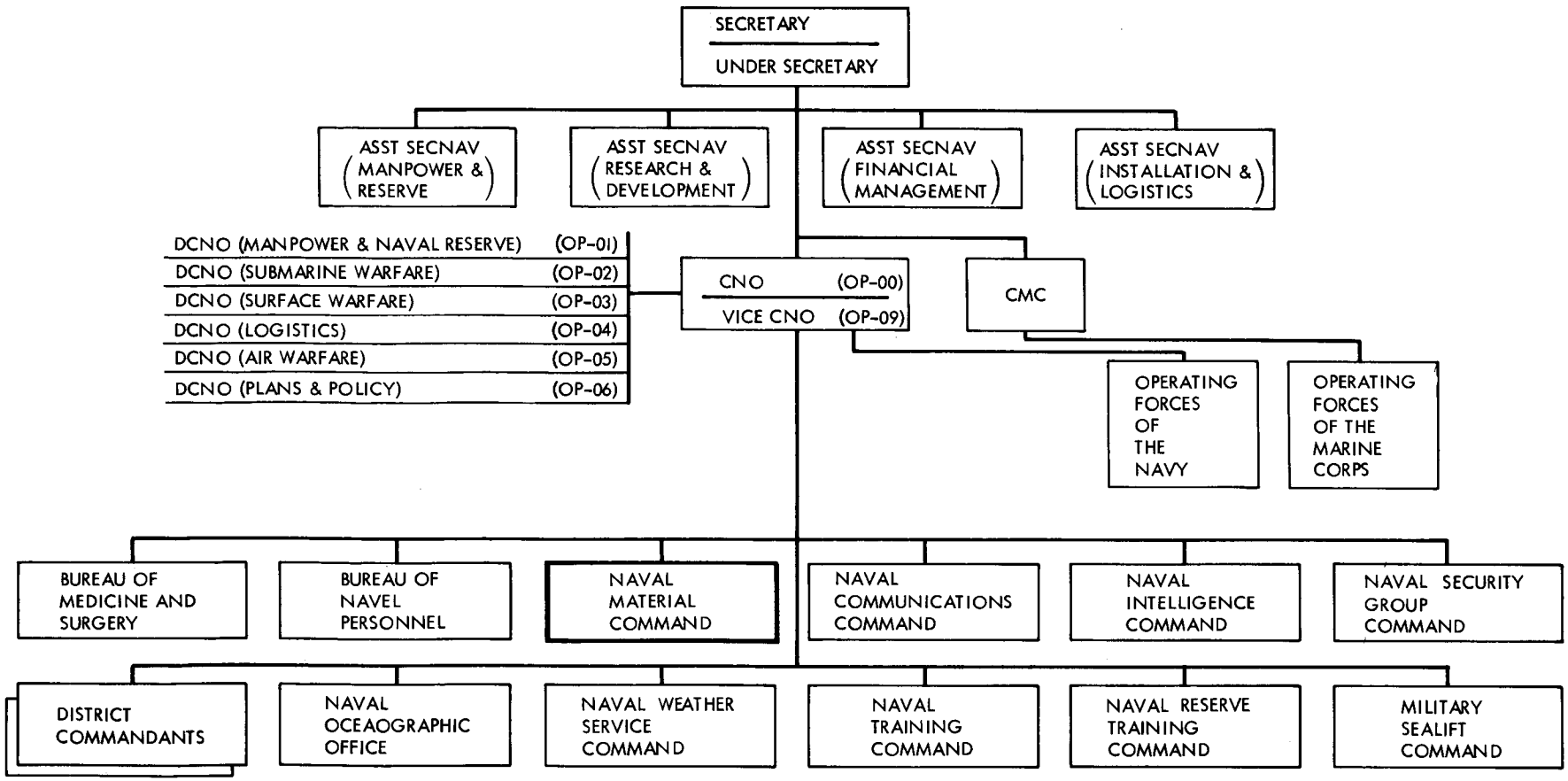


Figure 2-1. Basic Organizational Structure of the Department of the Navy

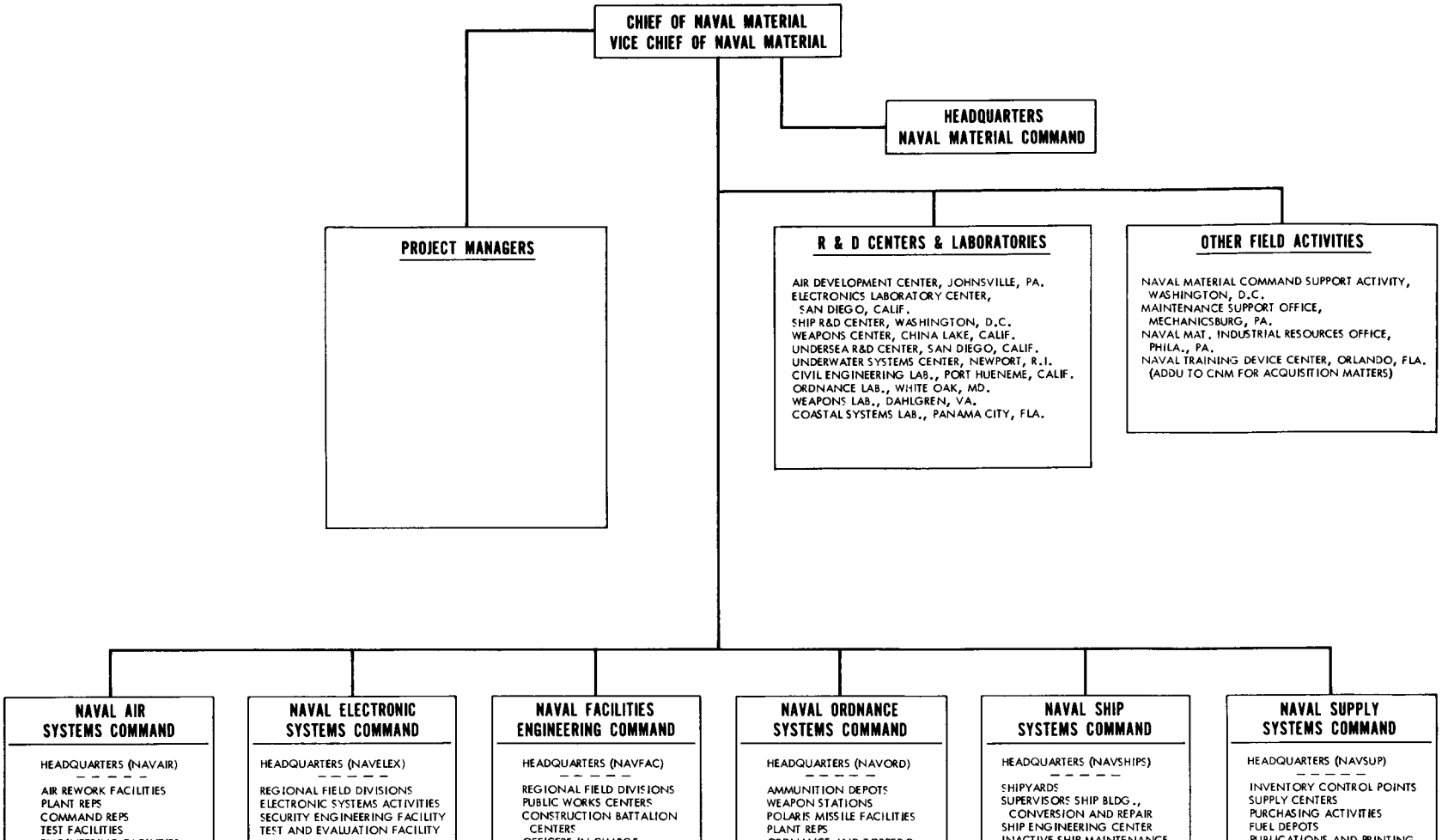


Figure 2-2. Naval Material Command

2.3.1 Research and Development (R&D) Centers and Laboratories

These activities are responsible under the Chief of Naval Development (MAT-03) for conducting programs of:

a. Warfare analysis
b. Research, development, test, evaluation, systems integration, and fleet engineering support of Naval Warfare systems and equipment
c. Investigation in regulated fields of science and technology

NAVELECSYSCOM engineers must communicate extensively and work directly with their counterparts at these activities in early stages of functional electronic systems development. The appropriate R&D centers and laboratories provide support to NAVELEX and are funded on a task basis.

2.3.2 Project Managers (PM's)

Only those projects considered of particular and exceptional stature and priority within NMC are designated for special emphasis (i.e., Project Management) in accordance with SECNAVINST 5000.21 and NAVMATINST 5000.5. The individual assigned as Project Manager of a given Project reports directly to CNM. NAVELECSYSCOM acts as a technical support agency to PM's within the bounds of its charter.

2.3.3 Naval Air Systems Command (NAVAIRSYSCOM)

This systems command is responsible for research, development, procurement, logistic support and other material functions related to aircraft, airborne weapon systems and other aviation-related equipment and for the systems integration of aircraft weapons systems.

2.3.4 Naval Facilities Engineering Command (NAVFACENGCOM)

This systems command is responsible for administration of the Navy military construction program, facilities planning, facility maintenance and utility operations, real property inventory, management, and natural resources and pollution control programs; and for research, development and material support functions related to public works, floating cranes, pontoons and moorings, ocean structures, and to transportation, construction, and load handling equipment.

2.3.5 Naval Ordnance Systems Command (NAVORDSYSCOM)

This systems command is the central technical authority on explosives, propellants, and actuating components, and on explosive safety and explosve ordnance disposal. NAVORDSYSCOM is responsible for research, development, procurement, logistic support and other material functions related to shipboard weapon systems and expendable ordnance, and to air-launched mines and torpedoes.

2.3.6 Naval Ship Systems Command (NAVSHIPSYSCOM)

This systems command is the central technical authority for ship and nuclear power safety; for naval architecture; for marine engineering; and for ship building. NAVSHIPSYSCOM is responsible for research, development, procurement, logistic support and other material functions for whole ships and craft and for most non-ordnance shipboard components, such as propulsion (including nuclear), power generating, sonar, search radar, and auxiliary equipment; for coordination of system integration of all shipboard subsystems and for procurement, technical guidance and supervision of operations related to salvage of stranded and sunken ships and craft.

2.3.7 Naval Supply Systems Command (NAVSUPSYSCOM)

This systems command is responsible for supply management policies and methods, for administration of the Navy Supply System, publications and printing, the resale program, the Navy Stock Fund, the field purchasing service, the transportation of Navy property, and for material functions related to materials handling equipment, food service, and special clothing.

2.4 NAVAL ELECTRONIC SYSTEMS COMMAND (NAVELECSYSCOM)

2.4.1 Responsibilities and Organization

This systems command is the primary technical authority for electronic standards, standardization, techniques, practices and compatibility. COMNAVELEX has the responsibility and authority for rendering all final decisions involving the development/acquisition/support for equipments and capabilities providing platform-to-platform command, control, and communications. NAVELECSYSCOM responsibilities include, but are not limited to, budgeting for and performing the following material support functions:

a. Engineering Design
b. Development
c. Logistics Planning
d. Test
e. Technical Evaluation
f. Acquisition
g. Procurement
h. Contracting
i. Production
j. Manufacture
k. Inspection
l. Installation or Fitting Out
m. Maintenance Beyond Capability of Station or Ships Force
n. Repair or Overhaul
o. Conversion
p. Alteration or Modification
q. Advance Base Outfitting

a. NAVELEXSYSCOM performs the preceding material support functions for the following:

(1) Command/Control/Communications Systems (Platform-to-Platform), Complete

(2) Underseas and Space Surveillance

(3) Navigation Aids, Air Traffic Control, and Automatic Landing Systems, Less Airborne

(4) Marine Corps Expeditionary and Amphibious

(5) Shipboard ESM and ECM Systems, and ECCM Applicable to other Assigned Systems

(6) Cryptographic and Cryptologic Equipment

(7) IFF (Less Airborne)

(8) Meteorological Equipment (Less Airborne)

(9) Television, Except Non-Standard Systems Integral With Weapon Systems

(10) General Purpose Electronic Test Equipment

(11) RADIAC

(12) Standardized Telemetry Equipment and Components

(13) Common Equipment, Components, and Parts

(14) Multi-Platform Systems Not Otherwise Assigned

(15) All Shore Electronic Systems Not Included Above

(16) Remote Sensor Systems

b. The following systems/equipments are exceptions to the above assignment and are assigned to other Systems Commands. However, in any instance where communications, command, and control (platform-to-platform) are involved, COMNAVELEX will exercise final material authority.

(1) Interior Communications
(2) Antennas integral to submarine hull or airframe
(3) Special purpose test equipment

c. NAVELECSYSCOM is organized as shown in Figure 2-3. The detailed organization, responsibilities, and concept of operations are contained in NAVELEXINST 5430.1.

2.4.2 Headquarters, Naval Electronic Systems Command (NAVELEX)

Headquarters is located in Washington, D. C. and serves as the focal point for liaison and communications among the major sponsors and headquarters of NMC and other Systems Commands. As the central authority, NAVELEX directs and controls standards, monitors all projects, and assures coordination and support essential to the total shore electronic responsibility.

