

ATTACHMENT I

**STATEMENT OF WORK
FOR THE**

**Surface Ship Undersea Warfare Systems Development, Integration and
Production**

DEPARTMENT OF THE NAVY

**PROGRAM EXECUTIVE OFFICE,
INTEGRATED WARFARE SYSTEMS (PEO IWS5)
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STATEMENT OF WORK FOR THE

Surface Ship Undersea Warfare Systems Development, Integration and Production

1 NATURE AND SCOPE OF THE ACQUISITION

1.1 Description of the Effort

The Program Executive Office for Integrated Warfare Systems, Undersea Systems Program Office (PEO IWS5) executes the acquisition and total life cycle system support responsibility for the Navy's Surface Ship Undersea Warfare (USW) programs. The program consists of the AN/SQQ-89(V) and supporting efforts on the Littoral Combat Ship (LCS) class ASW systems, and USW support systems for CVNs and Amphibious class ships. Each USW system combines improved sensors, support systems, and weapon control systems with advanced acoustic data processing and displays. The systems are specifically designed to support multiple ship class requirements by leveraging technology and common components to meet operational requirements for each ship class. Individual systems integrate the specific AN/SQQ-89(V) combat system with Light Airborne Multi-Purpose System (LAMPS) Shipboard Electronics, weapon control and launch systems, and other sensors.

The AN/SQQ-89(V) Surface USW Combat Systems consist of a complex set of personnel, equipment, and computer programs that provide U.S. Navy Destroyers, Cruisers, and other surface ships with the capability to effectively meet their offensive and defensive USW mission requirements within a multi-mission operational context. The AN/SQQ-89(V) is an element of the Aegis Combat System on forward fit DDGs, back fit DDGs, and back fit CG platforms. The system is fully interoperable with the parent combat system. For the AN/SQQ-89(V) system, the parent system will be Aegis Baseline 5.3.8, 6.3, 7.1, 7.1.2, 7.1.3, 7.1R, 9A.0, 9B.0, 9C.0, or other future Aegis baselines. These baselines will support Aegis Modernization (AMOD). The AN/SQQ-89(V) Systems provide the capability for the Aegis Destroyer and Cruiser to support battlespace dominance through effective conduct of USW operations in open ocean and littoral environments. It supports implementation of command doctrine for end-to-end execution of assigned USW missions. This includes the ability to plan, conduct, and evaluate underwater searches; to detect, classify, localize, and track contacts; and to engage or evade submarines, small objects, and torpedo threats as part of multiple platform or individual ship operations. Various combinations of the AN/SQQ-89(V) and supporting subsystems are installed onboard CG-47 and DDG-51 class ships.

1.1.1 The Collaborative Development Environment

The Contractor will provide for the System Enhancements being developed by IWS 5 to be integrated as part of the Surface Acoustic Systems program in the form of integrating Advanced Capability Builds. It is essential that the Contractor demonstrate an ability to work in a collaborative environment with a consortium of Navy, Navy Laboratories, Academia and other industry partners to ensure continued success of the program. The Contractor shall identify their approach to be used to support the "Open Source Initiative" to allow for the efficient integration of

improvements with the Surface Acoustic Systems. The Contractor shall leverage past experience involved in similar efforts and indicate the approach that will be used in delivering this effort including, liaison with Third-Party Developers.

1.1.2 Open Systems Architecture Approach

The Government intends to procure system(s) having an Open System Architecture and corresponding components. As part of this contract, the Contractor shall define, document and follow an open systems approach for using modular design, standards-based interfaces and widely-supported consensus-based standards. The Contractor shall demonstrate compliance with open systems architecture during all design reviews.

As part of an open system architecture approach, the Contractor shall identify to the Government all Commercial-Off-The-Shelf/Non-Developmental Item (COTS/NDI) components, their functionality and proposed use in the system, and provide copies of license agreements related to the use of these components for Government approval prior to use.

1.2 Scope

This Statement of Work (SOW) defines the efforts required for the production manufacturing, systems engineering, software development, program management, logistics and supportability engineering, configuration management, hardware and software integration (including material procurement or fabrication, and integration of GFM, as applicable), test, evaluation, and installation support of Surface Ship USW systems, including the AN/SQQ-89(V) system with provisions included to support other Surface USW systems and components. This SOW addresses the following major task areas:

- a) Program Management
- b) Engineering
- c) Test and Evaluation
- d) Integrated Logistics Support (ILS)
- e) Configuration Management (CM)
- f) Training
- g) Installation, Checkout and Field Support

The work shall be performed as specified in the Contract Schedule and/or as identified in individual Technical Instructions.

The Foreign Military Sales (FMS) system shall be a variant of the AN/SQQ-89(V) integrated system approved for release. When the unique functional, physical, and interface requirements of the FMS system are defined, the Non recurring Engineering (NRE) efforts required will be accomplished by the Contractor under separate tasking and funding. This SOW defines the minimum efforts required for the design, hardware and software integration (including material procurement, fabrication and integration of Government Furnished Property (GFP), as applicable), test, evaluation, production and installation preparation, and delivery of the Surface Ship USW systems which will meet the requirements specified in the AN/SQQ-89(V) Functional Performance Specification.

The AN/SQQ-89(V) baseline will be upgraded with the latest market based Commercial Off-The-Shelf (COTS) hardware every two years with supporting system software upgraded with new

capabilities every 2 years. As part of the Advanced Capability Build (ACB) /Technology Insertion (TI) process, the extent of hardware and software upgrades and technical refresh applied to the baseline is based on cost trade analyses, resolution of Fleet generated issues, and the approved budget. The program supports delivery of the AN/SQQ-89(V) configuration as the initial system baseline as part of Aegis backfit, forward fit, and modernization programs. These programs, once installed, will be supported through the ACB process and will receive Technology Insertion hardware to resolve obsolescence and incorporate future capabilities. The program is in a post delivery, technology refresh and sustainability life cycle phase to continue to standardize the system across each ship variant.

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2 APPLICABLE DOCUMENTS

The following documents, specifications, standards, and handbooks form a part of this SOW and are for use by the Contractor as general guidance. The documents include the basic references for the performance of this SOW. The list is not intended to be all inclusive. In the event of a conflict between the documents referenced herein and the contents of this SOW, the contents of this SOW shall be considered a superseding requirement.

