I ANEP-28

GUIDELINES FOR THE DEVELOPMENT OF OPERATIONAL STATIONS BOOK (OSB) FOR NATO NAVAL VESSELS

ANEP-28

This ANEP belongs to a series of ANEPs that were prepared by AC/141-IEG/6(SG/8) on the Influence of Human Factors on Ship Design. These ANEPs cover Human Factors/Ergonomics issues pertaining to manning, automation, maintenance, habitability, environment, work space design, etc.

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1. ANEP-28 "Guidelines for the Development of Operational Stations Book (OSB) for Nato Naval Vessels is a NATO UNCLASSIFIED publication.

2. ANEP-28 is effective on receipt.

3. It is permissible to distribute copies of this publication to contractors and suppliers and such distribution is encouraged.

I.STAI
Major-General, NOAF
Chairman

RECORD OF NATIONAL RESERVATIONS

CHAPTER	RESERVATION BY NATIONS
1	

NATION	SPECIFIC RESERVATIONS

RECORD OF CHANGES

CHANGE DATE	DATE ENTERED	EFFECTIVE DATE	BY WHOM ENTERED

PREFACE

1. The purpose of this document is to define the requirements for the Operational Stations Book (OSB) to be applied to NATO surface ships. The OSB establishes an information bridge between the ship designer and the user and provides a description of the various shipboard manned sub-systems. It furnishes details of the sub-system, together with the envisioned operational concepts, and outlines the specific operational procedures. The OSB also indicates how the sub-system is to be manned, what training is required for each operator position, and what means of communications are available. Interrelations between manned sub-systems are explained.

2. This Allied Naval Engineering Publication, ANEP-28, has been prepared by IEG/6 Sub-Group 8 On the Influence of Human Factors on Ship Design.

3. Each nation is encouraged to use this ANEP in its own design in order to provide a basis for evaluation of its designs by other countries, e.g. for the purposes of procurement decisions.

4. This ANEP is part of the ANEP Series on Human Factors/
Ergonomics In Ship Weapon System Life Cycle which includes issues related to WSLC management, personnel, planning, automation, selection and training, material design, shipboard organization and procedures. The covering document of the series, ANEP-20, HUMAN FACTORS/ERGONOMICS IN THE DEVELOPMENT AND ACQUISITION OF SHIP WEAPON SYSTEMS, describes the intention of the ANEP series and the interrelationships between the various issues, as well as providing a full list of ANEP's, together with a summary of each.

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CHAPTER 1 OPERATIONAL STATIONS BOOK (OSB)

101 SCOPE

This document sets forth the requirements for Operational Stations Books (OSB). The OSB is a reflection of the total system design and describes the integration of the actions of men, machines and software, delineating the actions of each as the designer intended. Initiated early in the design process, the OSB functions as an operational baseline reflecting either what the designer intended or the effect of his design upon operations. It affords traceability of the design, its changes and their impact. OSBs impart to the system's ultimate users the counsel of its designers as to how and in what modes the system must operate and its capabilities and limitations. They afford shipboard operational personnel the means by which managers of the system, the supervisors of the subsystems and the operators are trained.

102. CLASSIFICATION

OSBs shall be of the following types:

a. Type I Used to document preliminary design concepts and intended to:

(1) function as an operational baseline early in the design process.

(2) provide a basis for the exercise of operational systems at the Land Based Test Site (LBTS) if such is established.

(3) constitute the training basis, at LBTS or in Lead Ship, for Fleet Introduction Personnel, and nucleus or cadre crew indoctrination.

(4) provide an input to development of a Type II OSB (See 112 (b)).

(5) validate operational manning requirements.

(6) provide a planning basis for training requirements.

b. Type II A final document reflecting the as-installed design and intended to:

(1) provide a valid operational baseline for the total ship system operation.

(2) serve as the sole basis for Ship System (non-technical) Team training.

(3) validate and afford traceability of design (concept to operation) thus assuring correct total system operation as its designers intended.

(4) serve and be invoked as doctrine.

(5) be utilized by Training Officers and Petty Officers, by naval schools and underway training units for team and individual testing.

c. Outline OSB A skeleton OSB reflecting certain aspects of a design and intended to:

(1) demonstrate the operational suitability of a design by providing operational documentation, usually in association with a mock-up demonstration or review.

(2) afford demonstration of a mock-up by dynamic cycling of the mock-up through an actual operational sequence (scenario).

(3) provide operational documentation for mock-ups.

(4) provide a partial basis for input to the development of a Type I and Type II OSB (see 112 (a) and 112 (b)).

103. GENERAL

The design of new integrated ships systems, the improvement (modernization) of old systems and the development of their associated documentation demands the utmost in the application of new techniques to meet shipboard operability

requirements. Stringent manpower restrictions also dictate the use of proven work study and human factors engineering principles in the development of detail design and operational documentation. Optimization of the shipboard system in terms of human operators, equipment, and supporting software in the operational environment is the criterion. The OSB shall describe the following:

a. The operational (rather than the technical) system.

b. The man, machine, software interface.

c. Optimum system employment as developed through analytical techniques.

d. Operating and system set-up procedures for all modes of operation, including casualty conditions.

e. Rationale, including work study, to support the system design concept and the developed operational procedures.

f. Sequenced, step-by-step, operator procedures, and operator actions/interactions (see Annex A).

g. Manning requirements for various ship Conditions of Readiness, such as General Quarters, Wartime Steaming, and the manpower governing condition as established by the Ship Manpower Document (SMD), if other than General Quarters or Wartime Steaming.

h. Special skills, knowledge, or training required to operate the system.

i. Special evolutions, including their associated manning requirements.