2.4.3 Electronic Field Activity (EFA)

The field activities are assigned on a regional concept and provide the on-scene expertise essential to effective accomplishment of NAVELECSYSCOM responsibilities. The EFA provides the means for direct liaison and communications with the ultimate user activity.

a. Organization. The EFAs are organized in accordance with guidelines and standards published in NAVELEXINST 5430.2 and 5450.7. The first echelon of field activity is the Division, which is responsible for a region such as NAVELEXLANTDIV, NAVELEXWESTDIV, etc. A division may have activities (NAVELEXACT) and Naval Electronic Engineering Offices (NEEO) assigned to key localities and/or naval activities within its region. In addition to the EFAs which are part of the NAVELECSYSCOM organization, the Naval Shore Electronics Engineering Activity, Pacific (NAVSEEAPAC) and its subsidiary activities, Naval Shore Electronics Engineering Activity, Japan (NAVSEEACT JAPAN), Naval Shore Electronics Engineering Activity, Philippines (NAVSEEACT PHIL), and Naval Shore Electronics Engineering Activity, Guam (NAVSEEACT GUAM) are also EFAs with cognizance of the Pacific Ocean Area. NAVSEEAPAC reports to COMSERVPAC for command purposes. NAVELECSYSCOM provides technical support to the EFAs in the Pacific Ocean Area.

b. Responsibilities. The basic responsibilities of EFAs within assigned geographical areas are:

(1) Represent the COMNAVELECSYSCOM on all electronic matters concerning

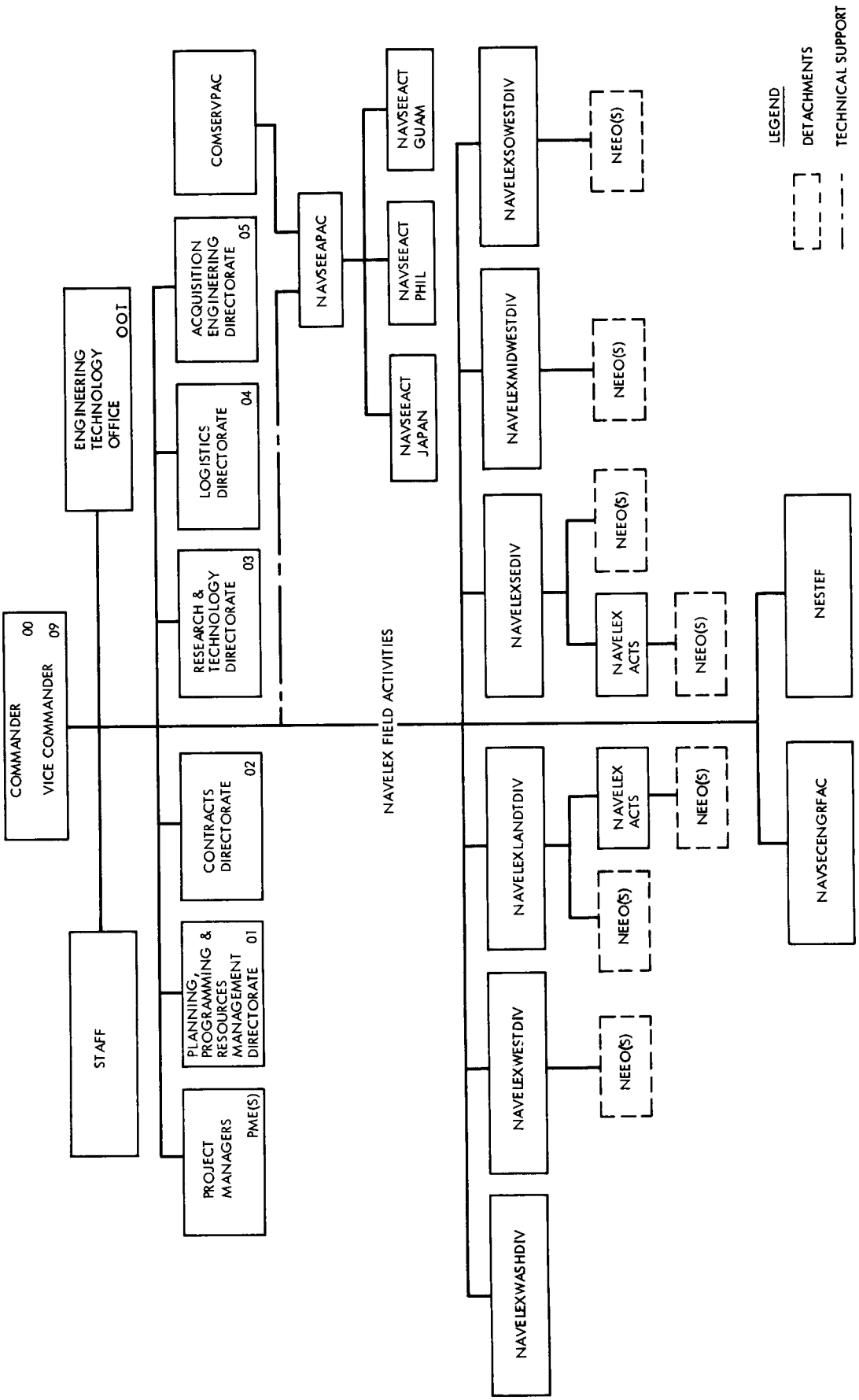


Figure 2-3. Naval Electronics System Command

systems/equipment under NAVELECSYSCOM cognizance

(2) Prepare BESEPs, cost estimates, installation plans, test plans, and specifications

(3) Perform engineering surveys, electronic installation, system/equipment checkout, and technical acceptance

(4) Execute formal turnover of completed installation to operating activity

(5) Establish and maintain liaison with user activities, field activities of NAVFACENGCOM and other local Government agencies to optimize joint effort in planning and execution of shore electronic facilities projects

(6) Conduct technical inspections on request, TEMPEST inspections and instrumented surveys, EMC/RADHAZ and HERO surveys.

(7) Exercise technical direction and supervision of electronics installations performed by other than EFA personnel

(8) Render assistance, on request, in maintenance and repair of electronic equipment beyond station capabilities

(9) Administer funding and coordinate the cryptographic repair, test equipment calibration and repair, electronic equipment and component repairable, and RADIAC calibration and repair programs

The detailed responsibilities for each EFA are contained in a specific instruction of NAVELEXINST 5450 series.

c. Lead Field Activity. Normally, the EFA assigned responsibility for the initial installation of a system or equipment under NAVELECSYSCOM cognizance will be designated as Lead Field Activity therefor (NAVELEXINST 5450.23). Responsibilities are to:

(1) Review/develop and document technical plans and procedures including Standard Installation Plans and/or Standard System Plans

(2) Develop baseline installation and checkout cost data

(3) Prepare special instructions relative to handling and safety

(4) Distribute the preceding documentation to all pertinent activities

(5) Provide consultant services to other EFAs with regard to installation and checkout of follow-on systems

d. Field Maintenance Agent (FMA). An EFA will be designated as FMA to perform maintenance engineering and maintenance production management functions for selected equipment procured for service use. Normally, the assignment of FMA will be established on a system or "family-of-equipments" basis and consolidated with the assignment of Lead Field Activity, whenever practicable. Detailed responsibilities are contained in NAVELEXINST 4700.12.

2.5 USER-PRODUCER RELATIONSHIP

The role of NAVELEXSYSCOM with regard to shore electronics is that of "producer" in a "user/producer" relationship within the Navy. The CNO or the CMC, as appropriate, represents the 'user". The CNM, Chiefs of BUMED and BUPERS, and the Chief of Naval Research represent the 'producer". In short, the 'producer" plans for and implements

those programs necessary to fulfill the requirements of the Operating Forces, as validated and approved by the "user". It is patently obvious that successful accomplishment of this role necessitates constant communications, coordination, and extraordinary teamwork among many commands/activities.

2.5.1 NAVELECSYSCOM/Other Commands

A "customer" is any command/activity requiring material support for systems/equipment for which NAVELEXSYSCOM has been assigned responsibility. In addition to the CNO commands/activities shown in Figure 2-1, the Defense Communications Agency (DCA) is a major customer. NAVELEX works directly with the DCA on technical questions/matters, but through the Naval Communications Command in response to DCA operational requirements. Direct liaison with user activities at the operating level is normally through the local EFA. Coordination efforts within the NMC are with NAVAIR (systems/equipments for Naval Air Stations and Facilities), NAVSUP (logistic support matters, such as packaging, spare parts support, documentation, etc.) and NAVSHIPS and NAVORD (planning for and installation of shipboard systems for training sites). NAVFACENGCOM and NAVELECSYSCOM are partners in Shore Electronics Facilities Projects (NAVFAC P-417/NAVELEXINST 10550.4) and are mutually dependent on one another for successful planning and accomplishment of projects. A unit of NAVFACENGCOM personnel (OOFAC) is co-located with NAVELEX (NAVELEXINST 5401.3).

2.5.2 NAVELEX/EFA

The field activities are the on-scene extensions of headquarters. They provide the means for direct continuous communications with the user activity. Neither headquarters nor the EFA can function effectively without the other. NAVELEX ensures communications, continuity, and response at the command level; the EFA assures the same at the operating level. It is essential that complete and timely exchange of information be established and maintained between headquarters and the EFAs and also among the EFAs. Field activities can provide invaluable information to alert headquarters to pending problems and to projected requirements/desires of the user activity. By the same token, headquarters must convey all pertinent information on major projects/programs to the appropriate EFAs in order to optimize the planning factors for the latter. It is encumbent upon both NAVELEX and EFAs to identify single points of contact at the outset of each project. ELEX 014 is responsible for communications among EFAs and headquarters on matters other than those directly related to assigned projects. Tasking of field activities is governed by NAVELEXINST 5200.13. NAVSEEAPAC and its subordinate activities are responsible for field activity work in the Pacific, but are under COMSERVPAC. NAVELEX relationships with these activities are defined in NAVELEXINST 5450.9.

2.5.3 EFA/EFD

The Engineering Field Division (EFD) is the NAVFACENGCOM equivalent of the NAVELEXDIV. Each has a regional assignment, although often of different sizes. It is possible that two EFAs, each working his region, may work with the same EFD. The EFD provides direct liaison and response to user activities in facility engineering matters. These two field activities are in direct, continuous communications and are the key to successful on-site planning, installation, and turnover. The joint technical responsibilities require the designation of an Overall Project Director (OPD) for those shore electronic facilities projects with a significant mix of electronic and facilities work, to minimize interface problems and to fix responsibility. The concept of OPD is set forth in NAVMATINST 5430.21 and discussed in NAVFAC P-417/NAVELEXINST 10550.4. Table 2-1 contains a responsibility matrix of the key factors in shore electronic facilities projects.

TABLE 2-1. RESPONSIBILITY MATRIX
FOR SHORE ELECTRONIC FACILITIES PROJECTS

	CNO	User Activity	Major Commands	NAVFAC	EFD	NAVELEX	EFA	Contractor(s)
1. Overall Policy, Programming Budgetary and Military Priority Guidance and Direction	D							
2. Technical Criteria and Standards	DPO	DPO	DPO	DPF	IE	DPE	IE	
3. Shore Facilities Planning Factors, Standards and Criteria (such as P-80)		IO	IO	DPF	IF	IE	IE	
4. LSR	A	IA	R		IF		IE	
5. BFRL		IA		A	IF		IE	
6. Engineering Survey		A			IF		IE	
7. Prelim. BESEP/MEESEP						A	IA	
8. DD1391		IA			IF			
9. PO and FYDP				IA		IA		
10. Final BESEP/MEESEP						A	IA	
11. PCE				D	IA			
12. Execution of Auth. and Funded Programs				IA		IA		
13. Design				IA	IA	IA	IA	*
14. Fabrication/Construction				IA	IA	IA	IA	*
15. Installation		#/IA				M	IA	*
16. Checkout		#/IA				M	IA	*
17. Tech. Eval.		#/IA				M	IA	*
18. Turnover		A				M	IA	
19. Tech. Inspections		OR					IA	
20. Repair		OR					IA	

Legend:

D-Direction
DP-Develop and Promulgate
(E-Electronics
F-Facilities
O-Operations)
IA-Initiating Action or Item Accomplishment
IE-Review and Assistance (Shore Electronics)
IF-Review and Assistance (Facilities)
IO-Review and Assistance (Operations)
A-Approval
OR-Originate Request
M-Monitor
R-Review
*-Accomplishment on EFI
#-Accomplishment for Local Projects - EFA Monitor and Supervise

CHAPTER 3

PLANNING AND PROGRAMMING

3.1 GENERAL

The ultimate objective of the Shore Electronic Facilities Project process is to provide effective base electronic systems and continuing material support to the Operating Forces and supporting shore activities in response to continually changing operational requirements. Although this series of handbooks is addressed primarily to those responsible for project execution and follow-on material support, the planning and programming phase of the process is included herein for continuity and to emphasize its significance as the keystone to successful implementation, execution, and follow-on. Planning is an iterative process which must be exercised continually by any individual responsible for accomplishment of an objective. This chapter addresses the initial planning and programming which defines and establishes the program. The objective of initial planning and programming is a well-defined, realistic, budgeted program which has a high probability of achieving the ultimate objective. This phase is considered the most critical, because it is during this part of a project/program that the key participants are identified, responsibilities are fixed, and major foundations for successful accomplishment are established. This phase is triggered by a validated operational requirement and ends with: (1) the OSD decision to initiate full-scale development for the functional electronic system; and (2) with the completion of a preliminary design of the facility. Figure 3-1 illustrates the initial planning phase. It should be reemphasized that reassessment and update of operational requirements, Logistic Support Requirements (LSR), Program Objectives (PO's), and Five Year Defense Plan (FYDP) are parts of a continuous process. Budget formulation and submission is an annual process. The emphasis in this handbook is upon the NAVELEX/EFA roles and the manner in which their efforts interrelate to those required of the "user" and facilities engineering activities.

3.2 OPERATIONAL REQUIREMENTS

Acquisition programs originate and are pursued in response to: (1) forces exerted to drive or capitalize upon technological advances; and (2) user requirements driven by changes in threat, mission, or need. Major system efforts derive their basic inputs from Navy and Joint Long-Range Strategic Studies which generally describe future Navy roles and missions and furnish broad Navy R&D program guidance. The broad needs are sequentially refined into formal operational requirements to permit initiation and pursuit of programs to acquire systems. Changes in operation plans, contingency plans, other situation-oriented plans, and needs for improved operating efficiency lead to submission of operational requirements from user activities via the chain of command to CNO for consolidation and validation. The paths are shown in Figure 3-2. NAVELEX, NAVFAC, and their field activities provide technical assistance, as shown, to aid in operational requirement determinations with regard to feasibility, initial cost estimates, and realistic achievement dates. The outputs of this evolution are General Operational Requirements (GOR's), Tentative Specific Operational Requirements (TSOR's), Advanced Development Objectives (ADO's), Specific Operational Requirements (SOR's) and Communications Operational Requirements (COR's). Basic references are OPNAVINST's 3910.6, 3910.7, 3910.9.