2.1 Government Documents

2.2.2 Government Specifications

OPNAVINST C5510.93D1	Government Implementation of National Policy on Control of Compromising Emanations
OPNAVINST S5513.3C-88.1	AN/SQQ-89(V) Security Guidelines, 18 December 1995 AN/SQQ-89A(V)15 Surface Undersea Warfare Combat System Functional Performance Specification (Classified Document)
IWS5B-94-CMP-009R3	IWS5B Surface Ship USW Combat Systems Configuration Management Plan, 12 March 2004 AN/SQQ-89 Product Environmental Test and Quality Assurance Requirements, Draft, 3 March 2011
NAVEDTREA 131	Personnel Performance Profile Based Curriculum Development Manual Vol I Developers Guide, July 1997 Product Definition Document (PDD) Engineering Release No. 4 (ER4) for the AN/SQQ-89A(V)15 ACB-11 with Aegis Weapons Systems 9A.0 and 9B.0 (ACB-12) Interfaces, dated 24 August 2010 (DRAFT) Naval Open Architecture Contract Guidebook for Program Managers, Version 2.0, 20 June 2010 (available at http://acc.dau.mil/NOAGuidebook) AN/SQQ-89(V) Operational Requirements Document (Classified Document)
140-2	Federal Information Processing Standards (FIPS) Security Requirements for Cryptographic Modules, May 2001

2.2.2 Military Standards

MIL-D-23140D	Military Specification: Drawings, Installation Control, For Electronic Equipment (30 April 1992)
MIL-HDBK-61A	Configuration Management Guidance (7 February 2001)
MIL-HDBK-217F	Reliability Prediction Of Electronic Equipment (28 February 1995)
MIL-HDBK-251	Reliability/Design Thermal Applications (19 January 1978)
MIL-HDBK-470	Designing and Developing Maintainable Products and Systems (29 June 2007)
MIL-HDBK-502	Acquisition Logistics Handbook (20 Jan 2005)
MIL-HDBK-881A	Work Breakdown Structures For Defense Materiel Items (30 July 2005)
MIL-HDBK-1785	System Security Engineering Program Management Requirements (1 August 1995)
MIL-P-24534A	Planned Maintenance System; Development Of Maintenance Requirement Cards, Maintenance Index Pages, And Associated Documentation (21 March 1991)
MIL-STD-901D	Requirements for Shock Tests High Impact Shipboard Machinery, Equipment, and Systems (17 March 1989)
MIL-STD-461F	Requirements for Control of Electromagnetic Interference Characteristics of Subsystems and Equipment (10 December 2007)
MIL-STD-882D	System Safety Program Requirements/Standard Practice for System Safety (10 February 2000)
MIL-STD-1472F Ch1	Human Engineering (5 December 2003)
MIL-STD-3018	Parts Management (15 October 2007)

2.2.2 Department of Defense (DoD) Regulations, Directives and Instructions

DoDD 5220.22	National Industrial Security Program (NISPOM) (18 March 2011)
DoDD 8500.1	Information Assurance (24 October, 2001)
DoDI 8500.2	Information Assurance Implementation (6 February, 2003)

DoD Supplier's Passive RFID Information Guide
(available at
<http://www.acq.osd.mil/log/rfid/index.html>),
Version 14

2.2.2 OPNAV Instructions

OPNAVINST C5510.93D

Tempest Requirements

2.2.2 NAVSEA and PEO IWS Instructions

PEO IWS INST 3058.1

Risk Management 2 Aug 2004

PEO IWS NAVSEA 9470-002-A-X-C

PEO IWS Enterprise Configuration Control Process
User Guide June 2007

PMS411-G&PP-001R3

AN/SQQ-89(V) and Ship ASW Software
Certification Guidance and Policy, 15 January 1999

2.2 Non-Government Documents/Publications

The following documents form a part of this SOW to the extent specified herein. In the event of a conflict between the documents referenced herein and the contents of this SOW, the contents of this SOW shall be considered a superseding requirement.

Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal Agencies.

Copies of specifications, standards, drawings, and publications required by suppliers, in connection with specified procurement functions, should be obtained from the contracting agency or as directed by the contracting officer.

2.2.1 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS

ANSI/EIA-748B

National Defense Industrial Association
(NDIA) Program Management Systems
Committee (PMSC) ANSI/EIA-748-A
Standard for Earned Value Management
Systems Intent Guide, June 2007

ANSI/AIAA-R-100A

Recommended Practice for Parts
Management

ANSI/J-STD-001

Requirements for Soldered Electrical and
Electronic Assemblies, September 2006

ANSI/EIA 649

National Consensus Standard for
Configuration Management

2.2.2 INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS

IEEE 828-1998

IEEE Standard for Software Configuration
Management Plans

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3 REQUIREMENTS

This SOW defines the efforts required for the program management, production manufacturing, systems engineering, software development, logistics and supportability engineering, configuration management, hardware and software integration (including material procurement or fabrication, and integration of GFM, as applicable), test, evaluation, and installation support of Surface Ship USW systems. The requirements set forth in this SOW are applicable to specific tasks performed by the Contractor under this contract to the extent specified and through any written individual Technical Instructions issued by the Contracting Officer's Representative (COR) in accordance with Naval Sea Systems (NAVSEA) clause 5252.242.9115 or assigned task with this solicitation. Such guidance or clarification can be in the form of replication or by reference to SOW paragraph numbers in part or in total.

The Surface Ship USW Combat Systems Contractor shall provide the material, equipment, supplies and technical engineering required to define, design, develop, integrate, test, deliver and support the CG-47 ship class, DDG-51 ship class, future surface combatant class, Foreign Military Sales cases for similar systems, and other platforms (LCS or CV/CVN, if required) as further described throughout this SOW and in any Technical Instructions that may be issued in accordance with NAVSEA clause 5252.242.9115. Today's CG-47 and DDG-51 combat and Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) systems that comprise the ship's total warfare system are extremely complex. Frequently within ship classes there are multiple versions of hardware and software. This procurement is for the integration of capabilities to create evolutionary baselines via the ACB process and provide upgrades/replacement to these diverse platforms in an Open Architecture (OA) environment.