104. SPACE APPLICABILITY

The OSB shall define and describe the operation of the shipboard system(s) for the space specified. The mission and tasks of the ship shall be used to determine the shipboard spaces and stations to be included in the OSB. Where essential, for clarity and complete understanding of a described function or evolution, functional extensions of spaces specified shall be described. For example, functional extensions of the Pilot House might include auxiliary, exposed and secondary conning stations. Spaces and stations of a type specified as follows are typical of those that may be considered for inclusion in the OSB (grouped functionally):

a. Ship Command and Control

(1) Pilot House, Chart Room, Bridge Wings, Signal Station
(2) Combat Information Center (CIC)
(3) Sonar Control Room (SCR)
(4) Weapons Control Station (WCS)
(5) Antisubmarine Classification and Analysis Center (ASCAC)
(6) Helicopter Control Station
(7) Central Computer Complex

b. Flag Command and Control

(1) Flag Bridge, Flag Plot
(2) Tactical Flag Command Center (TFCC)
(3) Tactical Support Center (TSC)
(4) Integrated Operational Intelligence Center
(5) Ship Signals Exploitation Space (SSES)

c. Air Operations

(1) Carrier Air Traffic Control Center (CATCC)
(2) Primary Flight Control (PRIFLY)
(3) Air Operations Control Center (AIROPS)
(4) Flight Deck Control Station
(5) Carrier Aircraft Maintenance Control Station

d. Amphibious Command

(1) Landing Force Command Area
(2) Supporting Arms Coordination Center (SACC)
(3) Tactical Air Coordination Center (TACC)
(4) Military Operations Area
(5) Ship-to-Shore Logistics Area
(6) Helo Direction Center (HDC)

e. Engineering and Damage Control

(1) Enclosed Engineering Operating Space (EEOS)
(2) Damage Control Center
(3) Damage Control Stations
(4) Machinery Monitoring and Control Stations

f. Ammunition and Cargo Handling

(1) Ammunition and Cargo Handling Stations
(2) Ammunition and Cargo Handling Control Stations
(3) Underway Replenishment Stations
(4) Cargo Control Center

g. Deck Operations

(1) Mooring Stations
(2) Anchoring Stations
(3) Fuelling Stations
(4) Special Evolution Stations
(5) Towing Stations

h. Communications

(1) Message Processing Center
(2) Technical Control Center
    (a) Nonsecure Technical Control
    (b) Secure Technical Control
    (c) Transmitter Rooms
    (d) Receiver Rooms
    (e) Communications Area Local Station (CALS) Operations Control Center

j. Battle Support and Administrative Spaces

(1) Battle Messing Stations
(2) Battle Dressing Stations
(3) Decontamination Spaces
(4) Galley
(5) Food Service Stations
(6) Garbage Disposal Station
(7) Paint Stowage and Preparation Area
(8) Scullery
(9) Central Office Complex

105. TECHNICAL, FUNCTIONAL AND OPERATIONAL ACCURACY

All information shall represent exactly the operational system, equipment arrangements, space configuration, and functions being described.

106. ENSURANCE OF COMPLETE AND UP-TO-DATE DATA

All information contained in an OSB shall be checked against established manning information, actual shipboard equipment lists (such as drawings, specifications, ship characteristics, and mock-ups), latest shipboard arrangement configuration, and documented information sources, immediately prior to submittal for review and approval (see 120).

107. PREPARATION

Except as otherwise specified herein, the OSB shall be prepared in conformance with the requirements specified for NATO military manuals.

108. PREPARATION TECHNIQUES

Functional and operational accuracy depend greatly upon the preparation techniques employed. Derivation of sequenced operator procedures to an acceptable level of detail involves the application of some or all of the following, or similar, techniques:

a. FUNCTIONAL ANALYSIS - is a widely employed systems engineering/work study technique; it examines the hierarchy of functions required to be accomplished

in their proper sequences. It is an examination of the total system input/output interactions in terms of their cause and effect relationships within a priority structured environment. Scenario based, it represents in terms of function, the actions required to transpire in the prosecution of an engagement or event being described. Functional analysis at its lower levels defines candidate modules for hardware and software selection.

b. FUNCTIONAL FLOW DIAGRAMS (FFD) - are an onward refinement of functional analysis. FFDs meld equipment, operators, and supporting software into functional equipment systems/modules describing the gross actions and interactions of men, equipment and software. For manual systems, the development of sequenced operator procedures can usually be generated directly from the first or second level of FFDs (called level zero and level one), when used in conjunction with equipment operating instructions/ manuals. At lower levels of development, FFDs are used for other design development purposes.

c. OPERATIONAL SEQUENCE DIAGRAMS (OSDs) - are similar to functional analysis and FFDs, in that they are scenario based. OSDs for OSB purposes are generally developed within a restrictive envelope comprising the maximum tactical or multidimensional environment. The intent is to describe the actions of men, equipment and software in an operational situation in which all systems are operating simultaneously so as to illuminate incompatible interfaces between man, equipment and software. As an example, OSDs for a Guided Missile Destroyer would be developed for the following major functions representative of its actions as a combatant:

(1) Receive and respond to orders
(2) Conduct AAW operations
(3) Conduct ASW operations
(4) Conduct SUW operations
(5) Operate tactically
(6) Control Aircraft
(7) Conduct electronic surveillance

OSDs tabulate the simultaneous and iterative actions and interactions of the operating systems. The tabular information derived from the exercise of OSDs can then be translated to individual operator procedures. OSDs may also be developed for any dynamic event, i.e. Special Sea Details, going along-side, or a system set-up procedure.

109. LEVEL OF WRITING

a. LEVEL OF WRITING: - The OSB shall be written to address three levels of personnel: the manager(s) of the system, supervisors of subsystems and individual operators. The language shall be such as to be understandable to persons having some previous experience in the operation of similar systems or equipment. The level of detail shall be such as to illuminate the action(s) and interaction(s) of an operator with his equipment and the system response to his action, i.e., the action of an operator depressing a named action entry button (or control) on his console (or equipment) and the systems software or hardware (or both) response(s) in terms of data readout (or dial change) or automatic visual display.

