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22 November 1977
SUPERSEDING
MIL-STD-1399A(NAVY)
20 December 1972

MILITARY STANDARD

INTERFACE STANDARD FOR SHIPBOARD SYSTEMS

FSC 1990

DEPARTMENT OF THE NAVY

WASHINGTON, DC 20362

Interface Standard for Shipboard Systems,
DOD-STD-1399B(NAVY)

1. This Military Standard is approved for use by all interested Commands of the Department of the Navy in the development planning, design, and procurement specifications for new ship acquisitions, ship modernizations or conversions, and equipment for installation therein and into active fleet ships where applicable, and is available for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Ship Engineering Center, SEC 6124, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FOREWORD

Purpose. The purpose of this standard and the supporting sections is to define the standard interface characteristics and constraints applicable to the design of ships and of shipboard equipment to ensure interface compatibility within the shipboard environment.

Background. The need for interface standards for shipboard systems has become apparent as ships and their equipment have grown more complex and as the number of activities (SYSCOMS, Project managers, contractors, etc.) involved in ship and equipment design has proliferated. This standard has been developed to meet this need.

General considerations. Interfaces, when considered from a system viewpoint, present the design engineer with complex and intricate problems. Solution of these problems requires the determination of the spectrum of shipboard interface characteristics and the design constraints imposed on equipment which may be affected by these interfaces. This standard specifies technical requirements and engineering guidance regarding the various shipboard interfaces.

Concept. This standard will be developed in depth over a period of time through the medium of supporting sections to cover the spectrum of shipboard interfaces. Such sections will be issued as they are prepared. Each section will be self-sufficient in technical coverage. They must be applied, however, with consideration of the policies and procedures expressed in the basic document to be implemented effectively. During this developmental phase, adherence to the policies and procedures set forth herein (see section 4 "Requirements" and 6 "Deviations") is necessary so that problems concerning interface areas not yet addressed by individual supporting sections are recognized and resolved in a timely manner. This standard establishes the procedures which will initiate the necessary early dialogue among the various activities involved and lead to resolution of conflicts and problems early in the design phase.

Benefits. This standard, with supporting sections, will be a significant factor in the realization of the following:

(a) Identify the characteristics of the shipboard equipment environment.
(b) Specify constraints on equipment design imposed by the shipboard environment at the interface.
(c) Relate interface considerations to applicable Ship Work Breakdown Structure (SWBS) primary elements as defined in publication, NAVSEA 0900-LP-039-9010.
(d) Encourage early dialogue among personnel concerned.
(e) Achieve more effective ship configuration management.
(f) Improve cost-effectiveness of ship design and other engineering processes by promoting interface compatibility.
(g) Achieve interface compatibility of installed equipment and thereby improve efficiencies of operational and supporting ship systems.

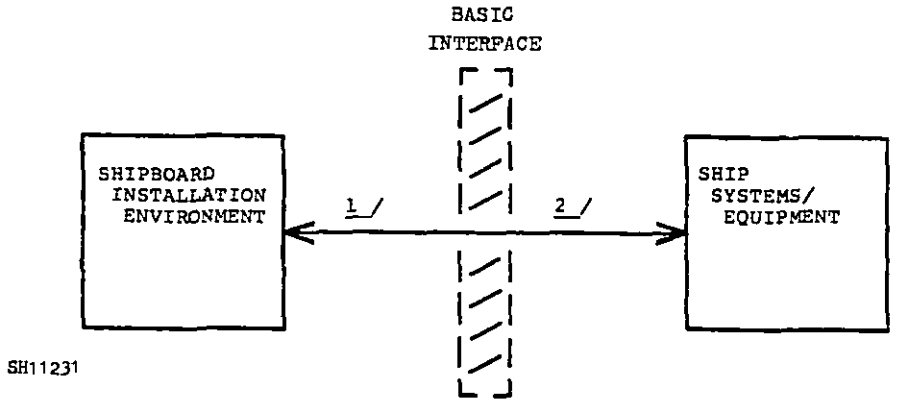
CONTENTS

1. GENERAL, SCOPE, INTERFACE, AND APPLICABILITY

1.1 General. This standard consists of a general basic document (DOD-STD-1399) and supporting sections. Each section addresses a specific interface area. When an individual interface area is under consideration, the section which addresses that particular interface and DOD-STD-1399 shall be viewed as an integral single document.