The requirements in Sections 3.1 through 3.7 of the SOW have been organized into the following subparagraphs:

- a) Program Management: Details the overall Program Manager (PM) requirements across all elements of the contract
- b) Engineering: Requirements for development of each integrated ACB baseline and individual requirements for the development, testing and delivery of the three (3) key functional components: Undersea Warfare Control Functional Segment (UCFS), Hull Active Transmit Functional Segment (HATFS), and Common Enterprise Services (CES); requirements for the design of hardware baselines; requirements for the manufacture of hardware systems for contracted platforms
- c) Test and Evaluation
- d) Integrated Logistics Support (ILS)
- e) Configuration Management (CM)
- f) Training
- g) Installation, Checkout and Field Support.

3.1 PROGRAM MANAGEMENT

The Contractor shall designate a Program Manager (PM) who shall have the responsibility for the planning, execution, and control of all aspects of this contract and the authority to commit the Contractor to specific courses of action. In addition, the PM will be responsible for directing subcontracting efforts. The PM shall have the necessary authority to utilize the company's

resources to assure the tasks of this SOW are accomplished. The PM shall be authorized to deal directly with PEO IWS 5 and/or the designated representative on all matters pertaining to this contract.

The Contractor shall organize, coordinate, control and report the status of all contract activities related to this contract, and be responsible for those activities assigned to subcontractors, to ensure the delivery of all supplies and services specified in this contract.

CDRL Contractor's Progress, Status, Achievement and Risk Assessment Report

3.1.1 Financial Reporting

The Contractor shall maintain technical and financial status and generate progress reports. The financial status shall include the Estimate at Completion (EAC), Actuals to Date (ATD), Estimate to Complete (ETC), amount funded and outlooks for when additional funding is required, as necessary, for tasks as identified in Technical Instructions.

CDRL Contractor's Progress, Status, Achievement and Risk Assessment Report

3.1.2 Subcontract Management and Control

The Contractor shall identify and monitor subcontractor technical, quality, schedule, and milestone achievement on a continuing basis, according to the Contractor's own established subcontract management techniques.

3.1.3 Contract Work Breakdown Structure

The Contractor shall develop and maintain the Contractor Work Breakdown Structure (CWBS) and CWBS dictionary using MIL-HDBK-881A for guidance. The CWBS provides the basis for further extension by the Contractor to lower levels during the performance of the contract. The Contractor shall extend the CWBS down to a minimum of 3 levels required to provide adequate internal management, surveillance, and performance measurement, regardless of the reporting level stipulated in the contract for Government visibility. The Contractor shall use the CWBS as the primary framework for contract planning, budgeting, and reporting of the cost, schedule, and technical performance status to the Government. The Contractor shall analyze the system requirements specified in this SOW and the system specifications and translate them into a structure representing the products and services that comprise the entire work effort under the contract. Changes to the CWBS or associated definitions, at any reporting level, require approval of the Government.

CDRL Contractor Work Breakdown Structure

3.1.4 Contractor Performance Management System

The Contractor shall utilize an Earned Value Management System (EVMS) and provide a Contract Performance Report for tracking and reporting costs segregated by tasks. The EVMS requirements which need to be met shall be defined in the Technical Instructions. The modified EVMS shall be linked to and supported by the Contractor's management processes and systems to include the integrated master schedule, contract work breakdown structure, change management, material management, procurement, cost estimating, and accounting. The correlation and integration of these systems and processes shall provide for the early indication of cost and schedule problems, and their relation to technical achievement.

CDRLs Contractor's Progress, Status, Achievement and Risk Assessment Report and Contract Performance Report

3.1.5 Integrated Baseline Reviews

The Contractor shall engage jointly with the Government's Program Manager in Integrated Baseline Reviews (IBR) to evaluate risks inherent in the Contractor's planned performance measurement baseline established from the culmination of Technical Instructions in effect per year during execution of the contract. The initial IBR baseline shall be jointly determined 60 days after Technical Instruction issuance; subsequent baselines will be established prior to the year of execution. Each IBR shall verify that the Contractor is using a reliable performance measurement baseline, which includes the entire scope of work for the culmination of Technical Instructions that are in place during the year of execution, and is consistent with Contract schedule requirements and has adequate resources assigned.

3.1.6 Integrated Master Schedule

The Contractor shall establish and maintain the initial baseline Integrated Master Schedule (IMS) by logically networking detailed program activities, task interdependencies, and critical path activities to completion of the contract. Any changes to the baseline require approval by the Government. The schedule shall contain the planned events and milestones, accomplishments, exit criteria, and all activities from contract award to the completion of each ACB, Technical Insertion, and reflect all assigned Technical Instructions. The IMS should have a direct and traceable correlation between events in the Program Management Plan (PMP). The Contractor shall make periodic deliveries of the IMS in accordance with (IAW) the DD1423. The Contractor shall provide support to allow the Government to incorporate the IMS data into a Government program level IMS, as required.

CDRL Integrated Master Schedule

3.1.7 Program Risk Analysis

The Contractor shall perform a continuous analysis of program, technical, cost and schedule risk. The analysis shall identify the risks associated with each area, identify the impact of each risk on the overall program, and proposed approaches for reducing identified risks. Risk analysis status shall be reported in the Contractor's Progress, Status and Management Report and presented during Program and Technical Reviews.

CDRL Contractor's Progress, Status, Achievement and Risk Assessment Report

3.1.8 Program Management Plan

The Contractor shall develop a Program Management Plan for the program that will support Government established schedule requirements as documented and specified in this SOW and any subsequent Technical Instructions. Using a metrics based management approach, the Contractor shall document in the PMP all planning, scheduling, technical, cost, risk, and quality monitoring/reporting of each Technical Instruction/contracted tasks with program-wide visibility of plan versus actual efforts under this contract. The Contractor shall provide their proposed metrics in the PMP. The PMP shall be provided to the Government for review and approval.

CDRL Program Management Plan

3.1.9 Meetings

The Contractor shall conduct program progress and status review meetings at regular intervals at times and places mutually agreed upon between the Contractor and IWS 5. These meetings shall be held quarterly. PEO IWS5 and/or such representatives as designated by PEO IWS5 shall be invited to the meetings. The Contractor shall issue a schedule for Program Reviews on a quarterly basis that plans at least 6 months into the future. Technical Interchange Meetings (TIM) shall be conducted in accordance with each Technical Instruction.