110. LAYOUT

The OSB layout shall provide for ease of use so that it may be directly promulgated as ship's doctrine.

111. CONTENTS

The contents shall be limited to information required by the user (operator) to understand and carry out the required functions of the shipboard operational system. Only major functional units of equipment shall be included in the OSB. The contents shall be organized in a form so that only those changes that affect the ship's functional operations will require revisions to the OSB. The avoid the requirement for minor revisions, the following shall not be included in the OSB unless required for clarity:

a. Specific military designation for equipment or system nomenclatures (use of general terms is intended).

b. Course numbers for service schools or correspondence courses.

c. Specific characteristics of the ship, systems or equipment items.

d. Listing of items, such as, equipment, systems, or armaments.

e. Equipment operating instructions contained in technical manuals.

112. PREPARATION REQUIREMENTS BY OSB TYPE

Requirements vary according to OSB type, the degree to which hardware, software and space configurations have been defined and whether the systems are automated or manual. Subsequent paragraphs specify by OSB type the preparation requirements for each, citing qualifying circumstances where indicated.

a. Type I OSB - A TYPE I OSB is generally developed during the later stages of the Concept Design or early in the Preliminary Design Phase. At this juncture, the design generally has not been finalized. In the case of the automated systems, those techniques, or similarly effective techniques, described in paragraphs 108a,108b and 108c shall be utilized. For manual systems, only paragraphs 108a and 108b shall apply, unless specified otherwise. For example, the techniques described in paragraph 108c would also be specified in the documentation of a manual system when complex equipment/systems are involved and revised or new system operating procedures are required.

b. TYPE II OSB - A TYPE II OSB is generally developed using a TYPE I or Outline OSB as a basis. Where the provisions of paragraphs 112a and 112c were invoked in the development of the TYPE I or Outline OSB, then

the TYPE II OSB constitutes a revision and update of the previously prepared documentation. If an Outline OSB is used as a partial basis for the development of the TYPE II OSB, the provisions of paragraph 112a must be complied with to the extent of those systems not developed in the Outline OSB. A TYPE II OSB may be required upon completion of an extensive overhaul not involving major system change. A TYPE II OSB may also be required specifying the provisions of paragraph 112a where previous documentation has not met its provisions. This latter case is where the final design is in an advanced stage and the provisions of the aforementioned paragraph are specified so as to validate the final design.

c. Outline OSB - An Outline OSB is generally developed in association with a mock-up. The purpose of an Outline OSB is to demonstrate the operational suitability of a particular design. Usually only certain aspects of the design are demonstrated and documented. In the case of automated systems, those techniques, or similarly effective techniques, described in paragraphs 108a, 108b and 108c shall be utilized to the extent of those systems developed. For manual systems, only paragraphs 108a and 108b shall apply, unless specified otherwise.

113. CLASSIFIED INFORMATION

Whenever possible, the OSB shall be void of classified material. Information classified higher the CONFIDENTIAL shall not be included in the OSB. Confidential material shall be kept to a minimum and, if possible, shall be assembled in an appendix or other division of the OSB, for ease of identification, removal, and separate distribution where desired.

114. REFERENCES

Where reference to other documents is required, it shall be treated as follows:

a. where a small amount of information is needed, the applicable material may be extracted and condensed.

b. a large amount of material shall be referenced fully, including the title of the publication, the publication number, and reference to volume, part, chapter, section, figure, table, and paragraph.

c. where reference is to the entire content of another document, the reference shall be only to the title of the publication and the publication identifying number.

115. TEXT DEVELOPMENT

The OSB text shall contain only essential information and shall be factual, specific, concise, and unambiguous. It shall be so clearly worded as to be readily understandable at levels specified in paragraph 109. The OSB shall be developed with particular attention to requirements of paragraphs 102 and 111.

a. Chapter 1 (General Information) - If the OSB covers several major systems, this chapter shall include general information on the overall operational concepts of the ship, to include:
(see Annex A for example)

(1) Mission and tasks (if this can be published as unclassified information).

(2) General characteristics that were developed by industrial engineering techniques in the design layout of the ship and that are not covered in subsequent chapters, such as the relationship of areas to each other.

(3) Operational concepts of the ship indicating the major functions to be performed and the interrelationship of the areas to be covered in subsequent chapters.

b. Other Chapters (describing specific physical areas) - Each chapter following Chapter 1 shall describe a specific physical area (space) in the ship. Modularized (functional) areas within a space shall be presented in separate sections of the chapter. For those spaces that are not described by use of
functional areas, all information shall be described in the chapter without sectional division. The requirements of paragraph 115b(2)(a) shall be

presented in the general articles and the requirements of paragraph 115b(2)(b) shall be presented in the other articles of such an unsectionalized chapter.

(1) Section I (general information) - Section I shall be the general sections and shall provide general information on its subject space. The articles contained in this chapter shall be numbered: X101 through X199 (X's denote the number of the appropriate chapter). As a minimum, the section shall include: (see Annex A for example)

(a) General functions within the overall space.

(b) Operation and supervision of the space, describing any variation for special evolutions or conditions, including emergencies and casualties.

(c) In general terms, the team training required for personnel manning the space.

(d)List of functional areas within the space.

(e)Diagram of the space showing areas (labelling functional areas by name).

(f)Where applicable, a matrix or an isometric diagram, or both, indicating which areas are manned under each operational condition or evolution.

(g) Operational aids required in the area, i.e. publications records and portable equipment.

(2) Other Sections (describing modular areas)

(a) General Articles - General articles shall provide general information on the modular areas by the parent section. General articles shall be numbered: XX01 (X's denote the number of the appropriate chapter and section). As a minimum the general articles shall describe the following: (see Annex A for example)

(b) Other Articles - Other articles shall describe specific operational positions. These articles shall be numbered XX10 through XX99 (X's denote the number of specific chapter and section). As a minimum these articles shall describe the following. (see Annex A for example)

(1) Name of operational position.