1.2 Scope. This standard establishes interface requirements for shipboard equipment to ensure compatibility between such equipment and the shipboard environment in which they will be installed.

1.3 Basic interface. The basic interface, its characteristics and constraints are shown on figure 1. This symbolical presentation is detailed in each of the supporting sections as it applies.



1/ CHARACTERISTICS
Engineering features of the shipboard environment (See 3.2)

2/ CONSTRAINTS
Equipment design controls (See 3.3)

FIGURE 1. INTERFACE.

1.4 Tailoring. The criteria established in individual supporting sections apply to all Naval ships where that particular interface is of concern. Circumstances may arise where the incorporation of requirements and constraints is considered impractical, or the expected shipboard environment will be less stringent than the postulated "worst case". In such a situation, it may be desirable to tailor the section requirements to be cost-effective. Such tailoring shall not be done unilaterally. In any such case, the procedures established in section 6 "Deviations" of this standard shall be followed.

2. REFERENCED DOCEMENTS

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

PUBLICATION

MILITARY
NAVSEA 0900-LP-039-9010 - Ship Work Breakdown Structure.

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. DEFINITIONS

3.1 Interface. An interface is a ship system component boundary through which flows functional information, or a physical action occurs, or a relation exists which causes such ships, systems, or system components to be unilaterally dependent or mutally responsive.

3.1.1 Environmental interface. An environmental interface is a boundary between the environment and a ship system component where the interface relationship is essentially physical and which causes such ship system component to be dependent or responsive to the environment. It is primarily concerned with the surroundings onboard ship in which the installed equipment must function and operate.

3.1.2 Functional interface. A functional interface is a boundary between ship system components through which flows functional information which causes such components to be dependent or responsive in operation. It is primarily concerned with the effective transmission of information and control signals through the interface boundary.

3.2 Characteristics. Characteristics are those engineering features of the shipboard environment that are measurable at an interface (see 5.1). Interface characteristics are firmly established and are not subject to change except by use of the deviation procedure (see 6.2).

3.3 Constraints. Constraints are specified controls or limits placed on the design of equipment to ensure operational compatibility of such equipment with the characteristics at the shipboard interface. Internal design features of equipment which do not interface with the environment and which are not influenced by that environment are not included.

3.4 Equipment. Equipment, for the purpose of this standard, are hardware entities which can encompass an integral system grouping of associated and related units and components, or may only relate to a single "black box".

4. REQUIREMENTS

4.1 Application. This standard applies to all activities involved in ship and equipment design, production, and installation and requires that interfaces be given priority consideration by such activities. This standard shall be adhered to by SYSCOMs, Project managers, contractors, and all others engaged in any aspect of ship design including equipment design, production and installation.

4.1.1 Invoking this standard. It is mandatory that Principal Development Activities (PDA) invoke this standard in Development Proposals, Ship Project Directives, Ship Design Manuals, and procurement specifications for equipment destined for shipboard installation.

4.1.2 Consideration of the interface. Interface requirements shall be carefully considered by all Naval activities and contractors involved in ship contruction/modernization/conversion throughout the entire ship life cycle.

4.1.3 Figure 2 is a graphical presentation of the various applications of this standard, depending on the nature of the particular interface involved and the circumstances existing at the time.

4.2 Interface areas not covered. Interested activities, in consonance with the objectives of this standard, shall establish a dialogue in a timely manner which will bring into focus and resolve any interface problems which may require attention in areas not yet covered by this standard (see 6.1).

5. INTERFACE SECTIONS

5.1 Interface groupings. Interfaces covered by this standard fall into two broad groupings: environmental interfaces and functional interfaces. Within these two groupings, interfaces are broken down into general areas and specific sub-areas which comprise the subject material for the individual supporting sections of this standard.

5.2 Environmental interface group.

5.2.1 Support services. Support services include interface inputs required by equipment to allow such equipment to meet specified requirements. Examples are electric service for primary power, compressed gases, water, and waste disposal.

5.2.2 Controlled design characteristics. Controlled design characteristics are interfaces that are responsive to or dependent on ship design. Examples are inside temperature and humidity, size and weight allowances, space allotments, vibration, and handling devices.