At each program review the Contractor shall report at a minimum the status of the following:

- a) Cost/schedule performance
- b) Design and technical issues
- c) Hardware and computer software engineering
- d) Risk analysis activities
- e) Reliability and maintainability
- f) Test and evaluation activities
- g) Production activities
- h) Logistics development and support efforts
- i) Safety program status
- j) Configuration management activities
- k) Government Furnished Property (GFP) and Government Furnished Information (GFI) status
- l) Efforts authorized under Technical Instructions
- m) Manpower utilization projection/actual (3 month history, 9 month future)
- n) Data items delivery schedule
- o) Hazardous material management efforts
- p) Information assurance.

The Contractor shall prepare agendas for Contractor-hosted meetings, program reviews, Integrated Process Teams (IPTs) and all other meetings/reviews. The agendas shall be reviewed jointly between the Government and Contractor and distributed electronically via e-mail by the Contractor. Minutes of the meetings shall be kept by the Contractor unless otherwise directed by the Government. Minutes of major programmatic and technical review meetings highlighted above, shall include a summary of discussions, copies of handouts or graphics, and a listing of action items, and distributed electronically.

CDRLs Risk Management Plan, Conference Minutes, and Conference Agenda

3.1.10 Design Disclosure, Intellectual Property and Data Rights

The Contractor shall establish and maintain a process that will provide 'early and often' design disclosure directly to third party developers via electronic access to in-process design documentation and computer software. The Contractor shall support an Open Source Initiative with other participants within the Shipboard Combat Systems Development community. The Contractor shall establish an Associate Contractor Agreement with each third party developer and coordinate disclosure directly with the developers. The exchange of information shall be structured so as to protect the Contractor's and third party developers' proprietary rights in the

information. The Contractor shall furnish to the Procuring Contracting Officer (PCO) a copy of the Associate Contractor Agreement and copies of all written communication between the Contractor and the third party developers that is pertinent to this contract. The Contractor shall discuss and attempt to resolve any problems between the Contractor and the third party developers and notify the PCO if required, in writing, of any problems including documentation of problem resolution.

The Contractor and their subcontractors are responsible to ensure that all software developed under this contract is properly marked with the delivered product. In addition, metadata, as prescribed in this contract and any subsequent Technical Instructions, shall be provided with all final software and document products for delivery into the Government's reuse repository. In the case of software delivered for FMS, it shall be the Contractor's responsibility to provide the Navy with a solution that includes only software and documentation that meets export requirements for the specific FMS tasking.

3.1.11 Non-Developmental Items Licenses

The Contractor shall be responsible for the procurement of all hardware and software licenses for non-GFE NDI products delivered in this contract including both Contractor developed and third party Non-Development Item (NDI). If the Contractor needs to obtain a license for any NDI incorporated into a deliverable under this contract, the Contractor shall notify the Government immediately in writing. This notification shall specify whether the license(s) that need to be procured are transferable to the Government and/or any of its other contractors.

The Contractor shall provide to the Government all licenses and documentation required by the Government to support any NDI that is modified by the Contractor.

3.1.12 Data Management

The Contractor shall be responsible for the digital generation, reception and electronic delivery of data in accordance with Appendix A attachment. All data shall be developed, managed, used, and delivered/exchanged electronically to the greatest extent practical. Controlled Unclassified Information (CUI) submitted by email shall be digitally signed and encrypted. All unclassified electronic deliverable data items shall be delivered via the Government's web server, PEO IWS5 Integrated Product Data Management System (iPDM). Individual iPDM accounts must be requested by the Contractor for all personnel who will load and/or access data into the Government system. A Public Key Infrastructure (PKI) certificate is required to access all Government databases and will be the responsibility of the Contractor. The Government will provide the Contractor twenty-four hour a day access to iPDM (except for planned maintenance or unplanned outages). The Government shall provide training for using iPDM and iPDM application tools if requested. Tracking, review, comment generation and consolidation, comment resolution and approval of the Contract Deliverables shall be done via iPDM.

The Contractor shall maintain a record of GFI, GFE, and Government Furnished Software (GFS) received, data items submitted, and technical and logistic documents generated in the AN/SQQ-89(V) Program and submitted for Government use. Such data shall be cataloged in a Data Accession List (DAL). The Contractor shall provide the Government team access to all data listed in the DAL, created for this contract.

CDRL Data Accession List

When data has been developed under a previous contract a certificate of prior submission may be submitted in lieu of submitting a duplicate data item. The item must, however, be certified by the Contractor as being 100% correct and in full compliance with the requirements of this contract. The Contractor shall provide a copy of previously submitted data, if requested, in writing, by the COR.

All contract data delivered by electronic media, shall be accessible by one or more of the following application programs:

- a) Word 2007
- b) Excel 2007
- c) PowerPoint 2007
- d) MS Project 2007
- e) Access 2007
- f) AutoCAD 2008 with compatibility to Solidworks 2011
- g) Interactive Computer Aided Provisioning System (ICAPS) Stand-Alone 5.1 and ICAPS Client/Server (C/S) (for Provisioning Technical Documentation (PTD) only)
- h) Computer-Aided Software Engineering (CASE) tools as agreed to via the approved Software Development Plan (SDP)

The version of the application programs may be changed to a different version with mutual consent of the Contractor and PEO IWS5. Other application programs may be used upon explicit approval by PEO IWS5.

If required, the Contractor shall establish secure communication (STE or equivalent) capabilities for the transmission of sensitive and classified data and to provide support to the operating Fleet and its land based support activities.

Classified data deliveries that require digital media delivery shall be delivered in electronic media and hardcopy format. Deliveries too large for delivery by E-Mail or electronic media (file size, drawings, data packages etc.) shall be delivered in hardcopy format in accordance with the applicable DD Form 1423.