(2) Station and equipment manned.

(3) When manned.

(4) General training requirements for manning the position or equipment shall be indicated unless specific requirements are provided by the Government, in which case the specific requirements shall be described. Training requirements shall include:

(i) Schools or course descriptions

(ii) Reference publications for study

(iii) If applicable, qualifications in other positions or jobs. If available, qualification standards for the position shall be included in this part of the test or as an appendix, whichever is appropriate.

(5) Communication facilities required at the position for carrying out duties. Where a selection of facilities is available, the facilities may either be referenced to those listed for the module or those listed for other positions in the module.

(6) Duties and responsibilities of the operational position, including a description of the operating procedures for the position and any variations for casualty, special evolutions or conditions. For command and control spaces, at least one alternate position (method) shall be indicated for a major casualty to the equipment at the position described. The description shall be thorough enough to cover the operational concepts, preparation of the equipment (tuning and watch standing routines), reports, and information sent and received including, where applicable, transmission methods (type of system and circuit nomenclature) and terminal equipment (handset, earphones, keyset, speaker, etc.). The description shall be concise, readable, and not a repetition of information readily available through other publications or the previous training of the individual. Specific operating instructions for the equipment (covered in manuals), procedures for communicating (covered by previous training) and responsibilities of such positions as Commanding Officer or Officer of the Deck shall not be specified. Duties that are applicable to the operational concepts of the system shall be specified. The operations shall be shown in a logic flow process chart (see Specific Task Accomplishment, Annex A).

116. SYMBOLOGY

The symbology employed in the contents of the OSB shall be standardized to that used in Industrial Engineering and Design Work Study Technology Operation and Flow Process Symbols, American Society of Mechanical Engineers (ASME) Standard. It is extremely important that the OSB users have a thorough understanding of the meaning and use of the various symbols.

Symbols not only provide the design engineer a means of examining the numerous operational tasks to be performed, but once established, if properly interpreted and employed, the symbols greatly facilitate and simplify operator training and user understanding of the functions to be performed. The symbols to be employed in the OSB to denote actions shall be those that are contained in Annex A, and their use shall be governed by the system of notation outline in Annex A.

117. ORGANIZATION

The OSB shall be organized in the order shown below and shall contain as a minimum the following divisions (see Annex A for example):

a. Front matter

(1) Cover
(2) Title Page
(3) Distribution List
(4) Forward
(5) Symbology Usage
(6) List of Effective Pages
(7) Table of Contents
(8) List of Figures
(9) Introduction
(10) Glossary of Terms

b. Information Chapters

(1) Informative Sections

c. Appendices

d. User Activity Comment Sheets

118. FRONT MATTER

The OSB Front Matter shall conform to the requirements specified herein.

a. Cover and Title Page - A typical sample of an OSB cover and title page is shown below:

TYPE I (OR II OR OUTLINE)

OPERATIONAL STATIONS BOOK

FOR

(Type Ship or System Defined)

(Volume Number if Multiple Volumes)

DATE

b. Forward - A standard foreword conforming to the one in Annex A shall be included in the OSB.

c. Symbology Page - Symbology in the OSB shall conform with the requirements of paragraph 116. In order that personnel who have occasion to use the OSB have an understanding of the meaning and use of the various symbols, standard symbology usage information as contained in Annex A shall be included in the OSB.

d. List of Effective Pages - The list of effective pages shall conform to normal requirements.

e. Table of Contents - The table of contents shall list all of the divisions of the OSB, including front matter, chapters, sections, primary articles, and appendices.

f. List of Figures - The list of figures shall list all figures contained in the OSB.

g. Introduction - The OSB introduction shall answer the question, "Why does this particular OSB represent the optimum solution?" The introduction shall, as a minimum, include the following (see Annex A for example):

(1) A short explanation of the design philosophy used to develop the operational system.

(2) A brief description of the design criteria that optimized the procedures and minimized the manning requirements within the configuration.

(3) A statement indicating that the procedures were developed within the arrangement according to analytical techniques, and any changes in the arrangement might severely hamper the effectiveness and efficiency of the system.

(4) An explanation as to why this configuration with the operational procedures contained in the OSB benefits the operator. A statement shall be included to the effect that the operator was given prime consideration throughout the development of the procedures presented.

h. Glossary of Terms - A glossary of terms shall be included in the order specified in paragraph 117 and shall provide the proper name for all abbreviations used throughout the OSB.

119. APPENDICES

Where applicable, appendices shall be provided to present summations to clarify or assist ship personnel, including:

a. Internal communications including an operational station versus circuit matrix.

b. External communications and circuit functions.

c. Check-off list of evolutions such as casualty control.

d. Special tools (if a separate complete listing would be useful).

e. Separation of classified information from the remainder of the tests (see para 113).

120. USER ACTIVITY COMMENT SHEETS

User Activity Comment Sheets shall be provided for reporting deficiencies and constructive comments on the OSB. They shall be attached as the last sheets of the OSB.

121. MODIFICATION (Updating)

An OSB shall be updated to eliminate all technical, operational, or functional inaccuracies or inconsistencies:

a. Brought about by approved changes to the ship operational system design.

b. Discovered during the indoctrination period.

c. Discovered during validation or verification.

122. TYPE I OSB

The TYPE I OSB manuscript shall be updated to incorporate comments developed during review and to depict the latest available installation information.

123. TYPE II OSB

A TYPE II OSB approved manuscript shall be updated after verification, if required, or within 6 months after completion of the ship or installation.

124. OUTLINE OSB

The OUTLINE OSB manuscript shall be updated to incorporate comments developed during review and to depict the latest installation information.

125. FINAL DISTRIBUTION

Immediately following the approved manuscript updating specified in paragraph 121, the OSB shall be prepared in final form and distributed.