5.2.3 Uncontrolled environmental characteristics. Uncontrolled environmental characteristics are interfaces that are independent of ship design. Examples are wind, icing, weather temperature and humidity, and sea state.

5.2.4 Operational characteristics. Operational characteristics are interfaces that are generally unpredictable in occurrence or magnitude. Examples are shock, blast, and electromagnetic radiation.

5.3 Functional interface group.

5.3.1 Electronic information characteristics. Electronic information characteristics are monitor and sensing signals of a functional nature. Examples are signals associated with search radar, sonar, and communications.

5.3.2 Weapons control characteristics. Weapons control characteristics are monitor, sensing and control signals of a functional nature associated with weapons systems. Examples are signals associated with missile guidance, tracking, and gun orders.

5.3.3 Electrical information characteristics. Electrical information characteristics are electrical monitor, sensing and control signals of a functional nature at direct current and power frequencies. Examples are signals associated with synchro, servo, and scalar devices.

5.3.4 Mechanical information characteristics. Mechanical information characteristics are mechanical transmissions or signals of a functional nature. Examples are transmissions or signals associated with shaft position or rotation, linear linkage, and fluid control or sensing devices.

5.4 Supporting section scope. Individual supporting sections of this standard cover discrete, finite, and manageable interfaces which identify the characteristics and constraints associated with that particular interface. Interface areas of potential interest are identified in table I. Since coverage of each section is restricted to interface requirements, and the overall policies are not repeated in the individual section, each section and the basic document must be viewed as a single integral document. Internal design features of equipment which are independent of, and not influenced by, the interface characteristics are not included in the sections. Where applicable, individual sections may provide for the acquisition of pertinent interface data through the preparation of a Contract Data Requirements List - DD Form 1423 attached to a procurement contract or purchase order.

TABLE I. Shipboard interface section coverages.

Environmental	Functional
Support services	Electronic information (signals)
Compressed gases	Audio
Cooling water for electronics	CW
Dry air for electronics	Digital
Electric power	Interface function parameters
Fresh water	Teletype
Hydraulics	Video
Salt water	Etc.
Steam	
Waste disposal	
Etc.	
Controlled factors	Weapons control (signals)
Air conditioning	Acquisition
Cables and connectors	Interface function parameters
Heating	Missile guidance
Maintenance access	Tracking
Shape	Weapon orders
Size	Weapon selection
Ventilation	Etc.
Weapons handling	
Weight	
Etc.	

TABLE I. Shipboard interface section coverages. - Continued

Environmental	Functional
Uncontrolled environment	Electrical information (signals)
Humidity Icing Ship motion/attitude Temperature Wave impact Wind Etc.	Alarm Scalar Servo Status indication Synchro Etc.
Operational factors	Mechanical information (signals)
Blast Electromagnetic fields Magnetic fields Noise (acoustic) Shock Vibration Etc.	Counters Cut-out cams Limit switches Position indication Stops Etc.

5.5 Relationship to the Ship Work Breakdown Structure (SWBS). The SWBS has been promulgated as publication NAVSEA 0900-LP-039-9010 to provide a common denominator for the diverse areas of endeavor associated with shipbuilding and establish a single language to span the entire ship life cycle. The SWBS consists of a structured 3 - digit numeric system. Sections of DOD-STD-1399 will, in the future, be identified by the 3 - digit SWBS number corresponding with the primary element influenced by the interface under consideration. In case of subject duplication, to distinguish between sections related to the same primary SWBS element, they will be identified as SECTION XXX-PART 1, 2, etc. Where a section covers several SWBS elements such sections will be numbered at the sub group or group level. The application of this numbering system to sections of DOD-STD-1399 will not be applied retroactively, (i.e.) sections previously issued will have their numbers changed to comply with the SWBS only when they are revised and reissued.