3.1.13 Integrated Product Team

It is essential that the Contractor works in a collaborative environment with a consortium of Navy, Navy Laboratories, Academia, and other industry partners to ensure continued success of the program. The Contractor (including subcontractors and vendors as necessary) shall attend, present as necessary, and participate in Integrated Product Team (IPT) meetings. Contractor participants shall be subject matter experts in the appropriate areas and have sufficient decision making authority to expedite process and product changes within the scope and terms of this contract. Efforts are expected to include activities such as participation in meetings, preparation of presentation material, providing subject matter expertise, sharing of pertinent technical data and work products, sharing of cost data (as appropriate) and performing design analyses and trade studies for the respective Contractor's area(s) of responsibility.

To the extent specified in the established charter, the IPTs shall have responsibility for the following functions:

- a) Monitoring and reporting of Subsystem status and progress for both the Government and the Contractor
- b) Joint identification, evaluation, management, and reporting of risk mitigation and cost reduction initiative efforts
- c) Identification, collection, analysis, and reporting of appropriate metrics for measurement of cost/schedule control, engineering and production progress
- d) Joint evaluation and management resolution of major issues associated with hardware and software engineering, production, integration, test, and installation and checkout (I&C) activities
- e) Verification that the Contractor's 'early and often' design disclosure process is providing data that is current, complete and accurate to third party developers
- f) Joint evaluation and management of the ILS effort
- g) Joint recommended approval of data items requiring approval under this contract

3.1.14 Contractor Facilities

The Contractor shall provide, operate, manage and maintain the hardware production, fabrication, assembly and test facilities required by the provisions of this SOW for the life of the contract. The production test facilities include Contractor sites used for fabrication, assembly, Incoming Inspection Tests, Production Inspection Test (PIT) and Production Reliability Acceptance Test (PRAT). PIT and PRAT require Contractor use of classified software. The Contractor shall provide appropriate classified test facilities.

The Contractor shall establish, administer, operate, and maintain the Surface Ship Engineering Site (SSES) facilities to support the ACB integration and test activities required by the provisions of this SOW for the life of the contract.

The Contractor shall follow all applicable sections of the Contract Security Classification Specification (DD Form 254). In addition, facilities that process computer programs subject to Telecommunications Electronics Material Protected from Emanating Spurious Transmissions (TEMPEST) security requirements shall be subject to the requirements of OPNAVINST C5510.93D1 Government Implementation of National Policy on Control of Compromising Emanations.

3.1.15 Use of Contractor Facilities

The Contractor and its major subcontractors shall provide and maintain secure office space with controlled access and related services for up to five technical representatives, authorized by the Government, on site at the Contractor's facility beginning at contract award and continuing through the life of this contract. The Contractor and its major subcontractors shall have mutual agreements which allow for similar office space access within their respective facilities. The related services at a minimum are:

- a) Telephone services
- b) FAX transmission and reception
- c) Computer and network equipment to support analytical tasks, tracking tasks, word processing, and E-Mail services

- d) Office equipment (e.g., desks, file cabinets)
- e) Internet Services
- f) Reproduction services (copying equipment)
- g) Classified material stowage containers

The Contractor shall make available to the technical representatives authorized by the Government all program data (e.g., working documents, databases, tracking systems, test results), including electronic access to computer files, pertaining to the Contractor and subcontractor activities in the performance of this contract.

3.1.16 Government Furnished Information

The Contractor shall manage and control the Government Furnished Information (GFI) identified in **Attachment 1** in accordance with the provisions of this contract. The Contractor shall provide e-mail notification of receipt of all GFI received herein. The Contractor shall thoroughly inspect GFI for deficiencies within thirty (30) days of receipt and report deficiencies to the Government.
CDRL GFI Deficiency Report

3.1.17 Government-Furnished Property/Equipment/Material

The Contractor shall manage Government Furnished Property/Equipment/Material (GFP/GPE/GPM) identified in **Attachments 2** in accordance with the provisions of this contract. The Contractor shall provide E-mail notification of receipt of all GFP/E/M. The Contractor shall report to the Government within ten (10) days of any GFP/E/M found damaged, malfunctioning, or otherwise unsuitable for use. The Contractor shall not modify GFP/E/M without Navy approval. The Contractor shall comply with Government procedures for those GFP/E/M that are under Government Configuration Management. The Contractor shall establish procedures for the adequate storage and maintenance of Government property. Records of all inspections and maintenance performed shall be maintained. These procedures and records shall be delivered to the Government and shall be subject to review by the Government.

CDRLs Status of GFE Report and GFI Deficiency Report

The Contractor shall have procedures governing the use of GFP, including GFE and GFM, in accordance with the provisions of this contract. The Contractor shall deliver a copy of the Contractor's procedures relating to GFP/GFE/GFM and presented at the first scheduled Progress Meeting. The Contractor's procedures shall address the following:

- a) Examination upon receipt, consistent with practicality, to detect damage in transit
- b) Inspection for completeness, proper type and quantity
- c) Methods for assurance of adequate storage conditions, proper handling, and protection from deterioration during storage
- d) Testing, as required, to determine satisfactory operation
- e) Identification and protection from improper use or disposition

3.1.18 Program Security Requirements

The Contractor shall adhere to all security requirements imposed by the National Industrial Security Program Operating Manual (NISPOM), DoDD 5220.22, MIL-HDBK-1785 (DOD

System Security Engineering Program Management Requirements), and the Contract Security Classification Specification (DD 254).

The Contractor shall maintain Information Security policies and procedures in accordance with appropriate sections of DODI 8500.2 ENCL 4, the Federal Information Processing Standards Publication (FIPS Publication (PUB)) 140-2, the NISPOM, and meet Defense System Security (DSS) certifications where applicable.

3.2 ENGINEERING

The Contractor shall provide engineering services to implement specified functionality and meet the defined requirements of the contract to achieve Surface Ship USW Systems performance. Any requested changes or deviations to the contract or System Performance shall be submitted to PEO IWS 5 for approval. This may include software development required to 1) integrate third-party systems, equipments, computer programs and software components, 2) extend open architecture components, and 3) resolve software trouble reports.

As directed in specific Technical Instructions, requirements may include:

- a) Continued Surface Ship USW system development in support of evolving improvements;
- b) Support of PEO IWS5 program planning and concept development to identify risk reduction activities to support Surface Ship USW system engineering and computer program development efforts;
- c) Surface Ship USW system and software engineering efforts including requirements analysis, performance assessment, modeling and simulation, advanced concept initiatives, and product/process improvement;
- d) Investigation of the applicability and synergy with existing/planned programs to ACB development efforts including interoperability with off-board sensors and joint systems;
- e) Studies to define Surface Ship USW system ACB/TI content.