ANNEX A

EXAMPLE OF OSB ORGANIZATION

This annex is a typical example of how an OSB is organized and contains examples of some of the different type of material making up the front matter, chapters, sections, articles and appendices. They are intended as examples only, with the exception of the foreword and symbology usage which are specified (see paragraphs 118b and 118c). Some examples portray the requisite level of detail and quality of product required. Others represent only a brief outline or explanation of information to be included. This annex is formatted in accordance with paragraph 117 of the guideline and is annotated in the example table of contents to indicate the page number in this annex if an example is provided.

FOREWORD

The purpose of the Operational Stations Book (OSB) is to describe the operational relationships and procedures that take into account the design philosophy utilized in space allocations and arrangements in this ship. This book provides operating personnel with station manning requirements, responsibilities and operational procedures.

The basic organization and procedures for operational spaces may be based on this book. The format has been prepared in such a manner that this book may be promulgated as doctrine for the spaces included.

The book is written to be used by all personnel concerned with personnel training, planning and operation of these spaces. It is intended to be used by ships personnel for instruction, information, and ready reference for the operation of the stations contained herein.

Operational concepts rather than technical descriptions have been emphasized. This book is not intended to duplicate technical information covered by equipment manuals or similar publications. Other guidance information can be obtained by referring to the Ships Information Book, Booklet of General Plans, Shipyard Drawings, Technical Manuals, Naval Warfare Publications and Naval Warfare Information Publications.

Appendices are used to summarize such areas as the external or internal communications circuits used in operating the spaces described in this book.

User Activity Comment Sheets (affixed at the rear of this book) are provided to report any possible deficiencies in this book or in the concepts presented. It is not desired that typographical errors be reported.

Importance of Symbols

The symbols employed in task descriptions contained in this book are those used in Design Work Study technology. It is extremely important that OPERATORS, SUPERVISORS and all personnel who have occasion to use this book have a thorough understanding of the meaning and use of the various symbols. Symbols not only provide the analyst a means of examining the various tasks in the initial Design Work Study but more importantly, used and interpreted properly, greatly facilitate and simplify OPERATOR training. Symbols employed in this book are as follows:

Transport - The movement of personnel, material or the transfer of information.

Operation - An operation performed.

Inspection - An examination or test.

System of Notation:

Broken Lines connecting symbols indicates a non-mandatory sequence.

Solid Lines connecting symbols indicate a mandatory sequence.

Broken Line symbols indicate nonmandatory actions.

Solid Line symbols indicate mandatory actions.

Reversed Symbols:

Internal Transport - Receipt of information or material from external source(s) or system(s).

External Transport - Generation of information or material to external source(s) or system(s).

Double Symbols:

An action implying first inspection, and second operation. Exterior symbol denotes the principal action.

Example 1:

Adjust throttle level to ordered speed,
and transmit appropriate RPM to
EOS by sound-powered phones.

Example 2:

First primary Operation required to be
performed. (Indicated by Arabic
numerals sequentially within like
symbols.

Second primary Operation required to be
performed.

First Transport required to be
performed.

First secondary Inspection. Lettered sequentially and
indented out-of-line. Connected
to b by broken line
indicating that a and b
need not be accomplished in
order.

Second secondary Inspection.

Third Operation (nonmandatory).

Second primary Transport

OPERATIONAL STATIONS BOOK
FOR
(SHIP) CLASS SHIP

CONTENTS
(Annotated and Keyed to this annex)

Annex
Reference Page

PRELIMINARY

OPERATIONAL STATIONS BOOK

FOR

(SHIP) CLASS SHIPS

LIST OF FIGURES

NOTE: Figure numbers in this annex correspond to those in the sample (OSB). An asterisk (*) indicates a figure listed but not included as an example in this annex.

INTRODUCTION

This Type I Operational Stations Book (OSB) serves to identify and prescribe those OPERATOR actions and interactions essential to support the Command and Control (C&C) systems designed for and installed in the (Ship) Class ship. The C&C systems and the operational procedures described are a product of Design Work Study Technology.
OPERATOR actions associated with the following shipboard spaces are included in this OSB.

- Pilot House, Bridge Wings and Chart Room
- Signal Bridge
- Combat Information Center (CIC)
- Data Processing Center
- Helicopter Control Station

Many factors were considered in the generation of the design and the development of OPERATOR procedures. Design Work Study techniques were employed throughout. These techniques consider that the human OPERATOR is the the single most important variable in the system. Some of the criteria considered, and designed to, were:

- Absolute closeness or the requirement to be manipulated by an OPERATOR
- Internal communication requirements, OPERATOR TO OPERATOR, station to station, area to area, etc.
- Necessary closeness, requiring voice, visual or physical nearness for communication or observation
- Visual closeness with required placement of equipment to facilitate or allow direct eye contact with displays or information
- Personnel access, convenience and mobility factors
- Human Factors
- Operational effectivness
- Minimum manning

In addition to the above considerations, many other factors associated with effective ship system design must be analyzed and evaluated if man is to be successfully integreted into an operationally effective shipboard system. The other factors deal with those peculiar aspects of ships that limit and inhibit the design from a human engineering standpoint. These latter considerations, essentially hostile to man in his shipboard environment, must be carefully weighed against (man's) needs in the system. For the (Ship) Class, the following are representative:

- Acoustic, light and temperature critical environmental requirements
- Mounting, sway, wiring and cooling requirements
- Weight and moment considerations
- Shock, blast and safety requirements
- Future growth requirements
- Security requirements
- Minimum manning
- Preventive maintenance and repair access requirements
- Cost considerations
- Physical space limitations

The (Ship) Class design as reflected in this OSB, considers the OPERATOR and his efforts as the single most important element in the operational C&C system.