3.3 CONCEPTUAL EFFORT

Generally, all effort conducted in connection with the user/producer dialogue in program initiation and with Research, Exploratory Development and Advanced Development is

considered part of conceptual effort as used in DOD Directive 5000.1. This effort leads to preparation and pursuit of a Development Concept Paper (DCP) to seek and obtain OSD program approval (SECNAVINST 5200.x). Conceptual effort is oriented toward broad specification of performance/operating characteristics and the proposed solutions thereto. Detailed planning such as called for in Technical Development Plans (TDPs), Project Master Plans (PMPs) and Advance Procurement Plans (APPs) is normally not called for prior to initiation of full-scale development. This effort involves headquarters personnel and, in most cases, will not be tied to specific shore electronic facility projects at this point in time. However, it is important that pertinent information regarding possible systems under consideration be disseminated and available to appropriate engineering codes in both NAVELEX and the EFAs for possible impact on existing systems and for planning purposes, as conceptual effort is a strong driving force for future projects. It is an evolutionary process involving continual reassessment, refinement, and evaluation of capabilities/limitations, risk factors, cost estimates, and time estimates which contribute to Navy and OSD decisions and to annual budget submissions.

3.4 BUDGET CYCLE

The annual formulation and submission of the budget continue throughout a program and are addressed in SECNAVINST 5000.16 and OPNAV 90P-1. Unacceptable constraints and/or project/program cancellation can result from ineffective planning, assessment, or submittal at any point in a program.

3.5 PLANNING/DESIGN CONSIDERATIONS

The following subparagraphs contain descriptions of factors which must be considered in this phase and expanded and solidified during each ensuing phase.

3.5.1 System Effectiveness

System Effectiveness is a measure of the degree to which an item can be expected to achieve a set of specific mission requirements, and which may be expressed as a function of availability, dependability, and capability (MIL-STD-721). Goals for system effectiveness are stated in the SOR and must be considered in specifications, test plans/procedures, and cost estimates.

a. Reliability. Reliability is the probability that an item will perform its intended function for a specified interval under stated conditions (MIL-STD-721). Reliability goals are stated in the SOR; Mean-Time-Between-Failures (MTBF) is a measure of reliability. This factor is a design function and impacts heavily on the maintenance concept/planning and logistic support. Reliability is specified in the contract and must be demonstrated normally at the factory and in the installation.

b. Maintainability. Maintainability is a characteristic of design and installation which is expressed as the probability that an item will be retained in or restored to a specified condition within a given period of time, when the maintenance is performed in accordance with prescribed procedures and resources (MIL-STD-721). This factor involves a combination of accessibility, test points, all ILS elements, and preventive maintenance. Mean-Time-To-Repair (MTTR) is a measure of maintainability with regard to corrective maintenance. Normally, maintainability must be demonstrated and verified during engineering/acquisition and check out or turnover.

c. Availability. Availability is a measure of the degree to which an item is in the operable and committable state at the start of the mission, when the mission is called for at a random point in time (MIL-STD-721). This factor is a result of design for an optimum combination of reliability and maintainability.

d. Dependability. Dependability is a measure of the item operating condition at one or more points during the mission, including the effects of Reliability,

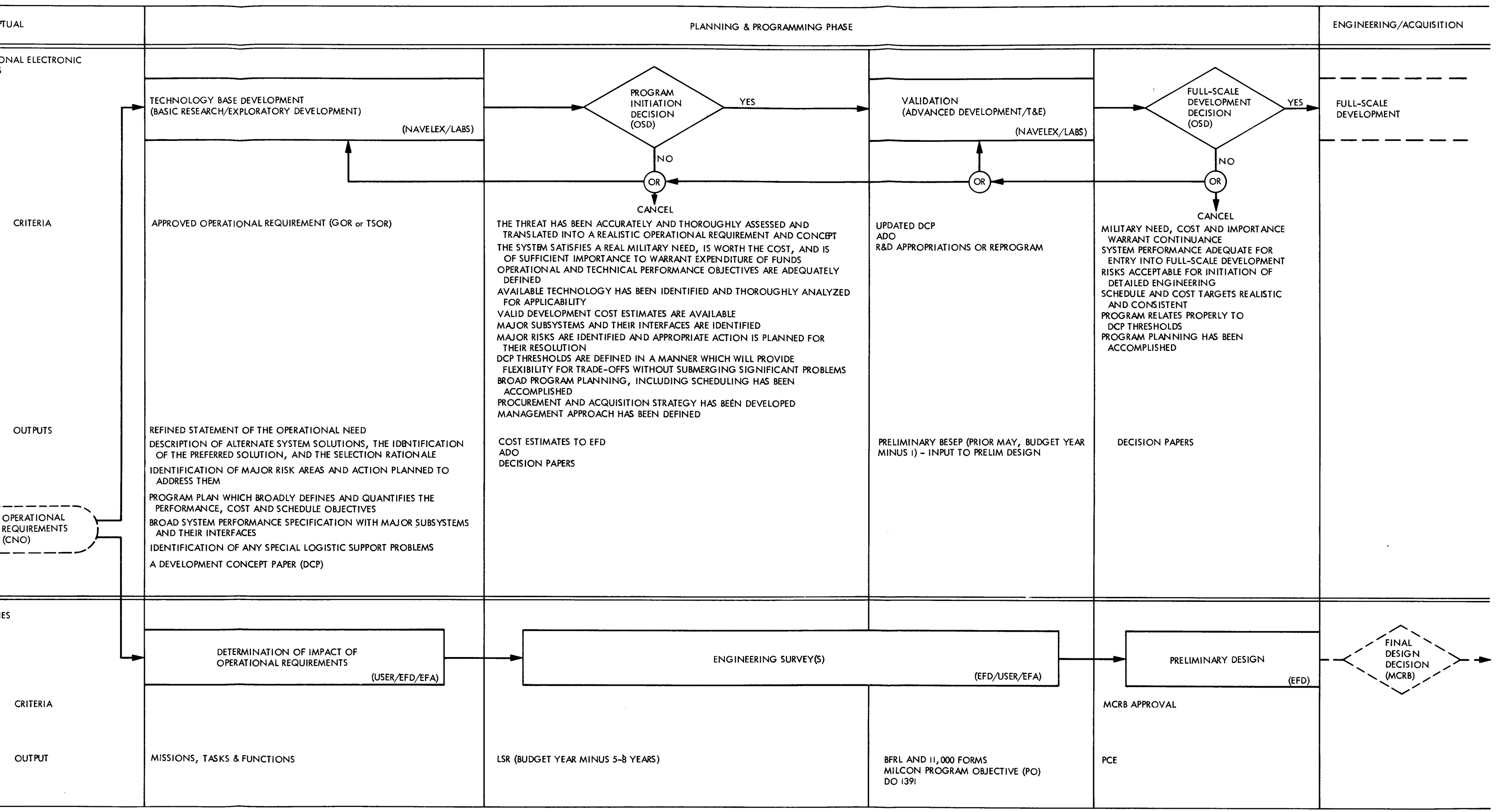
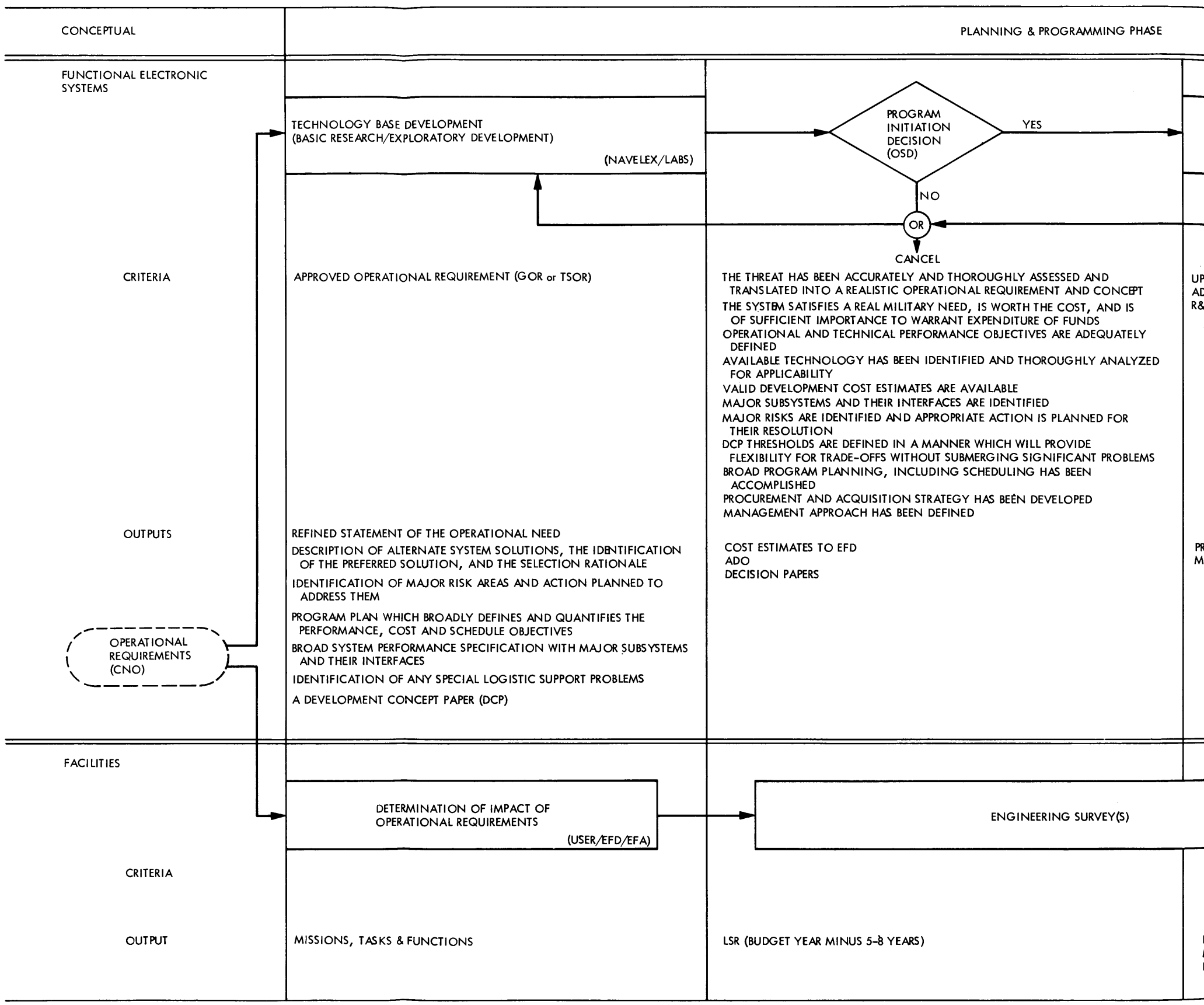


Figure 3-1. Planning and Programming Phase


CONCEPTUAL
PLANNING & PROGRAMMING PHASE
FUNCTIONAL ELECTRONIC SYSTEMS
TECHNOLOGY BASE DEVELOPMENT
(BASIC RESEARCH/EXPLORATORY DEVELOPMENT)
(NAVELEX/LABS)
PROGRAM INITIATION DECISION (OSD)
YES
NO
OR
CANCEL
CRITERIA
APPROVED OPERATIONAL REQUIREMENT (GOR or TSOR)
THE THREAT HAS BEEN ACCURATELY AND THOROUGHLY ASSESSED AND TRANSLATED INTO A REALISTIC OPERATIONAL REQUIREMENT AND CONCEPT
THE SYSTEM SATISFIES A REAL MILITARY NEED, IS WORTH THE COST, AND IS OF SUFFICIENT IMPORTANCE TO WARRANT EXPENDITURE OF FUNDS
OPERATIONAL AND TECHNICAL PERFORMANCE OBJECTIVES ARE ADEQUATELY DEFINED
AVAILABLE TECHNOLOGY HAS BEEN IDENTIFIED AND THOROUGHLY ANALYZED FOR APPLICABILITY
VALID DEVELOPMENT COST ESTIMATES ARE AVAILABLE
MAJOR SUBSYSTEMS AND THEIR INTERFACES ARE IDENTIFIED
MAJOR RISKS ARE IDENTIFIED AND APPROPRIATE ACTION IS PLANNED FOR THEIR RESOLUTION
DCP THRESHOLDS ARE DEFINED IN A MANNER WHICH WILL PROVIDE FLEXIBILITY FOR TRADE-OFFS WITHOUT SUBMERGING SIGNIFICANT PROBLEMS
BROAD PROGRAM PLANNING, INCLUDING SCHEDULING HAS BEEN ACCOMPLISHED
PROCUREMENT AND ACQUISITION STRATEGY HAS BEEN DEVELOPED
MANAGEMENT APPROACH HAS BEEN DEFINED
OUTPUTS
REFINED STATEMENT OF THE OPERATIONAL NEED
DESCRIPTION OF ALTERNATE SYSTEM SOLUTIONS, THE IDENTIFICATION OF THE PREFERRED SOLUTION, AND THE SELECTION RATIONALE
IDENTIFICATION OF MAJOR RISK AREAS AND ACTION PLANNED TO ADDRESS THEM
PROGRAM PLAN WHICH BROADLY DEFINES AND QUANTIFIES THE PERFORMANCE, COST AND SCHEDULE OBJECTIVES
BROAD SYSTEM PERFORMANCE SPECIFICATION WITH MAJOR SUBSYSTEMS AND THEIR INTERFACES
IDENTIFICATION OF ANY SPECIAL LOGISTIC SUPPORT PROBLEMS
A DEVELOPMENT CONCEPT PAPER (DCP)
COST ESTIMATES TO EFD
ADO
DECISION PAPERS
OPERATIONAL REQUIREMENTS (CNO)
FACILITIES
DETERMINATION OF IMPACT OF OPERATIONAL REQUIREMENTS
(USER/EFD/EFA)
ENGINEERING SURVEY(S)
CRITERIA
OUTPUT
MISSIONS, TASKS & FUNCTIONS
LSR (BUDGET YEAR MINUS 5-8 YEARS)