As specified in the Technical Instruction, the Contractor shall:

- i. Receive and integrate Government Furnished Software (GFS) as provided by PEO IWS5. In some cases the Contractor may be required and directed to work directly with Original Equipment Manufacturer (OEM) developers
- ii. Integrate Contractor developed or upgraded components and GFS components to create the AN/SQQ-89(V) ACB to run on the TI -XX computing environment, where XX refers to the applicable AN/SQQ-89(V) hardware baseline. Define, develop, maintain, and deliver Application Programming Interfaces (APIs) as required
- iii. Trace the Ship, Warfare System, and operational requirements to components to ensure that test cases are maintained for each requirement
- iv. Develop/modify tools, test cases, and test environments to test the capability performance to ensure conformance with Navy requirements
- v. Develop and deliver a Software Development Plan (SDP) to support the development of key system software components.

CDRL Software Development Plan

- vi. Modify and update the HATFS, UCFS and CES software components as required to support the ACB baseline
- vii. Develop and deliver the software design documentation that documents the computer program in a System/Subsystem Design Document (SSDD).
CDRL System/Subsystem Design Description
- viii. Conduct systems engineering and analysis on classified operational data at the secret level using approved personnel and facilities as authorized by the contract DD-254
- ix. Identify candidate improvements for system operational and/or performance improvements.

The Government will provide the AN/SQQ-89(V) Performance Specifications as GFI and will maintain CM of the Performance Specification. If the Contractor cannot meet some of the requirements of the Performance Specification, the Contractor shall request changes to the Performance Specification for Government approval through submission of Requests for Deviations (RFDs) and Requests for Waivers (RFWs).

CDRLs Request for Deviation and Request for Waiver

The Contractor shall develop the System Requirements Verification Matrices (SRVMs) for each ACB & TI to ensure traceability between the test requirements and the Performance Specifications, the AN/SQQ-89(V) Product Environmental Test and Quality Assurance Requirements and the AN/SQQ-89(V) Design Constraints Document.

CDRL System Requirements Verification Matrices

The SRVM maps to the test verification and shall establish the minimum verification, validation, and acceptance criteria for the Surface Ship USW systems and shall include the requirements that the Contractor must comply. These requirements include:

- a. All system requirements
- b. All Functional Segment (FS) to FS interface requirements
- c. Selected End-to-End performance requirements
- d. Other selected requirements.

The Contractor shall conduct detailed system engineering and design analyses of the proposed software and hardware system IAW the specifications included in individual Technical Instructions. Systems engineering analyses shall include but not be limited to the following:

- a) Analysis to determine and evaluate reliability and maintainability of the Surface Ship USW system hardware and software in the Fleet
- b) Evaluate Fleet problems, provide recommended solutions and implement enhancements when directed by Technical Instructions
- c) Ensure that the required performance is achieved by developing and coding software to implement requirements and integrate Government Furnished Software (GFS) code to successfully function as a complete combat system in a Naval warfare environment
- d) Participate as a member of various working groups to identify and recommend interface changes required to implement the ACBs onto the TI hardware and deliver a fully integrated Surface Ship USW system
- e) Development of ACBs and execution of unit, element, and system level test
- f) Recommend changes to the system baselines as necessary
- g) Perform factory acceptance testing

- h) Implement Production Engineering Support
- i) Ensure that the requirements of the MIL-STD-882D are met and satisfied.

The Contractor will brief the Navy on identified problems and recommend solutions, including risk assessment and cost estimates. The Contractor shall document all engineering analyses.

CDRL Technical Report – Study/Services: Engineering Analysis Reports

3.2.1 Systems Engineering

The Contractor shall provide a System Engineering Plan for how development will progress with the incorporation of inputs from the various supporting working groups. The Contractor shall describe how the various technical inputs to the systems engineering effort will be integrated into a collaborative development environment.

CDRL System Engineering Plan

3.2.1.1 Safety

The Contractor shall establish and maintain a System Safety Program to support efficient and effective achievement of overall system safety objectives using MIL-STD-882 as guidance.

3.2.1.2 Environmental Compliance

The Contractor shall ensure that work performed under the contract is performed in accordance with NAVSEA standards.

Hazardous material that is required to be used in, supplied with, or required to support the system shall require approval from the program office. To facilitate approval the Contractor shall document the analysis conducted to evaluate alternatives in a Health Hazard Analysis Report and provide Material Safety Data Sheets (MSDS) (Occupational Safety and Health Administration (OSHA) Form 174).

CDRLs System Health Hazard Analysis Report and Technical Report- Study/Services: Special Studies and Analyses

3.2.1.3 Problem Reporting System

The Contractor shall establish a single system for the identification, tracking, and resolution of all hardware, software and baseline documentation problems identified during system development, integration and testing. In addition, the Problem Report (PR) System shall be used to track test documentation problems and technical manual errors. Data on the problems covered in this system shall be included with the Contractor's Progress, Status and Management Report.

CDRL Contractor's Progress, Status, Achievement and Risk Assessment Report

3.2.1.4 Open Systems Architecture Approach

In satisfying the Government's requirements, the following system architecture approach characteristics shall be utilized:

- a) Open Architecture: The Contractor shall develop and maintain an architecture that incorporates appropriate considerations for reconfigurability, portability, maintainability, technology insertion, vendor independence, reusability, scalability, interoperability, upgradeability, and long-term supportability

- b) Modular, Open Design: The Contractor shall develop an architecture that is layered and modular and uses COTS/NDI hardware, operating systems (OS), and middleware that utilize non-proprietary or non-vendor-unique, key Application Programming Interfaces (APIs). The Contractor's design approach shall be applied to all subsystems and components. The Contractor shall provide the Government (and/or Government support contractors) electronic access to its integrated development environment throughout the term of the contract
- c) Modular Open Systems Approach (MOSA): The Contractor's design approach shall produce a system that consists of hierarchical collections of software and hardware configuration items (components). These components shall be of a size that supports competitive acquisition as well as reuse. The Contractor's design approach shall emphasize the selection of components that are available commercially or within the DOD, to avoid the need to redevelop products that already exist and that can be re-used.