6. DEVIATIONS

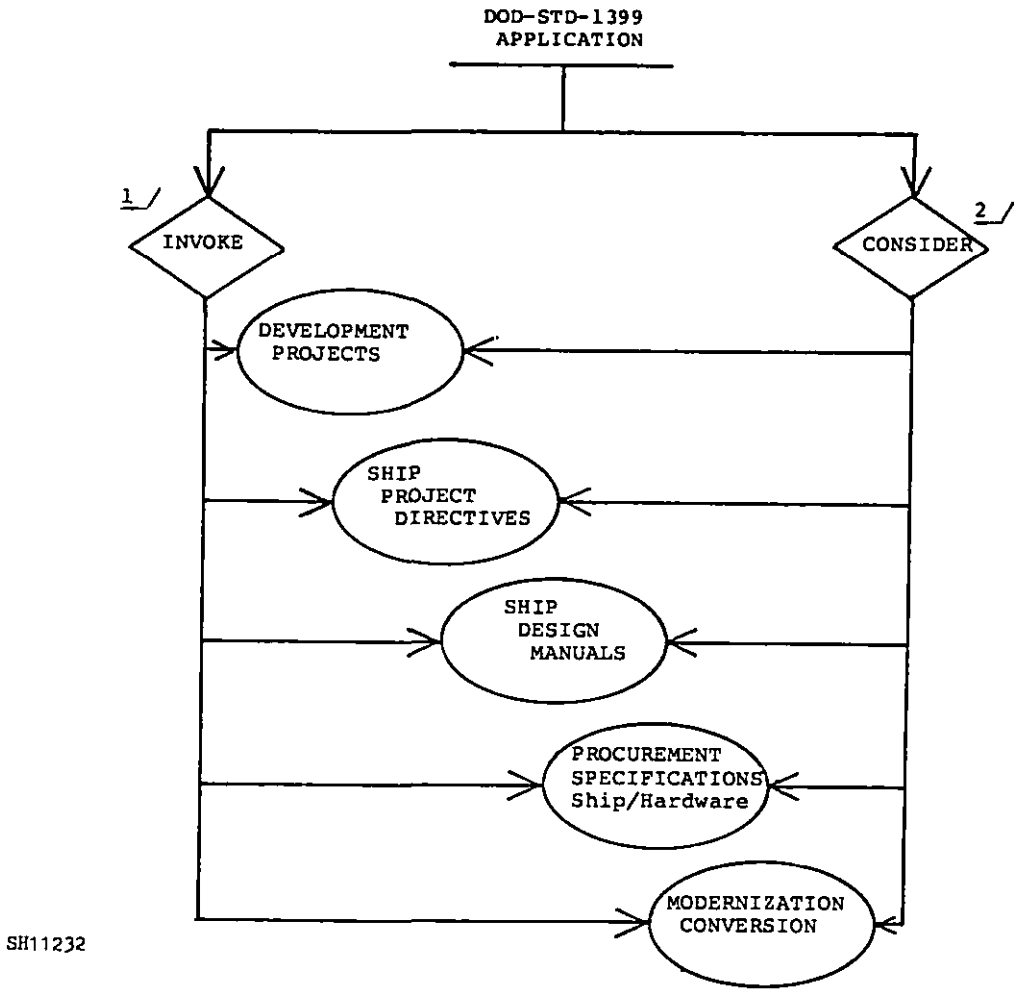
6.1 Conditions. In achieving the purpose of this standard it is recognized that some flexibility of application is required. During the early design stage of shipboard equipment, it may become apparent that significant advantages in the overall design or operation of such equipment can be achieved by deviating from one or more of the interface requirements. In such instance, a cost-benefit analysis of the proposed deviation shall be performed. When the analysis leads to a conclusion that a more cost-effective ship design will result from adoption of such deviation, the PDA shall forward the analysis with a report to the Naval Sea Systems Command (NAVSEA) justifying the deviation. The report shall specifically weigh the benefits of adoption of the deviation against the negative effects such as increases in supporting subsystem weight, space, current and life cycle costs, or compromise in reliability, with conclusions based on system effectiveness.

6.2 Deviation procedure. When requesting a deviation in accordance with 6.1, each section must be considered individually, and such request shall be submitted as directed in the particular section. Should contractual actions be involved, the procedural requirements of the applicable contract shall be adhered to.

Review activities:
AS, OS, EC

User activity:
YD

Preparing activity:
Navy - SH
(Project 1990-N011)



1/ INVOKE - by the PDA, always, when applicable.

2/ CONSIDER - by all Naval activities and contractors throughout the entire ship life cycle.

FIGURE 2. Application of DOD-STD-1399 to the ship acquisition process.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

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

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE.

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)