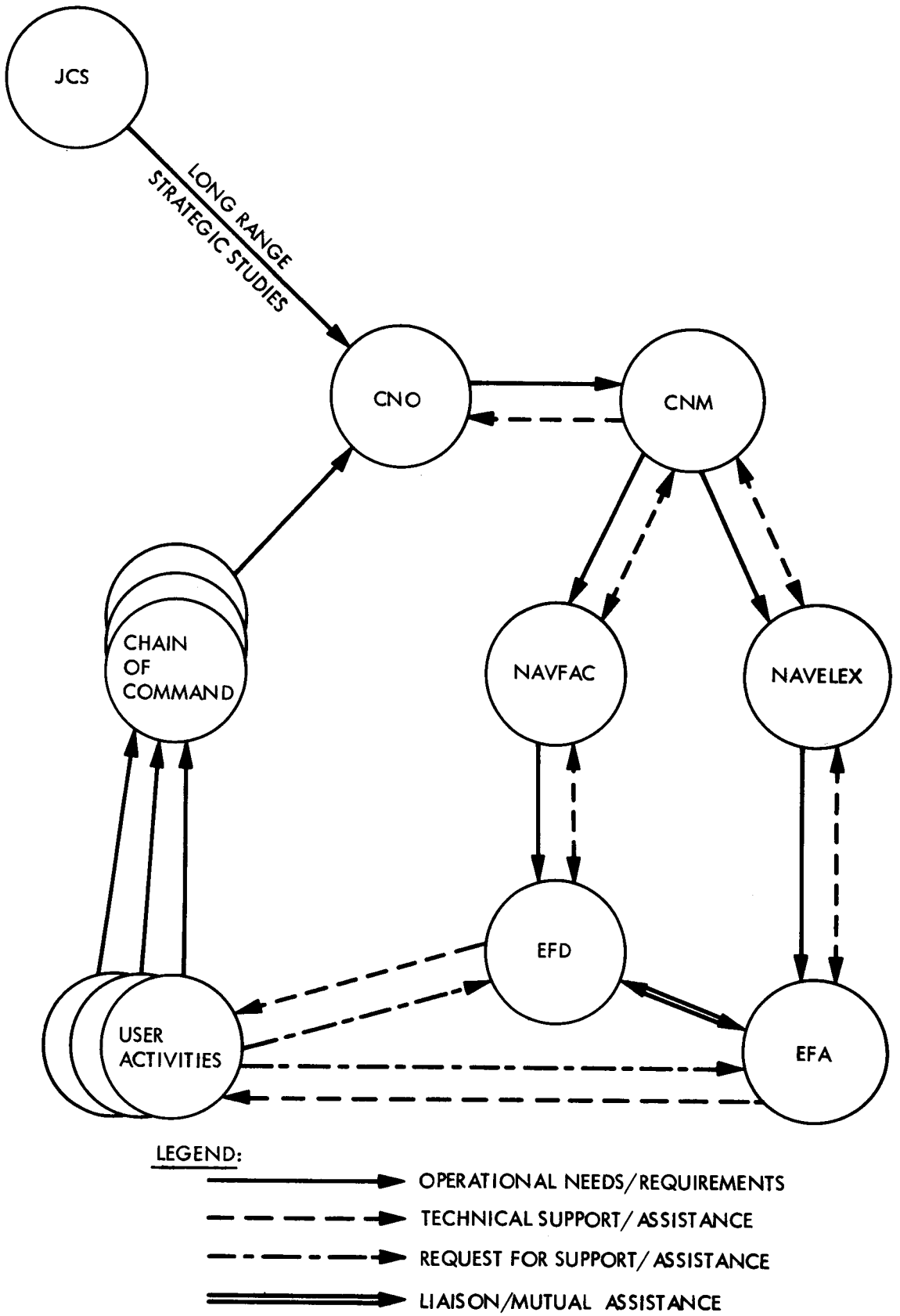


Figure 3-2. Operational Requirements/Technical Support Cycle

Maintainability and Survivability, given the Availability. It may be stated as the probability that an item will: (1) enter or occupy any one of its required operational modes during a specified mission; and (2) perform the functions associated with those operational modes (MIL-STD-721).

e. Human Engineering. Human engineering is the area of human factors which applies scientific knowledge to the design of items to achieve effective man-machine integration and utilization (MIL-STD-721). This factor must be considered not only from the item design aspect of operator functions and accessibility for maintenance and repair but from the base system aspect of physical layout for traffic, accessibility, and interface with other equipments and of environment, such as lighting, temperature, and humidity. The basic reference is MIL-STD-1472.

f. Safety. Safety is the conservation of human life and its effectiveness and the prevention of damage to items, consistent with mission requirements (MIL-STD-721). Safety engineering must be considered and specified for both the item and the base system. The basic reference is MIL-STD-882.

3.5.2 Integrated Logistics Support (ILS)

The best designed system/equipment is useless without the concomitant logistic support resources necessary to sustain its operations. ILS establishes the focus and fixes the overall responsibility for all logistic support planning, effort, and acquisition such that the mechanisms and resources are established and practicable as a continuing function when a system or family of systems become operational. Logistic support effort and costs are the most significant part of a system's life cycle, and it is essential that they be addressed from the outset. The following are the logistic support elements:

a. Maintenance Planning.
b. Support and Test Equipment.
c. Supply Support.
d. Transportation and Handling.
e. Technical Data.
f. Facilities.
g. Personnel and Training.

The development and realization of an effective logistic support capability for any system is a prime function of design, as well as of program management. It involves a continuous budgetting and control of logistic support resource funds and feedback through a simple, effective management information system. Key references are SECNAVINST 4000.29, OPNAVINST 4100.3, NAVMATINST 4000.20, and DOD Guide 4100.35.

3.5.3 Security

Security is another factor which can impact heavily on both cost and time in a shore electronics facility project, hence must be considered early. It may be a function of mission, equipment characteristics, and geographical location and falls into two categories: (1) physical and (2) compromising emanations. The basic references are OPNAVINSTs 5510.1 and 005510.93.

a. Physical Security. Physical security is a facility consideration, which addresses limiting, controlling, or preventing personnel access to specific areas. Physical security criteria are contained in OPNAV 5510 series instructions and pertinent NAVFAC Design Manuals (DMs). However, NAVELEX engineers are directly involved where fences and restricting structures for security purposes would affect the performance of electronic equipment, such as distortion of antenna patterns and generation/conduction of electromagnetic interference.

b. Compromising Emanations. Electronic and electromechanical systems involved in the handling and/or transmission of data/information are prone to electromagnetic and/or acoustic emissions which may be intercepted and interpreted by persons unknown or undesired. The concern over such emanations is determined by the classification limits of the information to be handled by the base system. The final base system definition is the result of tradeoffs between equipment and facility design, hence requires a joint effort by NAVELEX and NAVFAC personnel. Such emanations may be restricted to prescribed limits by optimum combination of the two. The TEMPEST program's objectives are to measure the emanations, to determine the extent to which they could be used by undesirable individuals/activities, and to define the measures required to correct any deficiencies. TEMPEST inspections are made by NAVELEX; (1) on a situation basis for equipment, functional electronic systems, and base systems and (2) on a periodic basis for operating systems. For systems involving on-line encryption devices/equipment careful consideration must be given to the base systems design with regard to RED/BLACK interface. Key references are: NAVELEXINSTs 05400.3, 05510.2, and 011120.1.

3.5.4 Fire Protection

Provisions for fire protection of the base system are the responsibility of NAVFAC. Key references are DNCINST 11320.2, NAVMATINST 11320.8, and DM-8.

3.5.5 Configuration Management

Configuration management is a discipline applying technical and administrative direction and surveillance to: (1) identify and document the functional and physical characteristics of a configuration item, (2) control changes to those characteristics, and (3) record and report change processing and implementation status of approved changes, (MIL-STD-480). Its purpose is not to inhibit either functional or base electronic systems, but to optimize performance and support through a controlled process for alteration or change. During the initial planning phase, a configuration management plan must either exist or be promulgated to fix responsibilities, define baselines and baseline configuration identification, and schedules, as appropriate. Key references are MIL-STD-480 through 483, NAVMATINST 4130.1, and NAVELEXINST 4130.7.

3.5.6 Test and Evaluation (T&E)

Programs should be structured and resources allocated to ensure that the demonstration of actual achievement of program/project objectives is the pacing function. The NAVELEX Systems Test and Evaluation Facility (NESTEF) is the primary activity within NAVELECSYSCOM for accomplishment of T&E (NAVELEXINST 5450.19).

3.6 NAVELEX FUNCTIONS

The major NAVELEX participation during initial planning/program as defined herein is at the headquarters level with assistance from appropriate EFAs. The key functions associated specifically with shore electronics are:

a. Assistance to the user activity and EFD with regard to facility-oriented inputs.
b. Update of electronic system related factors in NAVFAC P-80.
c. Engineering Survey(s).
d. BESEPs.
e. Budget formulation and submission.

CHAPTER 4

ENGINEERING/ACQUISITION

4.1 GENERAL

The objective of the engineering/acquisition phase is to provide a functional system ready for installation at a site/facility certified by the EFD ready for installation. The phase begins with full-scale development of the functional system and with final design of the facility. It terminates with the functional system's delivery and acceptance at the site by the EFA and with the site/facility ready for installation. The target date is BOD, and both NAVELEX and NAVFAC actions should be geared to converge at that date. The phases used to divide a project in this handbook are sequential and functional, to illustrate a logical progression from conception to realization and to highlight the NAVELEX actions/decisions which must either depend upon or constrain NAVFAC actions/decisions. Figure 4-1 illustrates the actions/decisions required during this part of a project. Engineering/acquisition commencement by NAVELEX may or may not coincide with that by NAVFAC, dependent upon the size and complexity of the particular project. The significant aspects are the obvious necessity for close coordination between the two system commands and their field activities and for meeting the deadlines for Preliminary BESEP, Final BESEP, and BOD. The events/processes which make up this phase are illustrated for a full-blown program from conception through life-cycle. Most tasks will not fall into this category; however, the NAVELEX project/program manager and his EFA counterpart can key to those requirements which are applicable for successful accomplishment of the assignment(s).

4.2 PROGRAM MANAGEMENT

During engineering/acquisition, the project/program manager must implement and execute the steps to meet developed during the initial planning and programming period. Throughout this phase, the NAVELEX manager and his EFA counterpart must continually reassess/modify their projects as a result of changes and contingencies and develop the detailed plans essential to successful accomplishment of the objective by all parties. The plans which may be required during the engineering/acquisition phase are:

a. ILS Plan* (NAVMATINST 4000.20)
b. Configuration Management Plan (NAVMATINST 4130.1)
c. Technical Development Plan (TDP) (NAVMATINST 3910.5)
d. Program Project Plan*
e. Advanced Procurement Plan (APP) (NAVMATINST 4200.31)
f. BESEP(s)* (NAVELEX 11000.1)
g. Installation Plan(s)* (NAVELEX 11120.2)
h. Test Plan(s)* (NAVELEX 3960.1)

All plans will be developed as dictated by current directives and by the size and complexity of a given project/program. The NAVELEX HQ program manager controls.

*Mandatory for projects

4.3 FACILITIES ASPECTS

Engineering/acquisition of the site/facilities portion of a project consists of the following processes/events:

a. Final Design or A&E Contract Decision (contingent upon OSD approval)
b. Final Design
c. Construction Decision (contract contingent upon appropriation by Congress)
d. Construction/Site Preparation
e. Certification of site/facility ready for installation

Coordination between NAVELEX and NAVFAC, EFA and EFD, and headquarters and field activity is an absolute necessity, in order that necessary technical and/or schedule changes to either the electronic system or the facility are reflected in the base system planning and implementation. Critical inputs from the EFA to the EFD are:

a. Preliminary BESEP (input to preliminary design in sufficient time for inclusion in PCE, which must be submitted prior to 31 July before the budget year)
b. Final BESEP (at outset of final design)

4.4 FUNCTIONAL ELECTRONIC SYSTEM ASPECTS

Engineering/acquisition of the electronic system(s) is geared to the delivery of an accepted system and supporting data/material on or before BOD. The processes/events in which NAVELEX personnel are involved are:

a. Full-scale development
b. Production decision
c. Production
d. Test and Evaluation
e. Factory Acceptance
f. Acceptance at Delivery Point

Throughout this phase, the development of the system supporting material and data is being developed and prepared to the level specified for effective test and evaluation.

4.4.1 Full-Scale Development

Full-scale development generally implies detailed specification, development, test and evaluation, and, in certain cases, limited pilot production of the total system, including those items necessary for ILS. This effort will be tailored to the needs and characteristics of each individual acquisition program. The primary purpose for conducting full-scale development is to ensure completion of sufficient effort to permit a confident commitment of resources required for quantity production. The majority of shore electronic projects involving full-scale developmental effort will probably be those which require the development and integration of total system hardware/software from a selection of "off-the-shelf" equipments/subsystems. The decision to go into production will be based upon the establishment of the following factors during development:

a. Quality Assurance
b. Standardization
c. System Safety
d. Systems Effectiveness, including all ILS elements
e. Configuration Management/Charge Control
f. Priorities and Allocations

4.4.2 Production

Production is initiated upon decision of appropriate authority and programmed to meet BOD(s) at the site(s) called out in the pertinent shore electronic facilities project(s).