As part of technical and design reviews, the Contractor shall, at a minimum:

- i. Describe how the proposed system architecture meets the modular, open design goals, including the steps taken to use non-proprietary or non-vendor unique COTS or reusable NDI components wherever practicable
- ii. Describe its rationale for the modularization choices made to generate the design
- iii. Provide rationale that explicitly address any tradeoffs performed, particularly those that compromise the modular and open nature of the system
- iv. Provide rationale for maintaining continued access to cutting edge technologies and products from multiple suppliers
- v. Describe how it will mitigate the risks associated with technology obsolescence
- vi. Describe how it will avoid being locked into proprietary or vendor-unique technology, and reliance on a single source of supply over the life of the system.

3.2.1.5 Modeling, Simulation and Test Suites

The Contractor shall develop new, modify existing, document, maintain, and deliver system level models, simulations and test suites to support the validation and verification of the system requirements, design, and software IAW. Test suites shall be designed to test required functionality of the system. These test suites must be able to test upon completion of the development of the Unified Modeling Language (UML), Extensible Markup Language (XML), and executable code. These test suites shall be placed under CM. These suites must be able to support Independent Verification and Validation (IV&V), Developmental Test (DT) and Operational Test (OT). The Contractor shall support Verification, Validation, and Accreditation (VV&A) conducted by the Government for the test suites. Results of testing of each software build will be made available to project personnel. The Contractor will report on modeling, simulation, and testing at reviews. The Contractor shall modify the Surface Ship USW computer program, develop, test and integrate the changes to interact or support the new ACB. The Contractor shall maintain the GFI Modeling and Simulation capabilities and provide Performance Analysis in support of ACB design activities.

CDRL Technical Report Study/Services: System Models, Simulation and Test Suites Documentation

The Contractor shall:

- a) Upgrade system Modeling & Simulation (M&S) tools to support the analysis of the new ACB's multi-mission performance against threats and scenarios
- b) Execute statistical performance runs of the ACB design against Compliance and Assessment cases
- c) Analyze results for performance against key metrics as specified in the relevant Technical Instruction.

3.2.1.6 Quality Assurance

The Contractor shall implement and maintain a Quality Assurance (QA) program that meets program objectives during the performance of the contract. The Contractor shall develop and deliver the Quality Assurance Program Plan (QAPP) to the Government for review and approval.

CDRL Quality Assurance Program Plan

At a minimum, the quality management process should include the following key QA activities:

- a) Establishment of capable processes
- b) Monitoring and control of critical processes and product variation
- c) Establishment of mechanisms for feedback of field product performance
- d) Implementation of an effective root cause analysis and corrective action system
- e) Continuous process improvement.

3.2.1.7 System Security Requirements

The Contractor shall include anti-tamper designs into the Surface Ship USW system to protect critical program information.

The Contractor shall ensure success by coordinating the design of all system software in a manner that allows successful testing and certification of the system in accordance with Information Assurance (IA) requirements. The Contractor shall establish and maintain an IA program to support the customer's system security certification and accreditation of Surface Ship USW systems to the DOD and Navy IA requirements. The Contractor shall work with the Government to ensure that the ACB program is compliant with any proposed Information Assurance solution set and that interface requirements are correctly implemented. The Contractor solutions shall satisfy all applicable DoD 8500.1 and DoD 8500.2 data security requirements. The Contractor solutions shall have no identified vulnerabilities or combination of vulnerabilities resulting in a high vulnerability. Vulnerabilities associated with protection of sensitive data will not be accepted.

The Contractor shall implement and apply safeguards such that information and resources maintain the appropriate level of confidentiality, integrity, availability, authentication, and non-repudiation based upon mission criticality, level of required information assurance and classification or sensitivity level of information entered, processed, stored, or transmitted for Surface Ship USW Systems. The Contractor shall safeguard information and information systems through the use of multi-disciplined defensive layers, as well as sound administrative and operational practices. The Contractor shall document its security engineering process in the PMP.

The Contractor shall analyze system security requirements and provide data inputs to support the Program Office in the development of the System Security Authorization Agreement (SSAA)

and shall collaborate with other system and subsystem contractors. To ensure traceability and completeness of system security requirements, references to system performance specification requirements shall be included in the Specification Requirements Verification Matrix (SRVM).
CDRL Specification Requirements Verification Matrix

3.2.1.8 Studies/Analyses

The Contractor shall conduct studies and analyses to meet the requirements of the contract and achieve USW combat system performance. The Contractor shall document the results of special studies and analyses.

CDRL Technical Report- Study/Services: Special Studies and Analyses

3.2.2 Software

3.2.2.1 Component Software Development Requirements

The Contractor shall be responsible for the design and development of the integrated USW components. These include, but may not be limited to, HATFS, UCFS, and CES functional segments.

The HATFS program is a critical component of the Active Processing capability within the AN/SQQ-89(V) system variants that allows the scheduling of the active transmission sequences to be output from the system.

The UCFS program is the critical component in the engagement function of the Surface Ship USW systems. It is responsible for the accurate targeting of ordnance and responsible for maintaining the position of all possible threat data facing a platform and a battlegroup. The UCFS also provides interfaces to the external combat systems such as Aegis. The CES program provides the system service capabilities of the overall Surface Ship USW systems.

The Contractor shall deliver the Surface Ship USW system computer programs to the Navy as iterative deliveries and as a final system delivery after system level testing efforts. The Contractor shall provide evaluation of test results, investigation of noted discrepancies, and corrective actions to resolve problems. The Contractor shall use the UML to model the architecture of the software within each element. The Contractor shall develop an Interface Design Description (IDD) using the system model, plan transition from component IDD's to data models, and shall develop SDDs for each developed functional component using model outputs to replace legacy Computer Program Design Document (CPDD) for the changes required for the new ACB.

3.2.2.2 Software Requirements Specification

The Contractor shall update and maintain the Software Requirements Specifications (SRS) for HATFS, UCFS, CES and any other functional segment development allocated to the Contractor after Contract award.