OPERATIONAL STATIONS BOOK

FOR

(SHIP) CLASS SHIP

GLOSSARY OF TERMS

Abbreviation	Proper Name
AAW	Anti-Air Warfare
AEW	Airborne Early Warning
ASAC	Antisubmarine Air Controller
ASCAC	Antisubmarine Classification & Analysis Center
ASW	Antisubmarine Warfare
ASWO	Antisubmarine Warfare Officer
BRG	Bearing
C&C	Command & Control
CIC	Combat Information Center
CIWS	Close-In Weapon System
CO	Commanding Officer
DRT	Dead Reckoning Tracer
D/T	Detector/Tracker
EOS	Engineering Operating Station
EW	Electronic Warfare
IC	Interior Communications
ICS	Integrated Combat System
ID	Identification
IFF	Identification, Friend/Foe
NED	Number Entry Dials
NTDS	Naval Tactical Data System
NWIP	Naval Warfare Information Publications
NWP	Naval Warfare Publications
OSB	Operational Stations Book
OTC	Officer in Tactical Command
PPI	Plan Position Indicator
RNG	Range
RPM	Revolutions per Minute
SAU	Surface Attack Unit
SD/T	Surface Detector/Tracker
SSW	Surface-to-Surface Warfare
SUW	Surface Warfare
WCC	Weapon Control Console

CHAPTER 1

GENERAL INFORMATION

Section I - Mission and Tasks

1101 GENERAL

1. The (Ship) Class ship is designed to operate in company with others of its class as principal escort for Mercantile and Military Convoys providing AAW, ASW, and SSW defencive and offencive capabilities. No unit commander capability is provided except to the extent of normal command communications primarily suited to that required to prosecute a coordinated ASW search and attack as a detached Search and Attack Unit (SAU). Screen commander capability is anticipated to be vested in an accompanying NTDS-equipped ship of another class.

1102 MISSION

1. The mission of the (Ship) Class ship is that of escort for Mercantile and Military Convoys.

1103 DESIGN TASKS

1. The designed tasks cover the following general areas:

a. Detection and destruction of air, surface and subsurface targets.

b. Advisory control of ASW, AEW, aircraft and helicopters.

c. Stationing speeds commensurate with the 22 knot Military Convoy.

d. ICS capability of essential simultaneous engagement of threats through ownship weapons and/or in concert with accompanying escorts.

1104 CONTINGENT TASKS

CHAPTER 1

GENERAL INFORMATION

Section II - General Characteristics

1201 GENERAL

1. The (Ship) Class ships are designed for one (single-ended) Standard Missile launching system, with HARPOON surface-to-surface alternative, under control of WCC-1, WCC-2 configuration. Likewise, under control of WCC-1 are the guns, and a local control CIWS is provided. Sonar provides underwater passive and active surveillance capability with associated torpedo attack capability.

1202 COMMAND AND CONTROL SPACES

1. Command and Control incorporates the Integrated Combat System (ICS) supported by two computers directly controlling or supporting the standard missile, HARPOON, guns and indirect control and support of CIWS, ASW Weapons/Countermeasures, Class III air control facilities and tactical communications. The ICS will perform the functions of target tracking, display, identification, designation, weapons control and advisory air control under EVALUATOR direction.

2. The Bridge, Pilot House, Bridge Wings and Chart Room are on the 02 level. Alidades on each Bridge Wing are mounted to permit bearings to be taken from right and/or left astern to slightly across the bow on either side. Additionally, a centerline alidade in the Pilot House permits ahead and limited peripheral bearings from within the Pilot House. All alidades are equipped to accommodate a removable bearing circle and telescopic attachments and are self-synchronous. Ship control indicator and IC facilities are located on each wing of the Bridge allowing for CONNING OFFICER close-in supervision during UNREP and going alongside. A HELMSMAN sit-down console is provided centerline in the Pilot House which contains throttle controls, steering control wheel, rudder angle and gyro repeater, magnetic compass, facilities for sinuous course steering and automatic pilot steering capability. The HELMSMAN's console is fully viewable from both port and

starboard alidades. A General Announcing System (Circuit 1MC) and CAPTAIN's Command Announcing System (Circuit 21MC) are installed to permit all hands announcing and selective control station intercommunications. Sound-powered phones and selector switches permit requisite command access to sound-powered IC systems during all conditions of manning. Collision, general alarm, whistle and siren facilities are available.

3. The Combat Information Center (CIC), located on the 01 level, provides Command and Control (C&C) facilities for the accomplishment of all C&C functions associated with the following:

a. The effective employment of all installed weapons systems.

b. Radar navigation.

c. Ship control and tactical manoeuvring.

d. Command access to all essential Damage Control and Emergency Communications.

e. All shipboard evolutions except "hands-on" control of engine and helm, required for close-in manoeuvring and going alongside.

Essentially the CIC is divided and arranged into the following functional areas:

a. Display and Decision Area.

b. Detection and Tracking Area.

c. Engagement and Weapons Control Area.

d. Electronic Warfare (EW) Area.

e. An associated Sonar Control Area.

3.1 (etc). (Subsequent paragraphing to amplify the above and to describe the general characteristics of each functional area.)

1203 WEAPONS

(General, unclassified if possible, characteristics of the weapons suite.)

1204 SENSORS AND COUNTERMEASURES

(General, unclassified if possible, characteristics of the sensors and countermeasures suite.)

1205 MISCELLANEOUS

(If appropriate.)

CHAPTER 1

GENERAL INFORMATION

Section III - Operational Concept

1301 GENERAL

1. The (Ship) Class is designed primarily for operation with others of its class as an escort for Military and Mercantile convoys. It is equipped to deal independently with air and high speed surface targets as well as conduct a coordinated ASW search and attack as a detached Surface Attack Unit (SAU).

2. The (Ship) Class ships will operate offensively in the presence of air, surface or subsurface threats, in company with an NTDS-equipped Screen Commander or OTC embarked in a DLGN, DDG, DD963 Class, as supporting escort with other ships of its class and provide protection for a Military or Mercantile Convoy.