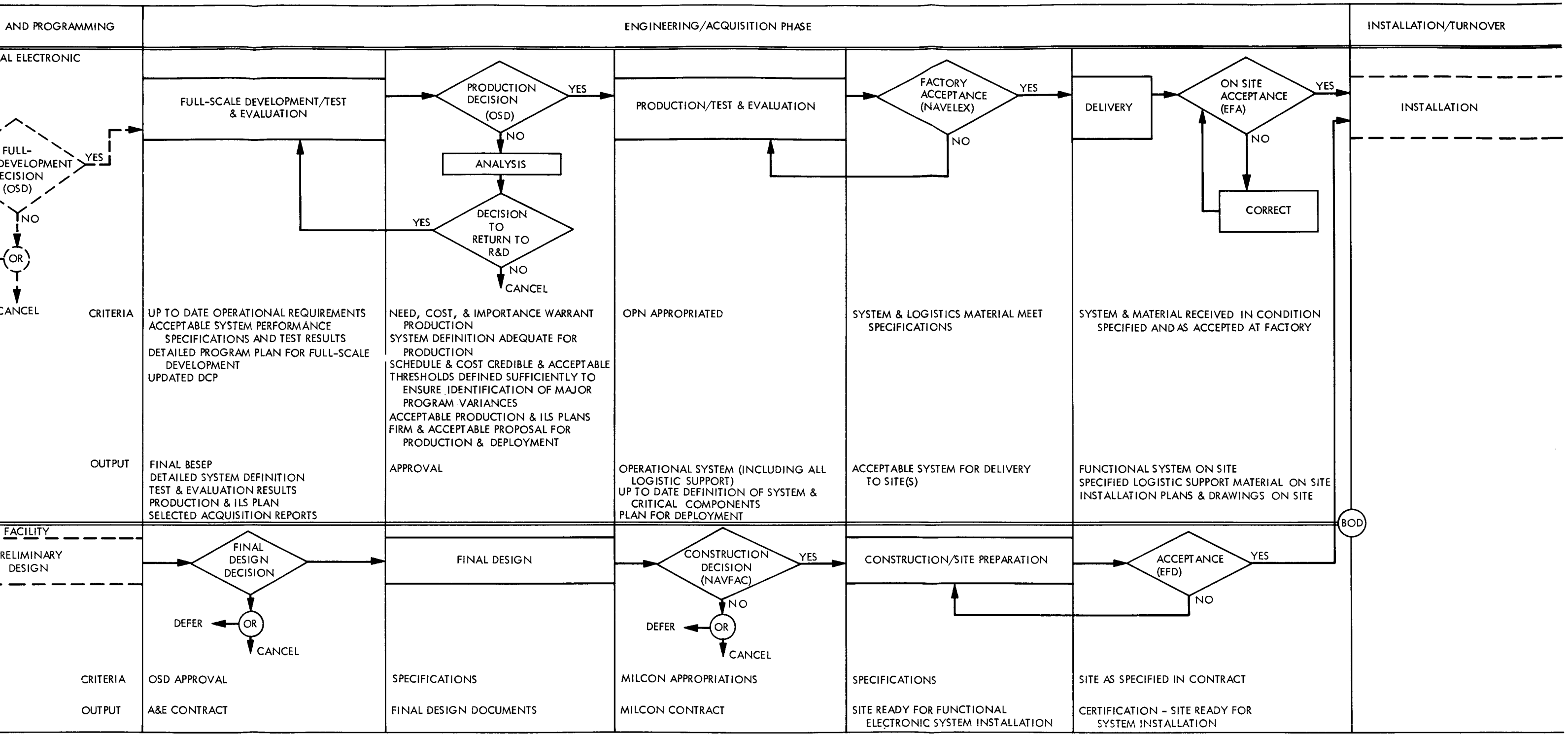
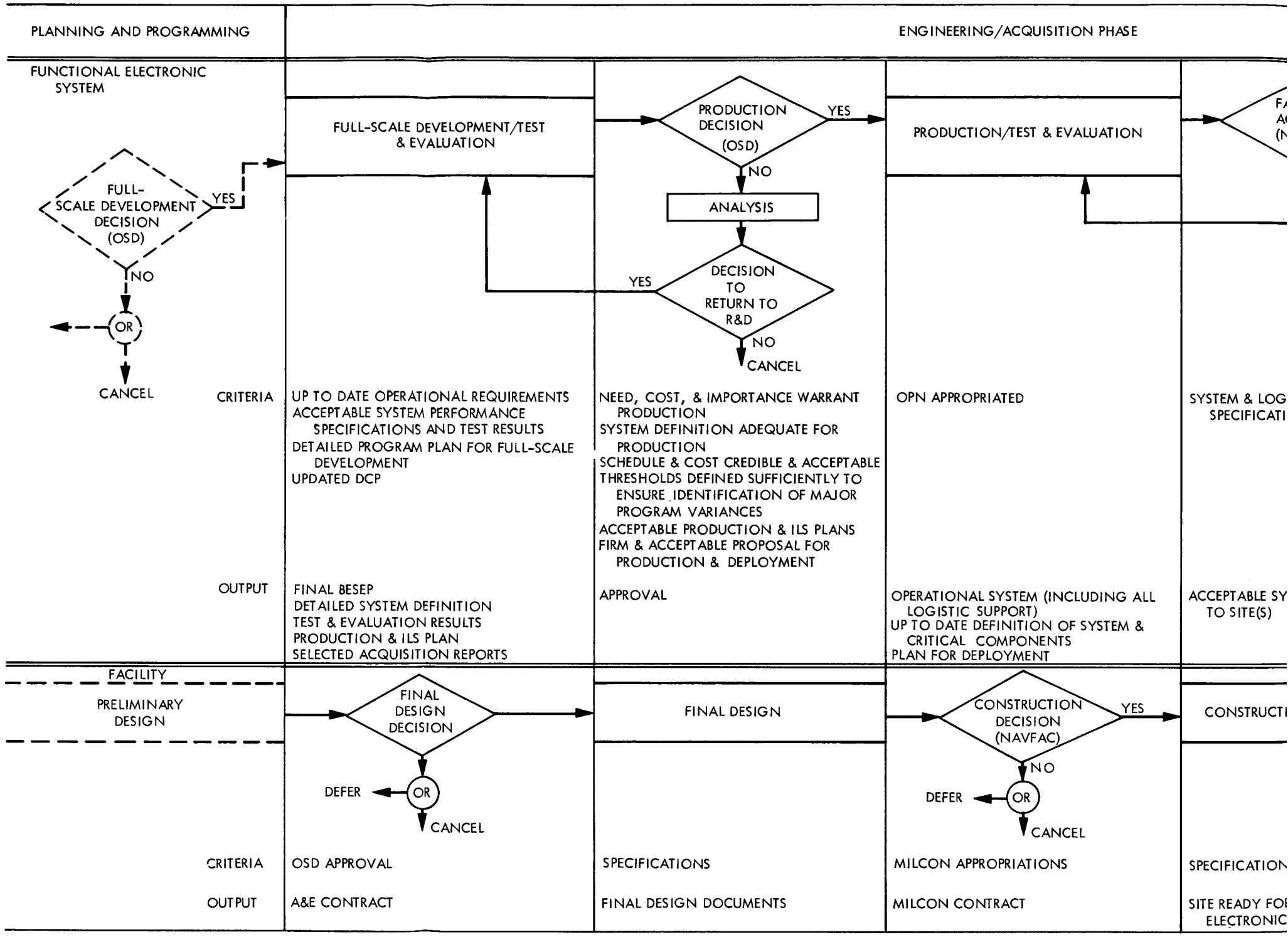


Figure 4-1. Engineering/Acquisition Phase


PLANNING AND PROGRAMMING
ENGINEERING/ACQUISITION PHASE
FUNCTIONAL ELECTRONIC SYSTEM
FULL-SCALE DEVELOPMENT DECISION (OSD)
YES
NO
OR
CANCEL
FULL-SCALE DEVELOPMENT/TEST & EVALUATION
PRODUCTION DECISION (OSD)
YES
NO
ANALYSIS
YES
DECISION TO RETURN TO R&D
NO
CANCEL
PRODUCTION/TEST & EVALUATION
CRITERIA
UP TO DATE OPERATIONAL REQUIREMENTS
ACCEPTABLE SYSTEM PERFORMANCE SPECIFICATIONS AND TEST RESULTS
DETAILED PROGRAM PLAN FOR FULL-SCALE DEVELOPMENT
UPDATED DCP
NEED, COST, & IMPORTANCE WARRANT PRODUCTION
SYSTEM DEFINITION ADEQUATE FOR PRODUCTION
SCHEDULE & COST CREDIBLE & ACCEPTABLE
THRESHOLDS DEFINED SUFFICIENTLY TO ENSURE IDENTIFICATION OF MAJOR PROGRAM VARIANCES
ACCEPTABLE PRODUCTION & ILS PLANS
FIRM & ACCEPTABLE PROPOSAL FOR PRODUCTION & DEPLOYMENT
OPN APPROPRIATED
SYSTEM & LOG SPECIFICATI
OUTPUT
FINAL BESEP
DETAILED SYSTEM DEFINITION
TEST & EVALUATION RESULTS
PRODUCTION & ILS PLAN
SELECTED ACQUISITION REPORTS
APPROVAL
OPERATIONAL SYSTEM (INCLUDING ALL LOGISTIC SUPPORT)
UP TO DATE DEFINITION OF SYSTEM & CRITICAL COMPONENTS
PLAN FOR DEPLOYMENT
ACCEPTABLE SY TO SITE(S)
FACILITY
PRELIMINARY DESIGN
FINAL DESIGN DECISION
DEFER
OR
CANCEL
FINAL DESIGN
CONSTRUCTION DECISION (NAVFAC)
YES
NO
DEFER
OR
CANCEL
CONSTRUCTI
CRITERIA
OSD APPROVAL
SPECIFICATIONS
MILCON APPROPRIATIONS
SPECIFICATION
OUTPUT
A&E CONTRACT
FINAL DESIGN DOCUMENTS
MILCON CONTRACT
SITE READY FO ELECTRONIC

Successful execution requires the careful consideration of realistic production schedules, test and evaluation fund and time constraints, and delivery times as determined backwards from BOD. ILS requirements and evaluation criteria, must be clearly specified in solicitation documents and reflected in resulting contracts.

4.4.3 Test and Evaluation (T&E)

T&E is conducted throughout the engineering/acquisition process to the level dictated by the complexity and state of development of the system. These requirements must be clearly specified in solicitation documents and reflected in resulting contracts. Test plans/procedures shall be developed and appraised sufficiently in advance of actual tests to ensure thorough review and approval prior to the tests. The objective of T&E is to ensure data sufficient to evaluate system effectiveness and program progress at major decision points in order to minimize cost and optimize program achievement. Typical tests are:

a. Design benchmark tests (subsystem and system)
b. Environmental tests
c. First Article tests (FAT)
d. Technical Evaluations (TECHEVAL) (See Chapter 5)
e. Operational Evaluations (OPEVAL) (See Chapter 5)
f. Reliability and Maintainability Demonstrations
g. Packaging tests

Key references are OPNAVINST 3960.1 and NAVELEXINST 3960.1.

4.5 OUTPUTS

As discussed previously, the objective of engineering/acquisition is delivery of an accepted functional system at a site coincidental with BOD. Throughout this phase, the development, review, and approval of all support material and data will have been accomplished in parallel to ensure their inclusion as a part of a total package. The deliverable "package" should include:

a. Complete system

b. ILS material

   (1) Trained personnel for installation and tests
   (2) Installation/checkout spares
   (3) Support and Test Equipment (Support facilities by NAVFAC)
   (4) Transportation and Handling capabilities
   (5) Technical data-operating/technical manuals, preventive maintenance documents, provisioning documentation.

c. Installation Plan - sufficiently in advance for EFD/user activity concurrence and acquisition of all necessary installation material and services

d. Installation material and drawings

CHAPTER 5

INSTALLATION/TURNOVER

5.1 GENERAL

The objective of the installation/turnover phase is to provide to the ultimate user activity a fully accepted base system. The phase begins with the delivery and acceptance of the functional system on site, certification by the EFD that the facility is ready for system/equipment installation and the availability on site of supporting installation material and documentation. It terminates with the formal acceptance of the base system by the user activity. The processes of this phase are installation, technical evaluation, and turnover. The local EFA is the prime mover. The actual functions may be performed by EFA personnel, by user activity personnel (Local Project), by contractor (e.g., Engineer Furnish and Install (EFI)), or by any combination thereof, as determined by the EFA, based upon the size and constraints of a given project. Regardless of the resources actually committed for installation, the EFA is responsible for supervision and monitor. Figure 5-1 illustrates this phase. Throughout the period, the various data required are in the process of revision and update.

5.2 INSTALLATION

This is the actual installation of the functional system into the facility. Criteria are shown in Figure 5-1. The basic criteria for installation are contained in NAVELEX 0101,110; specific criteria are as detailed in the project installation plan and/or contract(s). The EFA shall advise the Commanding officer of the user activity, as far in advance as possible, of the projected completion, date of technical evaluation and request scheduling of turnover. In cases where a new facility consists of both new and reinstalled equipment, turnover of the new equipment and schedule for the cut-over portion shall be requested.

5.3 TECHNICAL EVALUATION/CHECKOUT

A technical evaluation of the base system must be conducted by the EFA for certification as to readiness for turnover. The extent of this evaluation may vary from a rigorous, in-depth process for a major system prototype or initial production system installation to a routine checkout for follow-on systems or relocation of existing equipment(s). Evaluation criteria will be established on a project/program basis in sufficient depth to assure the EFA of technical quality of the installation and of the base system. The evaluation process may overlap with that of installation in those instances where the project involves a major system which can be installed and tested logically in increments. Figure 5-1 illustrates basic criteria and requirements. Test procedures will vary, dependent upon system complexity and whether or not system is prototype, first production, or follow-on system and will extensively test all pertinent capabilities specified in the contract. Test data/results will be provided to the user activity, local EFA, and lead field activity to establish the basis for subsequent technical evaluations and inspections.

5.4 TURNOVER

This is a joint inspection and checkout of the completed base system by the EFA and the authorized user activity representative for system operational suitability. In the case of a prototype system, this may be an Operational Evaluation, (OPEVAL), as directed by CNO. It will consist of a thorough inspection and operational checkout of the base system and all specified support material/capabilities. In any case, acceptance criteria will be those developed in the test plan/procedures established jointly by NAVELEX and

user activity representatives. Criteria for turnover are listed in Figure 5-1. Procedures for turnover will vary from project to project and will be developed to checkout operation and maintenance characteristics specified in operational requirements and contract documents. Test results will be provided to the user activity, the local EFA, and the lead field activity for file and will be used as bases for subsequent technical inspection criteria.

5.5 ACCEPTANCE

Upon completion of turnover, the Commanding Officer shall be requested to submit formal written acceptance to NAVELEX via EFA, as follows:

a. Unconditional. Installation complete and operationally satisfactory.

b. Conditional. Installation operational but not fully satisfactory or complete. The deficiencies responsible for this type acceptance will be detailed and shall be corrected by the installing activity. An unconditional acceptance will be obtained as soon as possible

c. Partial. Interim acceptance of a part of the total installation. This category is appropriate where incremental activation of a facility is required by the command in order to maintain the station operations schedule.

d. Unacceptable. The deficiencies will be detailed and recommendations will be solicited with regard to corrective action necessary to satisfy operational requirements.

Upon unconditional acceptance, "as-built" plans will be provided to the user activity. Preparation of a complete station instruction will be accomplished by the EFA provided it is funded in the project or by the user activity.

ATION/TURNOVER PHASE				OPERATION/MAINTENANCE PHASE
	(2A)	(31)		
X/EFA)	ACCEPTANCE (NAVELEX) YES / NO → ANALYSIS → CORRECTIVE ACTION DECISION	CORRECT DEFICIENCIES → OPEVAL/TURNOVER (USER & NAVELEX)	ACCEPTANCE (USER) CONDITIONAL / UNCONDITIONAL / PARTIAL / UNACCEPTABLE → ANALYSIS → CORRECTIVE ACTION DECISION	OPERATION/MAINTENANCE (TOTAL SYSTEM)
RY		TO PHASE NECESSARY TO RECTIFY		OPERATION/MAINTENANCE (PORTION OF SYSTEM ACCEPTED)
				INSTALLATION/TURNOVER (UNACCEPTED PORTION)
OR AL ON SITE ONNEL LS OCEDURES	AS DETAILED IN TEST PLAN	SYSTEM CERTIFIED READY FOR OPEVAL/TURNOVER LOGISTIC SUPPORT MATERIAL ON SITE SAME AS (2) UPDATED OP/TECH MANUALS UPDATED MRCS/MIPS UPDATED PROVISIONING DOCUMENTS TRAINED STATION PERSONNEL APPROVED TEST PLAN & PROCEDURES	AS DETAILED IN OPEVAL/TURNOVER PLAN	
SYSTEM RESULTS	CERTIFICATION-SYSTEM READY FOR OPEVAL	OPERATIONALLY SUITABLE SYSTEM TEST DATA/RESULTS REFINED FAILURE ANALYSIS RESULTS PROGRESS REPTS (AS REQ)	SYSTEM ACCEPTANCE LETTER	

Figure 5-1. Installation/Turnover Phase

INSTALLATION/TURNOVER PHASE

	(1)	(1A)	(2)	(2A)	(31)
	INSTALLATION (EFA)	NO ACCEPTANCE (EFA) YES	TECHEVAL/CHECKOUT (NAVELEX/EFA)	ACCEPTANCE (NAVELEX) YES NO ANALYSIS CORRECTIVE ACTION DECISION TO PHASE NECESSARY TO RECTIFY	CORREC DEFICIE OPEVAL/TURNOVER (USER & TO PHASE NECESSA TO RECTIFY
BOD	SITE CERTIFIED READY FOR INSTALLATION ACCEPTED FUNCTIONAL SYSTEM ON SITE (IN EFA CUSTODY) LOGISTIC SUPPORT MATERIAL ON SITE SUPPORT AND TEST EQUIPMENT TRAINED INSTALLATION PERSONNEL SPARES FOR INSTALLATION/ CHECKOUT PRELIMINARY PROVISIONING DOCUMENTS INSTALLATION PLANS & DRAWINGS	AS DETAILED IN INSTALLATION DWGS	SYSTEM CERTIFIED READY FOR TECHEVAL LOGISTIC SUPPORT MATERIAL ON SITE SAME AS (1) TRAINED TECHEVAL PERSONNEL PRELIM OP/TECH MANUALS PRELIM MRCS/MIPS UPDATED PROVISIONING DOCUMENTS APPROVED TEST PLAN & PROCEDURES	AS DETAILED IN TEST PLAN	SYSTEM CERTIFIED READY OPEVAL/TURNOVER LOGISTIC SUPPORT MATI ON SITE SAME AS (2) UPDATED OP/TECH MA UPDATED MRCS/MIPS UPDATED PROVISIONI DOCUMENTS TRAINED STATION PER APPROVED TEST PLAN &
	PROPERLY INSTALLED SYSTEM PROGRESS REPTS (AS REQ.) REFINED INSTALLATION DWGS.	CERTIFICATION - SYSTEM READY FOR TECHEVAL	TECHNICALLY ACCEPTABLE SYSTEM TEST DATA/RESULTS INITIAL FAILURE ANALYSIS RESULTS PROGRESS REPTS (AS REQ.)	CERTIFICATION-SYSTEM READY FOR OPEVAL	OPERATIONALLY SUITAB TEST DATA/RESULTS REFINED FAILURE ANAL RESULTS PROGRESS REPTS (AS REQ

CHAPTER 6

OPERATION AND MAINTENANCE

6.1 GENERAL

The objective of this phase is to operate the base system and to keep it operating at its maximum capability throughout its lifetime. The phase begins with the acceptance of the base system and terminates with the system's replacement or decommissioning. Operation and maintenance is the responsibility of the Commanding Officer of the user activity; the means to perform these functions should have been provided by completion of turnover by the NAVELEX/NAVFAC material support team. Thereafter, NAVELEX/EFA and NAVFAC/EFD provide continuous technical support and assistance beyond the capability of the user activity. Figure 6-1 illustrates the basic aspects of this phase, highlighting the electronic system material support and the control loop.

6.2 OPERATIONS

Operations commence upon acceptance of the equipment/system by the user activity Commanding Officer. The items provided at this time by the project for operations are training devices and/or built-in capabilities for on-the-job training, operating instructions, and the final operator's manual.

6.3 MAINTENANCE

Maintenance consists of all actions necessary for retaining an item in or restoring it to a specified condition (MIL-STD-721l). It is the NAVELEX goal to ensure that all support material for the system is on site at commencement of operations.

6.3.1 Preventive Maintenance

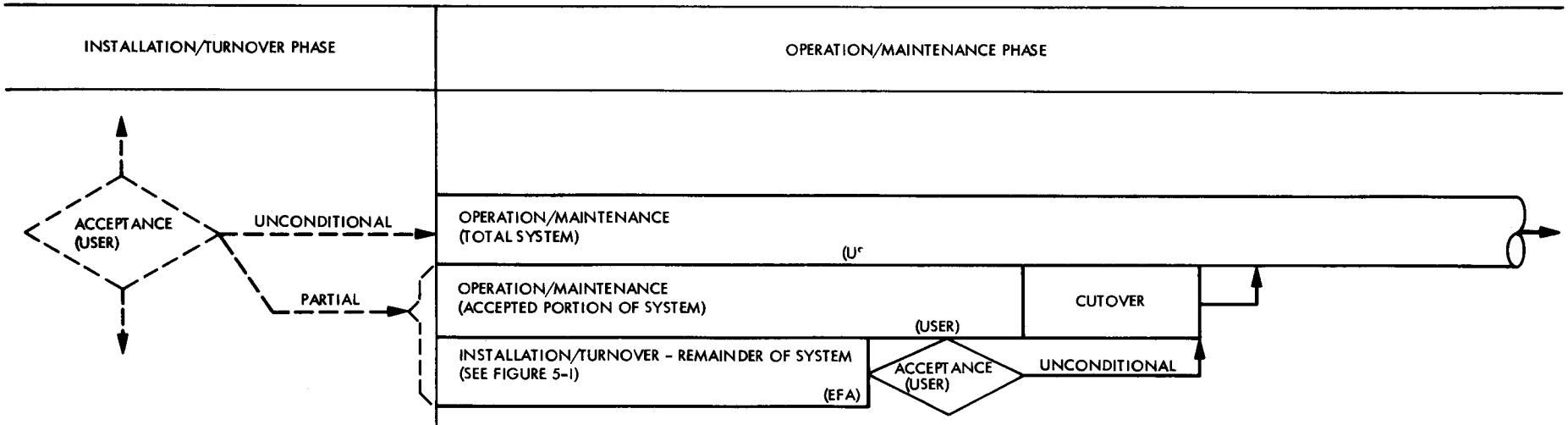
Preventive maintenance consists of the actions performed in an attempt to retain an item in a specified condition by providing systematic inspection, detection and prevention of incipient failure (MIL-STD-721l). System design addresses preventive maintenance, and the means to perform it are included as part of the ILS package.

a. Maintenance and Material Management (3-M). Preventive maintenance for new systems/equipment will be incorporated into the 3-M System, which consists of two subsystems:

   (1) Planned Maintenance Subsystem (PMS), which consists of the documentation necessary for operators to perform preventive maintenance, such as Maintenance Requirements Cards (MRCs) and Maintenance Index Pages (MIPs) and

   (2) Maintenance Data and Collection Subsystem (MDCS) which is the information closing the loop between operational activities and activities responsible for updating and supporting the system. Key references are OPNAV 43P2, MIL-P-28759(EC), and NAVELEXINSTs 4700.4 and 4700.8.

b. Performance and Operational Maintenance Standards of Electronic Equipment (POMSEE). Preventive maintenance standards and procedures for older equipments were established prior to 3-M and may still come under POMSEE. Until all such equipment has been phased out or become a part of 3-M, preventive



CRITERIA

BASE SYSTEM ACCEPTED UNCONDITIONALLY OR PARTIALLY

LOGISTIC SUPPORT

- NAVAL SUPPORT DATE (NSD) ESTABLISHED
- ALL MATERIAL ON SITE:
  - SUPPORT & TEST EQUIPMENT
  - ALL PROVISIONS
  - DATA (FINAL)
    - OP/MAINT MANUALS
    - TRAINING COURSE MATERIAL
    - PROVISIONING DOCUMENTATION
    - AS-BUILT DRAWINGS
    - STATION INSTRUCTION (IF APPLICABLE)
    - PREVENTIVE MAINTENANCE DOCUMENTATION
- TECHNICAL SUPPORT CAPABILITIES AT EFA(S)

FEEDBACK

- ENGINEERING CHANGE PROPOSALS (ECPS)
- CASUALTY REPORTS (CASREPTS)
- MAINTENANCE DATA AND COLLECTION SUBSYSTEM (MDCS)
- FAILURE REPORTS
- INSPECTION REPORTS
- OTHER REQUIRED REPORTS

Figure 6-1. Operation/Maintenance Phase

maintenance will be in accordance with POMSEE. The performance standards and standardized test procedures for POMSEE are in MIL-B-21741 (SHIPS).

6.3.2 Corrective Maintenance

Corrective maintenance consists of the actions performed, as a result of failure, to restore an item to a specified condition (MIL-STD-721). In order to support this responsibility of user activity maintenance personnel, the following support material will be provided at commencement of operations:

a. Support and Test Equipment

b. Supply support (provisioning material and documentation, including that necessary for follow-on support within the Navy system)

c. Technical data (Maintenance manual(s), as-built drawings, test data and results, and station instruction (if applicable)

6.4 TECHNICAL SUPPORT

The EFAs provide technical support as indicated in paragraph 2.4.2 of this handbook and the pertinent NAVELEX instruction(s) of the 5450 series.

6.4.1 Repair/Modification

The local EFA will render assistance, on request, in maintenance and repair of electronic equipment beyond station capabilities. In particular, the EFAs perform cryptographic equipment repair, test equipment calibration and repair, and RADIAC calibration and repair. User activity funds are required for test equipment, calibration and repair. Cryptographic and RADIAC repairs are supported by NAVELEX funding. The EFAs will also provide technical support in entering authorized field/engineering changes, alterations, and modifications to existing equipment. It is incumbent upon all technical personnel to be familiar with NAVELEXINST 5215.5 (NAVELEX 100,000).

6.4.2 Inspections

EFAs will conduct technical inspections, as requested by operational commanders. Such inspections will be based upon criteria derived from test data and/or programs, such as in CINCPACFLTINST 2300.13. It is the policy to accomplish inspections within the constraints/limitations of funds. Requirements will be assessed and ranked in priority order of capability, informing NAVELEX HQ of those beyond capability to accomplish.

a. Technical - upon request, as dictated by system(s)
b. TEMPEST - periodic; NAVELEXINSTs 5430.10, 7302.1, 05400.3, 05510.2, and 011120.1
c. HERO - upon request; OPNAVINST 8020.8
d. EMC/RADHAZ - upon request; NAVELEX 0101,106
e. EMI and Noise Surveys - upon request; NAVELEX 0101,108

6.4.3 Technical Assistance

This function is part of the EFA's continuous liaison with the user activity and consists of technical aid to the users in appraisal of technically-oriented problems and in preparing Engineering Change Proposals (ECPs) and operational requirements through the chain of command. The EFA also provides technical assistance to the EFD with regard to electronic systems matters.

6.5 FEEDBACK

Control is provided by various reporting and feedback systems which follow, basically,

the following paths:

a. Operational needs/requirements - via the operational chain of command to CNO, thence to NAVELEX via CNM

b. Material support - from the EFA via the NMC chain of command to NAVELEX for review, approval, and/or further transmittal to CNM

Timely, thorough participation in and adherence to the authorized procedures and paths in the feedback loop are essential to successful support of the Operating Forces. Figure 6-1 shows primary feedback paths.