3. In addition to that previously described, the (Ship) Class must perform other duties normally ascribed to destroyer-type ships. Essentially these are as follows:

a.(etc). (Listing and description of collateral tasks).

CHAPTER 2

COMBAT INFORMATION CENTER

Section I - General Information

2101 GENERAL

1. Mission - To collect, display, evaluate, and disseminate tactical and combat information received for effective employment of the (Ship) Class Integrated Combat System (ICS).

2. Purpose - To provide the organization, methods, procedures, facilities, and personnel training required to:

a. Search, detect, locate, classify, track, and identify contacts.

b. Employ the computer capabilities to display, correlate, exchange, and store contact information.

c. Utilize entered threat parameters and/or other source data to perform threat analysis and, under EVALUATOR/CO control, designate targets for engagement to the Weapon Control System.

d. Initiate firing orders to the Weapons Control System.

e. Perform radar navigation.

f. Conduct passive and active electronic/acoustic surveillance.

g. Conduct ASW operations.

3. Policy - To provide the system of data management that best meets the requirements for reliable and rapid data collection, display, evaluation, and dissemination of information consistent with full utilization of the installed ICS.

2102 OPERATION AND SUPERVISION

1. Operation - (List and explain the major functions of the space.)

a. Collect data.

b. Process data.

c. Display data.

d. Evaluate data.

e. Disseminate information.

2. Supervision - (Describe the degree and level of supervision and by whom.)

2103 TEAM TRAINING

1. Training requirements for the CIC Team are indicated in each functional area described in the following sections. OPERATOR training is part of each individual job description.

2104 FUNCTIONAL RELATIONSHIPS

1. Functional relationships - man-to-man, man-to-equipment, and equipment-to-equipment were developed utilizing Design Work Study techniques. As such, the relationships and procedures portrayed and developed in this document are optimal and should not be changed or altered without careful consideration of the impact of such a change on each of the other elements of the system.

2. Functionally, the CIC is divided into the following major areas:

a. Display and Decision Area

b. Detection and Tracking Area

c. Engagement and Weapons Control Area

d. Electronic Warfare Area

e. Sonar Control Area

2.1 (etc). (Amplify the functional relationships for the areas listed above.)

2105 OPERATIONAL AIDS

1. Publications - (List)

2. Records and Reports - The following records and reports are maintained by CIC:

a. Records - (List)

b. Reports - (List)

2106 SPACE ARRANGEMENT

1. Figure 2-1 shows the (Ship) Class ship CIC space arrangement.

2107 MANNING

1. Figures 2-2 and 2-3 show CONDITION I and CONDITION III manning, respectively. Figure 2-4 is a matrix of the manning required in CIC for different conditions with the article indicated that describes the position, duties and functions.

2108 EMERGENCY AND CASUALTY PROCEDURES

(As appropriate.)

2109 NOT USED

(May be utilized to describe special features, communications or evolutions.)

(OSB) Figure 2-1.
Combat Information Center Plan View

(OSB) Figure 2-2.
Combat Information Center CONDITION I Stations

(OSB) Figure 2-3
Combat Information Center CONDITION III Stations

(OSB) Figure 2-4
CIC Manning Requirements Matrix

CHAPTER 2

COMBAT INFORMATION CENTER

Section II - Display and Decision Area

2201 GENERAL

1. Mission - To display contact data, surface intellgence information, subsurface data, and EW intercept information pertaining to friendly, hostile, and unknown tracks; to display environmental data, as required, to support command evaluation and decisions and, through the use of automatic data processing, support effective weapon employment for the (Ship) Class and units in company.

2. Purpose - To provide an area within the CIC complex that contains manual and automated tactical display equipment and communication facilities to support threat evaluation and weapon assignment functions.

3. Policy - To display all tactical, status, and environmental data and to provide facilities in support of force, unit, and ownship AAW, ASW, and SUW operations.

2202 OPERATION AND SUPERVISION

1. Operation - The Display and Decision Area is used to display all collected and processed data on the real-time tactical displays, vertical plots, and status boards. Once displayed, this data is readily available to the personnel concerned in the evaluation and decision process. When this process is completed, the resulting information or decision is disseminated to everyone concerned, both internally and externally of own ship for proper control of the tactical and combat situation.

2. Supervision - The Display and Decision Area is under the supervision of the EVALUATOR/CO during CONDITION I and the CIC WATCH OFFICER during CONDITION III.

2203 TEAM TRAINING

1. The objective of team training for the CIC team is to provide effective control of the ship's combatant system to accomplish independent, group, or force mission and tasks.

2. Team training will be required for the General Quarters team and also for each CONDITION III team. Due to the short reaction time required to counter certain types of threats, there will not always be time to go to General Quarters before attack.

3. Training should reflect combat situations in which the threat is similar to that encountered when accomplishing a mission or task as opposed to ASW or AAW team training. It is vital that the decision-makers train with the team, because the team must look to them for leadership.

4. Shore-based simulator or ownship facilities can be used to provide training.

2204 FUNCTIONAL RELATIONSHIPS

1. General - The Display and Decision Area is the heart of the command and control system. From this area, the COMMANDING OFFICER and the EVALUATOR monitor and control missile, gun, and torpedo engagements. The EVALUATOR assists the COMMANDING OFFICER in preforming designated ICS control functions. The EVALUATOR can be the EXECUTIVE OFFICER or a DEPARTMENT HEAD or an OFFICER with similar experience. The UNIT COMMANDER, when embarked, also monitors and controls the activities of ships of the unit from this area.

2. Functional Facilities (Describe functional facilities)

2205 OPERATIONAL AIDS

2206 SPACE ARRANGEMENT

2207 MANNING

2208 CASUALTY/EMERGENCY PROCEDURES

2209 NOT USED

(There is no article number 2209. This article may be used to describe special evolutions, procedures, etc.)