APPENDIX A

KEY REFERENCES LISTED IN NUMERICAL ORDER

A.1 MILITARY SPECIFICATIONS

MIL-D-1000	Military Specifications for Drawings, Installation Plans and Preliminary Data for Electronics and Related Equipment
MIL-Q-9858	Quality Program Requirements
MIL-M-15071	Manuals Technical, Equipment and System Content, Requirements for
MIL-E-16400	Electronic Equipment, Naval Ship and Shore, General Specification
MIL-B-21741	Performance & Operational Standards of Electronic Equipment (POMSEE)
MIL-P-24014	Preclusion of Hazards from Electromagnetic Radiation to Ordnance
MIL-M-24365	Maintenance Engineering Analysis, Establishment of, and Procedures and Formats for Associated Documentation, General Specification for
MIL-P-28759	Planned Maintenance Subsystem (PMS) for Shore and Shipboard Requirements
MIL-S-38130	System Safety Engineering of Systems and Associated Subsystems and Equipment; General Requirements for
MIL-M-38784	Manuals Technical, General Requirements for, Preparation of
MIL-H-46885	Human Engineering Requirements for Military Systems, Equipment and Facilities

A.2 MILITARY STANDARDS

MIL-STD-188	Military Communications System, Technical Standards
MIL-STD-280	Definition of Item Levels, Item Exchangeability, Models, and Related Items
MIL-STD-449	Radio Frequency Spectrum Characteristics, Measurement of
MIL-STD-461	Electromagnetic Interference Characteristics, Requirements for Equipment

MIL-STD-462	Electromagnetic Interference Characteristics, Measurement of
MIL-STD-463	Definition and System of Units, Electromagnetic Interference Technology
MIL-STD-470	Maintainability Program Requirements, for Systems and Equip ment
MIL-STD-471	Maintainability Demonstration
MIL-STD-480	Configuration Control - Engineering Changes
MIL-STD-481	Configuration Control - Engineering Changes
MIL-STD-482	Configuration Status Accounting Data Elements and Related Features
MIL-STD-483	Configuration Management Practices for Systems, Equipment, Munitions, and Computer Programs
MIL-STD-490	Specification Practices
MIL-STD-721	Definition of Effectiveness Terms for Reliability, Maintainability, Human Factors, and Safety
MIL-STD-785	Reliability Program for Systems and Equipment, Development and Production
MIL-STD-881	Work Breakdown Structures for Defense Material Items
MIL-STD-882	System Safety Program for Systems and Associated Subsystems and Equipment, Requirements for
MIL-STD-1375	Provisioning, Initial Support, General Requirements for
MIL-STD-1378	Stand Hardware Program Modules, Requirements for Employing
MIL-STD-1472	Human Engineering Design Criteria for Military Systems, Equipment and Facilities

A.3 INSTRUCTIONS/DIRECTIVES

a. DOD

DODINST 4120.3	Standardization
DODINST 4630.1	Programming of Major Telecommunications Requirements
DODDIR 5000.1	Acquisition of Major Defense Systems (DDR&E)
DODINST 4100-35-G	Integrated Logistic Support Planning Guide
DCA CIRCULAR 300-175-1 (Conf)	DCA Red/Black Engineering Installation Criteria (U)

DNC INST 5430.1	Management and Technical Cognizance of Electronic Systems and Equipment, Policies and Procedures for
DNC INST 11320.2	Fire Prevention and Fire Protection

b. SECNAV

SECNAVINST 4200.29	Integrated Logistic Support
SECNAVINST 5000.X	System Acquisition in the Department of the Navy
SECNAVINST 5000.21	Electronic Installation Procedures
SECNAVINST 5200.X	Weapon System Acquisition Coordinating Papers (DCP Process)
SECNAVINST 5400.13	Assignments and Distribution of Authority and Responsibility for the Administration of the Department of the Navy

c. OPNAV

OPNAV 09B3-105	Catalog of Naval Shore Activities
OPNAV 43P2	Maintenance and Material Management (3M) Manual
OPNAV 90P-1	Navy Programming Manual
OPNAVINST 2300.37	Basic Navy Guide for Planning, Programming and Implementing DCA Plans
OPNAVINST 3910.4	Preparation of Technical Development Plans (TDPs), Guide for
OPNAVINST 3910.6	Specific Operations l Requirements (SOR) and Tentative Specific Operational Requirements (TSOR), Instructions in the preparation of
OPNAVINST 3910.7	Advanced Development Objective (ADO), Procedure for Preparation of
OPNAVINST 3910.8	Proposed Technical Approaches (PTA)
OPNAVINST 3910.9	General Operational Requirements (GORs) for Navy Research and Development
OPNAVINST 3960.1	Support of RDT&E Projects by Operating Forces
OPNAVINST 4000.72	Logistic Support Requirements System
OPNAVINST 4100.3	ILS
OPNAVINST 5000.19	The Navy Planning and Programming System
OPNAVINST 5000.36	Shore Communications Equipment; responsibility for programming for

OPNAVINST 5100.14	Department of the Navy Shore Safety Program; promulgation of
OPNAVINST 5430.21	Research, Development, Test and Evaluation (RDT&E), Planning Responsibilities
OPNAVINST 5510.1	Manual for Classified Matter
OPNAVINST 005510.93	Navy Implementation of National Policy on Control of compromising evaluations from facilities systems or equipment used to process classified information (U)
OPNAVINST 8020.8	Hero Applications
OPNAVINST 11010.1	Shore Installations and Facilities Planning and Programming
OPNAVINST 11010.5	Navy Military Construction Review Board
OPNAVINST 11010.20	Facilities Project Manual
OPNAVINST 11120.5	Communications Requirements, Policy Concerning

d. NAVAL COMMUNICATION COMMAND

2300.1	Communications Equipment; Installation, reinstallation and funding procedures

e. NAVSECGRU

NAVSECGRUINST 3520.1	Electronic Installation Procedures

f. CINCPACFLT

2300.13	Tactical Communication Quality Monitoring Program for certain shore commands
5450.19	NAVSEEACT Philippines; Mission, Tasks & Functions
5450.23	NAVSEEAPAC Hawaii; Mission, Tasks & Functions
5450.25	NAVSEEACT JAPAN; Mission, Tasks & Functions
5450.26	NAVSEEACT GUAM; Mission, Tasks & Functions

g. NAVMAT

NAVMAT P 3910	Guide for the Preparation of Proposed Technical Approaches (PTA)
NAVMATINST 3910.5	Technical Development Plans (TDPs) and Research and Development Summaries, Procedure for Preparation

NAVMATINST 4000.15	Data Management Program
NAVMATINST 4000.20	Integrated Logistic Support Planning Procedures
NAVMATINST 4120.97	Standardization of Equipments/Components
NAVMATINST 4120.99	Defense Standardization Program (DSP)
NAVMATINST 4130.1	Configuration Management
NAVMATINST 4200.31	Advanced Procurement Planning
NAVMATINST 5101.1	Resolution of EMR Hazard Problem
NAVMATINST 5430.21	Material Support of Shore Electronics; General Policies and Procedures for
NAVMATINST 5460.2	Organization Manual
NAVMATINST 11320.8	Installed Fire Protection Systems in Electronics/ Avionics Shops and Related Facilities Ashore, Provisions of

h. NAVELEX

NAVELEX 100,000	Technical Policies and Procedures Manual
NAVELEX 0101,101	Naval Shore Electronic Criteria Handbook, General
NAVELEX 0101,102	Naval Communications Station Design
NAVELEX 0101,103	HF Radio Propagation and Facility Site Selection
NAVELEX 0101,104	HF Radio Antenna Systems
NAVELEX 0101,105	Satellite Communication Systems
NAVELEX 0101,106	Electromagnetic Compatibility and Electromagnetic Radiation Hazards
NAVELEX 0101,107	Naval Aeronautical Facilities
NAVELEX 0101,108	Naval Security Group Elements, Design and Performance
NAVELEX 0101,109	Naval Training Facilities
NAVELEX 0101,110	Installation Standards and Practices
NAVELEX 0101,111	Digital Computer Systems, Volume 1
NAVELEX 0101,112	Microwave and Tropo-Scatter Communication Systems
NAVELEX 0101,113	Navy VLF, LF and MF Communication Systems
NAVELEX 0101,114	NAVELEX Calibration Program
NAVELEX 0101,115	Digital Computer Systems, Volume 2

NAVELEX 0103, 155-0104, 154 Series	NAVSECGRU Standard Installation Plans
NAVELEX INST 2400.1	Responsibility for Radio Frequency Allocation Matters within NAVELEX
NAVELEX INST 2410.1	Electromagnetic Compatibility (EMC) within NAVELEX; Assignment of Responsibilities
NAVELEX INST 3430.1	Quick Reaction Capability (QRC) for Rapid Development Capability (RDC) Electronic Warfare and Related Systems; Responsibilities and Procedures for
NAVELEX INST 3900.2	NAVELECSYSCOM RDT&E Manual
NAVELEX INST 3960.1	Test and Evaluation Policy; Promulgation of
NAVELEX INST 4000.6	Integrated Logistics Support (ILS); Implementation of
NAVELEX INST 4120.1	Plan of Operation for Standardization of Electronics Components/Equipments (C/E) Required for Fleet or Ashore Installations for which NAVELEX has Material Support
NAVELEX INST 4120.2	Review and Control of Communications Systems Standards within NAVELEX; Information Concerning
NAVELEX INST 4120.8	Standard Hardware Program
NAVELEX INST 4121.2	Suitability Status Classification Assignments for NAVELEX Components/Equipments; Procedures and Guidance for
NAVELEX INST 4130.2	NAVELEX Configuration Management Policy for the SPECOM (Special Communications) Systems and Equipments
NAVELEX INST 4130.3	NAVELEX Interface Control Drawing Policy and Procedures for the SPECOM (Special Communications) System
NAVELEX INST 4130.4	NAVELEX Installation Planning Policy and Procedures for the SPECOM (Special Communications) System
NAVELEX INST 4130.6	NAVELEX Integrated Test Program for SPECOM (Special Communications) System
NAVELEX INST 4130.6	NAVELEX System Cabling Policy and Procedures for the SPECOM (Special Communications) System
NAVELEX INST 4130.7	Configuration Management Policy During the Acquisition Phase

NAVELEX INST 4130.9	Configuration Management Policy and Procedures for Field Changes During the Operational Support Phase
NAVELEX INST 4200.6	Advance Procurement Planning
NAVELEX INST 4200.8	Acquisition Procedures for Production Hardware
NAVELEX INST 4200.10	Acquisition Engineering and Logistics Directorates Detailed Acquisition Procedures
NAVELEX INST 4225.1	Purchase Support for NAVELECSYSCOM (Naval Electronic Systems Command) Field Activities
NAVELEX INST 4350.1	Naval Security Group Contract Field Services; Guidance and Information Concerning
NAVELEX INST 4350.2	Engineering and Technical Services, Management and Control
NAVELEX INST 4400.3	Technical Support of Delivered Equipment
NAVELEX INST 4401.1	Inventory Control and Accounting for Material
NAVELEX INST 4408.2	NAVELEX Equipment Repair/Restoration Program (NAVELEX Reports Control Symbol 4408-2)
NAVELEX INST 4410.1	2Z Cognizance Material Identification
NAVELEX INST 4440.3	Inventory Management of 2Z Cognizance Equipment; Responsibilities for
NAVELEX INST 4490.3	Availability of Equipment for Training Purposes
NAVELEX INST 4700.3	Depot Level Equipment Maintenance Contracting Support; Policy and Procedures for
NAVELEX INST 4700.4	PMS (Planned Maintenance Sub-System); Support of
NAVELEX INST 4700.5	Maintenance Data Reports for NAVELEX Cognizance Equipments; Availability and Utilization of
NAVELEX INST 4700.6	Technical/Maintenance Overhaul and Repair Standards; Policy Concerning
NAVELEX INST 4700.7	Improved Maintenance Support
NAVELEX INST 4700.8	The Navy 3-M (Maintenance and Material Management) System; Policy and Responsibilities for Within the Naval Electronic Systems Command

NAVELEX INST 4700.9	Marine Air Traffic Control Unit (MATCU) Logistics Support Program; Policy and Procedures Concerning
NAVELEX INST 4700.10	Levels of Equipment Maintenance in the Naval Electronic Systems Command; Policy Governing
NAVELEX INST 4700.12	Field Maintenance Agent (FMA); Assignment and Responsibilities of
NAVELEX INST 4720.1	NAVELEX Policies and Procedures for Alteration of SPECOM (Special Communications) System Equipments
NAVELEX INST 4790.1	Policies Governing Maintenance Engineering Within the Department of Defense (NAVELEX Reports Control Symbol RCS 4790.1)
NAVELEX INST 4858.1	System Effectiveness Engineering; Operating Procedures for
NAVELEX INST 5000.2	Implementation of the Regional Concept for NAVELEX Activities
NAVELEX INST 5000.3	Project Management and Project Direction in the Naval Electronic Systems Command
NAVELEX INST 5100.4	Field Support for the Electromagnetic Radiation (EMR) Hazards Program
NAVELEX INST 5200.7	Naval Electronic Systems Command Project Status Report; Implementation of
NAVELEX INST 5200.8	NAVELEX Inspection Testing (NON-RDT&E) Program Status Report; Implementation of
NAVELEX INST 5200.11	NAVELECSYSCOM Standard Engineering/Installation Plans for Electronics Facilities Ashore
NAVELEX INST 5200.12	Annual Forecast of Field Activity Workload
NAVELEX INST 5200.13	Standardized Tasking of NAVELECSYSCOM Field Activities
NAVELEX INST 5215.1	Index of NAVELEX Instructions
NAVELEX INST 5215.5 (NAVELEX 100,000)	NAVELEX Technical Policies and Procedures Manual, Implementation of
NAVELEX INST 5230.2	Aperture Card Coding, Engineering Drawing Micro-Reproduction System (EDMS)
NAVELEX INST 5312.2	Electronic Systems Command Technical Support of Non-Electronic Equipment at Shore Installations
NAVELEX INST 5400.7	NAVELEX Organization/Key Personnel Charts

NAVELEX INST 5401.3	Naval Facilities Engineering Command Support; Responsibilities of Co-located Unit for
NAVELEX INST 5420.5	NAVELEX Configuration Control Board and Sub-Boards for Configuration Management; Establishment of
NAVELEX INST 5430.1	NAVELEX Organization Manual
NAVELEX INST 5430.2	Responsibilities, Standards and Procedures Concerning the Organization of the Naval Electronic Systems Command Headquarters and Field Activities
NAVELEX INST 5430.10	Responsibilities of Naval Security Engineering Facility in TEMPEST; Assignment of
NAVELEX INST 5430.11	Responsibilities for EMR Hazard Problems; Assignment of
NAVELEX INST 5450.2	Naval Security Engineering Facility; Mission and Functions of
NAVELEX INST 5450.4	Detachments of NAVELECSYSCOM Field Activities
NAVELEX INST 5450.6	NAVELECSYSCOMSOWESTDIV (Naval Electronic Systems Command Southwest Division); Mission and Functions of
NAVELEX INST 5450.7	Organizational Guidelines for NAVELECSYSCOM-DIVS (Naval Electronic Systems Command Divisions) and NAVELEXACTS (Naval Electronic Systems Command Activities); Promulgation of
NAVELEX INST 5450.8	NAVELECSYSCOMWASHDIV (Naval Electronics Systems Command Washington Division) Mission and Functions of
NAVELEX INST 5450.9	Assignment of tasks and distribution of documents to the Naval Shore Electronics Engineering Activities in the Pacific area; Procedures for
NAVELEX INST 5450.10	NAVELEXACT Boston; Mission and Functions of
NAVELEX INST 5450.12	NAVELEXACT New Orleans; Mission and Functions of
NAVELEX INST 5450.14	NAVELECSYSCOMIDWESTDIV; Mission and Functions of
NAVELEX INST 5450.16	NAVELEX Field Technical Authorities Responsibilities for Marine Air Traffic Control Unit (MATCU); Assignment of
NAVELEX INST 5450.18	NAVELEXACT Philadelphia; Mission and Functions of

NAVELEX INST 5450.19	NESTEF (Naval Electronic Systems Test and Evaulation Facility); Mission and Functions of
NAVELEX INST 5450.20	NAVELECSYSCOMLANTDIV (Naval Electronic Systems Command, Atlantic Division); Mission and Functions of
NAVELEX INST 5450.21	NAVELECSYSCOMSEDIV (Naval Electronic Systems Command, Southeast Division); Mission and Functions of
NAVELEX INST 5450.22	NAVELECSYSCOMWESTDIV (Naval Electronic Systems Command Western Division); Mission and Functions of
NAVELEX INST 5450.23	Electronic Equipment Installation and Checkout Support; Lead Field Activity Responsibilities
NAVELEX INST 5450.24	Test Equipment Management Organization and Relationships, Revision to
NAVELEX INST 5450.25	Naval Electronic Systems Command Responsibilities for Shore Electronics
NAVELEX INST 5510.3	Naval Electronic Systems Command Security Manual; Promulgation of
NAVELEX INST 5600.4	Naval Electronic Systems Command Technical Manual Management Program
NAVELEX INST 7000.2	Financial Management Internal Review and Appraisal Function; Performance of
NAVELEX INST 7000.3	Financial Management Procedures Under the Regional Concept for NAVELEX Field Activities
NAVELEX INST 7000.4	Cost Increases; Instructions for Flash Financial Reporting of (FLASH FIRE)
NAVELEX INST 7030.1	Acceptance of Work by NAVELECSYSCOM Field Activities from Organizations Other than NAVELEX
NAVELEX INST 7040.3	Funding Work Performed by Naval Electronic Systems Command Field Activities
NAVELEX INST 7110.2	Development of the NAVELEX OPN and O&MN Budget Estimates; Procedures for
NAVELEX INST 7110.3	Submission of Budget Analysis Information
NAVELEX INST 7300.4	NAVELEX Request for Funding Action
NAVELEX INST 7300.5	Restoration and Issue of 2Z Cognizance Items from Stock for Other than NAVELEX Maintenance and Operations Programs; Funding and Accounting for

NAVELEX INST 7302.1	NAVELECSYSCOM Field TEMPEST Survey Team Quarterly Reports of Resources Expenditures; establishment of Reporting Requirement Concerning (NAVELEX Reports Control Symbol RCS 7302-1)
NAVELEX INST 8020.1	Coordination of Electronic Transmitter Installations to Preclude Hazards to Ordnance; Procedures and Responsibility for
NAVELEX INST 9690.3	Naval Electronic Systems Command Test Equipment Calibration Program
NAVELEX INST 10500.1	Field Support of the Electronic Navigational Aids (ENA) Program
NAVELEX INST 10500.2	Field Support for On-the-Job Training H in Electronic Navigational Aids (NAVELEX RCS Symbol 3530-1)
NAVELEX INST 10550.1A	Electronics Standards and Practices; Microelectronics Policy
10550.4 NAVFAC P-417	Shore Electronic Facilities Projects; Handbook on Policies and Procedures for
NAVELEX INST 11000.1	The Base Electronic System Engineering Plan (BESEP); Policy and Procedures Concerning
NAVELEX INST 11010.2	Shore Installations and Facilities Planning and Programming, Naval Electronic Systems Command; Procedures for
NAVELEX INST 11120.2	Procurement of Standard Installation Plans
NAVELEX INST 12250.1	Field Activity Utilization of Civilian Personnel Services Obtained from Another Activity
NAVELEX INST 12306.1	Naval Electronic Systems Command Technical Representative (NAVELEXTECHREP); Assignment of
NAVELEX INST 12306.2	Contract Field Services for Naval Electronic Systems Command Equipments and Systems; Policy and Procedures for
NAVELEX INST 12510.3	Program Manager and Department Head Positions in the Planning and Program Management Departments in NAVELEX Field Activities
NAVELEX INST 05400.3	TEMPEST Inspection & Survey Program; Establishment of (U)
NAVELEX INST 05510.2	Guidelines for the Application of Compromising Emanations Control Procedures and Techniques to Automatic Data Processing (ADP) Facilities (U)

NAVELEX INST 011120.1	Shore Electronics Engineering Installation Guidance for Equipments and Systems Processing Classified Information (U)

i. NAVFAC

NAVFACINST 5401.1	Electronic Facilities and Installations; Responsibilities and Functions Within the Naval Facilities Command Applicable to the Electronic Facilities Support Division relative thereto
NAVFACINST 8020.3	Site Approvals for Electromagnetic Wave Generating Transmitting Equipment
NAVFACINST 11010.14	Program Cost Estimates for Military Construction Projects
NAVFACINST 11010.44	Shore Facilities Planning Manual
NAVFACINST P-80	Facilities Planning Factors
NAVFACINST P-357	Abstracts of Manuals - Technical and Nontechnical
NAVDOCKS DM-50	Design Manual, Comulative Index

APPENDIX B

KEY REFERENCES LISTED IN ALPHABETICAL ORDER

ACQUISITION	
Major Defense System	DOD Dir 5000.1
System in Dept. of Navy	SECNAVINST 5000.X
Weapon System (DCP Process)	SECNAVINST 5200.X
Procedures for Production Hardware	NAVELEXINST 4200.8
Detailed Procedures; ELEX 04 and 05	NAVELEXINST 4200.10
Purchase Support for EFA's	NAVELEXINST 4225.1
ADVANCED DEVELOPMENT OBJECTIVE (ADO)	
Preparation Procedures	OPNAVINST 3910.7
ADVANCED PROCUREMENT PLANNING (APP)	
NAVMAT Policy	NAVMATINST 4200.31
NAVELEX	NAVELEXINST 4200.6
COMMUNICATIONS	
System Technical Standards	MIL-STD-188
Shore Program Responsibilities	OPNAVINST 5000.36
Requirements Policy	OPNAVINST 11120.5
Installation and Funding Procedures	NAVCOMCOMINST 2300.1
Shore Criteria	NAVELEX 0101, 100 Series
Management and Technical Policy	DNCINST 5430.1
Quality Monitoring for Shore Station	CINCPAFLTINST 2300.13
CONFIGURATION MANAGEMENT	
Configuration Control-Engineering Changes	MIL-STD-480
Configuration Control-Engineering Changes	MIL-STD-481
Status Accounting Data Elements	MIL-STD-482
Practices for Systems, Equipment, Acuistions, and Computer Programs	MIL-STD-483
Acquisition Phase	NAVELEXINST 4130.7
Operational Phase	NAVELEXINST 4130.9
NAVELEX CCB and Sub-boards	NAVELEXINST 5420.5
Policy	NAVMATINST 4130.1
CONTRACTING SUPPORT	
Naval Security Group Field Services	NAVELEXINST 4350.1
Depot Equipment Maintenance	NAVELEXINST 4700.3
Electronic Equipment & Systems Policy	NAVELEXINST 12306.2
CRITERIA	
System & Equipment	NAVELEX 0101, 100 Series
System Effectiveness	NAVELEXINST 4858.1

Policy	OPNAVINST 4100.3
Policy	NAVELEXINST 4000.6
Levels of Maintenance	NAVELEXINST 4700.10
Analysis (MEA)	MIL-M-24365
Improved Support	NAVELEXINST 4700.7
Preventive Maintenance	
PMS (MRCs/MIPs)	MIL-P-28759
POMSEF	MIL-B-21741
3-M Manual	OPNAV 43P2
PMS Support	NAVELEXINST 4700.4
3M;NAVELEX Policy	NAVELEXINST 4700.8
Provisioning	MIL-STD-1375
Supply Support	
2Z Cog Material Identification	NAVELEXINST 4410.1
2Z Cog Equipment; Inventory Management	NAVELEXINST 4440.3
Inventory Control and Accounting	NAVELEXINST 4401.1
Test Equipment	
Calibration Program	NAVELEXINST 9690.3
Management Organization	NAVELEXINST 5450.24
Training	
Equipment Availability for	NAVELEX 4490.3

INDICES

NAVELEX Instructions	NAVELEXINST 5215.1
Abstracts of Manuals	NAVFACINST P-357
Design Manual	NAVDOCKS DM-50

INSTALLATION

Communication Equipment	NAVCOMCOMINST 2300.1
Electronic Procedures	NAVSECGRUINST 3520.1
Standards & Practices	NAVELEX 0101, 110
Specom	NAVELEXINST 4130.4
Plans, Standard Engineering	NAVELEXINST 5200.11
Plans, Procurement of	NAVELEXINST 11120.2
Classified Systems Equipment	NAVELEXINST C11120.1
Electronic Procedures	SECNAVINST 5000.21

MAINTAINABILITY
(See System Effectiveness)

MAINTENANCE ENGINEERING ANALYSIS (MEA) (See ILS)

Field Activity Responsibilities	NAVELEXINST 5450.16
Logistic Support	NAVELEXINST 4700.9

MEASUREMENTS

Radio Frequency Spectrum	MIL-STD-449
EMI	MIL-STD-462

MILITARY CONSTRUCTION

Logistic Support Requirement (LSR) System	OPNAVINST 4000.72
Facilities Planning Factors	NAVFAC P-80

Shore Facilities Planning Manual	NAVFACINST 11010.44
Facilities Project Manual	OPNAVINST 11010.20
MCRB	OPNAVINST 11010.5
Program Cost Estimates (PCE)	NAVFACINST 11010.14
OPERATIONAL REQUIREMENTS	
SOR & TSOR	OPNAVINST 3910.6
GOR	OPNAVINST 3910.9
ORGANIZATION	
Department of Navy	SECNAVINST 5400.13
Naval Shore Activities	OPNAV 09B3-105
NAVMAT	NAVMATINST 5460.2
NAVFAC CO-located Unit (00FAC)	NAVELEXINST 5401.3
NAVELEX Manual	NAVELEXINST 5430.1
Standards and Procedures; NAVELEXHQ	NAVELEXINST 5430.2
NAVELEX, Responsibilities for Shore Electronics	NAVELEXINST 5450.25
PLANNING AND PROGRAMMING	
Major Systems	DOD DIR 5000.1
Weapon Systems (DCP Process)	SECNAVINST 5200.X
Navy Programming Manual	OPNAV 90P-1
Navy Guide to DCA Plans	OPNAVINST 2300.37
Planning and Programming System	OPNAVINST 5000.19
Shore Installations and Facilities	NAVELEXINST 11010.2
BESEP	NAVELEXINST 11000.1
PREVENTIVE MAINTENANCE	
(See ILS)	
PROGRAM/PROJECT MANAGEMENT	
Project Management and Direction	NAVELEXINST 5000.3
Status Reports	NAVELEXINST 5200.7
Facilities Projects Handbook	NAVELEXINST 10550.41/ NAVFAC P-417
PROVISIONING	
(See ILS)	
PROPOSED TECHNICAL APPROACHES (PTA)	
PTA	OPNAVINST 3910.8
NAVMAT Guide	NAVMATINST P3910
QUALITY	
Program Requirements	MIL-Q-9858
RADIO FREQUENCY	
Allocation Matters within NAVELEX	NAVELEXINST 2400.1
RF Spectrum Characteristics; Measurement	MIL-STD-449
RED/BLACK	
Red/Black Criteria	DCAC-300-175-1(Conf)

SUITABILITY	
Equipment Classification	NAVELEXINST 4121. 2
SUPPLY SUPPORT (See ILS)	
SYSTEM EFFECTIVENESS	
Maintainability Requirements	MIL-STD-270
Maintainability Demonstration	MIL-STD-271
Definition of Terms	MIL-STD-721
Reliability Program	MIL-STD-785
Safety Program	MIL-STD-882
Human Engineering Design Criteria	MIL-STD-1472
Safety Engineering	MIL-S-38130
Human Engineering Requirements	MIL-H-46885
Department of Navy Shore Safety	OPNAVINST 5100. 4
TECHNICAL DEVELOPMENT PLAN (TDP)	
Guide for Preparation	OPNAVINST 3910. 4
Preparation Procedures	NAVMATINST 3910. 5
TECHNICAL POLICIES	
Technical Policies and Procedures Manual	NAVELEX 100, 000 (NAVELEXINST 5215. 5)
TECHNICAL SUPPORT	
Delivered Equipment	NAVELEXINST 4400. 3
Non-Electronic Equipment	NAVELEXINST 5312. 2
Technical Representative	NAVELEXINST 12306. 1
TEMPEST	
NSEF Responsibilities	NAVELEXINST 5430. 10
Program	NAVELEXINST C 5400. 3
TEST AND EVALUATION	
Test and Evaluation Policy	NAVELEXINST 3960. 1
Operating Forces Support	OPNAVINST 3960. 1
TRAINING	
Naval Training Facilities	NAVELEX 0101, 109
WORK BREAKDOWN	
Structures; Defense Material Items	MIL-STD-881