(Remaining articles listed in the example table of contents are not included as they are unnecessary for purposes of the example.)
(The following example is provided for the purpose of illustration of an article describing specific operational purposes as described in 115b.(2)(b) of this guideline.)

NOTE: Principal operating position always described first as X110, X210, X310, etc; subsequent positions as X111, X211, X311, etc.

24XX ASW AIR CONTROLLER (ASAC)

1. Station - This position is manned in the Engagement and Weapon Control Area of CIC.

2. Manning -

a. CONDITION I

b. As required for special evolutions

3. Training -

a. Qualified in:

(1) Helicopter air control
(2) ASW/CIC procedures
(3) Helicopter ASW procedures
(4) NTDS console operation
(5) Operation of AIMS/IFF
(6) Operation and capabilities of ownship and aircraft radar

b. Successful completion of courses in:

(1) Helicopter air control
(2) NTDS console capabilities

c. Working knowledge of:

(1) Capabilities and limitations of enemy submarines and surface craft
(2) Technical manuals on:

(a) NTDS-type equipment
(b) Installed radar
(c) Ship's helicopters
(d) Sonobuoys

4. Communications -

Facilities at the ASAC position consist of:
(1) Ten voice radio channels

(2) Sound-powered telephone by selector positions:

SP2	1JG	Helicopter Control
SP3	22JS	Air Search Radar
SP4	2JS	NTDS Coordinating

(3) Interphone circuit CK

5. Duties and Responsiblities -

a. The ASAC is responsible for the control and direction of ASW helicopters in the performance of their assigned mission.

b. The ASAC shall track and ID all helos and provide positional information to the DRT PLOTTER.

c. The ASAC shall vector helos for initial and subsequent sonobuoy drops. He shall provide sonobuoy position information to the DRT PLOTTER.

d. The ASAC shall monitor the sonobuoy pattern as to position and age and shall update sonobuoy positions, as required. He shall recommend replacement of sonobuoys to the ASWO.

e. The ASAC shall enter contact reports into the data system. In conjunction with ASWO and DRT PLOTTER, he shall localize DATUM and shall specify DATUM TIME.

f. The ASAC shall maintain continuous voice communications with assigned helos.

g. The ASAC shall track and report any detected target not held by D/Ts.

h. ASW AIR CONTROLLER Specific Task Accomplishment.

Receive order from EVALUATOR to take control of helo.

Search PPI for helo on launch.

Establish communications with helo by:

Voice radio.

Check for patrol station being entered.

If patrol station not entered, enter same by:

BALL TAB patrol station position.

HOOK.

Depress REF POINT.

Observe PPI for reference point symbol.

Vector ASW helo to patrol station.

Determine if ASW helo parameters in system.

Enter ASW helo parameters (number and type sonobuoy, number and type weapon) by keyset if required.

If ASW helo to drop sonobuoys, enter preplan sonobuoy pattern by:

BALL TAB sonobuoy position.

HOOK

Depress REF POINT.

Repeat through until pattern entered.

Vector ASW helo to sonobuoy drop position, informing helo of recommended depth setting.

Direct helo to drop sonobuoy.

Receive channel number and depth of sonobuoy.

Enter sonobuoy position by:

BALL TAB ASW helo.

HOOK

Depress SONOBUOY

Enter buoy number in Number Entry Dials (NEDs).

Depress FUNCTION CODE.

Enter channel number in NEDs.

Depress FUNCTION CODE.

Enter depth in NEDs.

Depress FUNCTION CODE.

Enter time in NEDs.

Depress FUNCTION CODE

Verbally inform DRT PLOTTER of buoy number and position.

Repeat through until desired sonobuoy pattern laid.

If required, vector ASW helo through monitor pattern for sonobuoy positions.

If ASW helo to use dipping sonar, vector to dip point.

ASW helo reports dipping.

Repeat and until ASW helo completes dipping operations.

Receive contact report by:

Interphone from SONAR SUPERVISOR.

Enter BRG/RNG and CHANNEL NUMBER by keyset or if sonar contact by:

HOOK ASW helo.

BALL TAB contact position.

Depress SUB SURF.

Notify DRT by interphone.

Observe display on PPI.

Determine if any other reports.

Enter other contact reports.

Receive direction from ASWO to perform datum search.

Determine if there is a fix by observing PPI for crossed bearing or range (from dipping sonar report) lines.

Vector ASW helo to position for additional sonobuoy drops to localize target.

Receive direction from ASWO to drop localizing (active) sonobuoy(s).

Direct ASW helo to drop localizing (active) sonobuoy(s).

Send sonobuoy position(s) to DRT PLOTTER.

Contact held? If no, repeat and .

Enter new DRG/RNG

Fix good enough for attack? If no,

repeat through

Inform ASWO of fix.

Receive directions for attack from ASWO.

Vector ASW helo for weapon drop.

Direct ASW helo to drop weapon.

Mark weapon drop by:

BALL TAB ASW helo.

HOOK.

Depress WEAPON ENTRY PT.

Notify DRT PLOTTER

Observe PPI for correct display.

Inform ASWO and EVALUATOR of weapon in water.

Contact destroyed? If no, repeat through

Resume PPI search. Recommence with

Determine time to recall ASW helo by means of:

Flight plan.

Sonobuoys and weapons expended.

Information from ASW helo.

Vector ASW helo to home.

Inform EVALUATOR and FLIGHT CONTROL OFFICER of ASW helo return.

Director ASW helo to shift radio channel for handover to FLIGHT CONTROL OFFICER.

Give control of ASW helo to FLIGHT CONTROL OFFICER.

Await next helo operation. Monitor PPI for contacts not held by SD/T or other D/T.

The following examples are normally included as an appendix to the OSB.

COMMAND AND CONTROL COMMUNICATIONS

* Listed but not included as an example.

(OSB) Figure A-1
Command and Control Interior Communications Matrix
(Amplified Voice and Recording Systems)