CDRL Software Requirements Specification

3.2.2.3 Interface Requirement Specifications/Interface Design Description

The Contractor shall update and maintain the system level Interface Requirement Specifications (IRS) and IDD for each functional component developed by the Contractor.

CDRLs Interface Requirements Specification and Interface Design Description

3.2.2.4 Data Design and Management

For all new and modified software the Contractor shall, as specified in the Technical Instructions:

- a) Clearly define and describe all component and system data objects
- b) Define and document all subsystem and Configuration Item (CI) level data objects to provide full functional, logical, and physical specifications
- c) Identify processes for specifying the lowest level (i.e., subsystem or component) at and below which it intends to control and define “data” design by proprietary or vendor-unique standards and the impact of that upon its proposed logistics approach
- d) Consider an overall Information Assurance (IA) strategy that implements IA Processes in accordance with DoD Instruction 8500.2 and other IA requirements that are part of the Contract baseline when developing all data objects and architecture, including options to tag security levels of data objects
- e) If applicable, select data objects from existing open or Government standards (DoD Core Architecture Data Model (CADM)) on the Defense Information Services Agency (DISA) web site, with an emphasis on enterprise-level interoperability. The Contractor shall describe how its selection of data object designs will maximize the ability of the system to easily accommodate technology insertion (both computing hardware and software) and facilitate the insertion of alternative or reusable modular system elements.

3.2.2.5 Software Product Specification

The Contractor shall develop and update a Software Product Specification (SPS) for each Computer Software Configuration Item (CSCI) for which they have developed/modified for the integration baseline. The SPS shall contain and reference the executable software, source files, and software support information, including "as built" design information and compilation, build, and modification procedures for each CSCI developed/modified.

CDRL Software Product Specification

3.2.3 Hardware

The Contractor shall work in cooperation with the Hardware IPT to select a hardware baseline, which uses a common core architecture to support the Surface Ship USW and FMS (V)15 configurations. The Contractor shall develop, update and maintain a hardware functional, performance and interface requirements baseline and generate program-unique specifications for the Surface USW programs.

CDRL Hardware Performance and Interface Requirements Baseline

3.2.3.1 Hardware Requirements Definition

The Contractor shall develop, update and maintain a hardware functional, performance and interface requirements baseline and generate program-unique specifications for the Surface Ship Acoustic Systems hardware.

CDRL Hardware Performance and Interface Requirements Baseline

3.2.3.2 Technology Refresh

The Contractor shall implement a technology refresh program to ensure the systems and components are not obsolete at final acceptance. The Contractor will provide the engineering resources to support the COTS technology surveys, identification of emergent obsolescence and Diminished Manufacturing Sources/Material Shortages (DMS/MS) issues and the selection, evaluation and regression testing of candidate replacement COTS components as well as the management of software licenses. As a part of the modernization of the Surface Ship USW system computing infrastructure, the Contractor shall design hardware changes for COTS refresh computing and network equipments, operating systems, and middleware to address obsolescence issues.

3.2.3.3 Hardware Design

All Mission Critical Functions shall be implemented in Shock Grade A qualified cabinets. Non Mission Critical functions may be implemented in either Grade A or Grade B shock qualified cabinets. The hardware baseline shall host the Surface Ship USW and FMS(V)15 integrated software baselines. The Contractor shall be responsible for ensuring that AN/SQQ-89(V) Product Environmental Test and Quality Assurance Requirements are met for the product baseline hardware configuration.

The Contractor shall specify materials and components to be incorporated into the system or subsystems including a listing of any hazardous materials or processes incorporated or used in the fabrication of the system or subsystems. The design analyses shall consist of detailed examinations of the design techniques and materials that the Contractor plans to use to meet the requirements of the specifications. The design analyses shall be specific on both the system and component levels. ANSI/J-STD-001 shall be used as guidance for any soldering requirements.

The Contractor shall develop and deliver engineering design data review information packages to the Government.

CDRL Technical Report – Study/Services: Engineering Design Data Information Package

Materials and components to be incorporated in the system shall be specified. Stress levels and safety factors, as appropriate, shall be identified for all mechanical and electrical parts. Methods and materials to be used to protect the components from the environment shall be identified using MIL-S-901D, MIL-STD-461F, MIL-HDBK-470 as guidance. In addition to the system hardware physical considerations, the design analyses shall evaluate the system concept in terms of operability, reliability, producibility, maintainability and supportability objectives using MIL-STD-1472F, MIL-HDBK-251 and MIL-HDBK-470 as guidance. The Contractor shall examine the design details and modify them, as necessary, to ensure that the system design will conform to established Navy precepts for minimum practical manning, personnel and training requirements.

3.2.4 System Integration

One of the primary objectives of this contract is to integrate Government Furnished Information/Software into production baseline builds referred to as ACBs. The Contractor shall

complete the systems engineering for the front end systems design including participation, execution and reporting for System Requirements Review (SRR), System Functional Review (SFR), Preliminary Design Review/Software Specification Review (PDR/SSR) and Critical Design Review (CDR). The Contractor shall develop Surface Ship USW system engineering designs starting with the AN/SQQ-89(V) ACB 13 software on a TI-14 hardware configuration to support the CG-47 Class Cruisers and DDG-51 Class Destroyers. These efforts will be performed for future ACBs with future Technology Insertion hardware configurations. Each ACB should be designed to operate on the previous Technology Insertion hardware configuration as well as the next Technology Insertion hardware configuration.

The Contractor shall develop a System Integration Plan (SIP) for each ACB/TI, that identifies the necessary development facilities and processes to conduct system integration. The Contractor shall provide the facilities and conduct system integration IAW the SIP. The Contractor shall address all problems identified during interface testing. The Contractor shall support integration and testing of all applicable shipboard subsystems for a total Surface Ship USW system.

CDRL Technical Report - Study/Services: System Integration Plan

The Contractor shall successfully integrate the new software release into a ship-specific software program. The Contractor shall support problem resolution for the developmental release of the system on the initial ship and for additional follow-on releases of the software when tested on other follow-on ship specific builds. The Contractor shall deliver all source code, objects, scripts, executables, etc. required to build, install, load, operate, maintain and update the application. The Contractor shall deliver the modified ACB software as specified by the Navy via a new ACB software build for ship integration, further testing, and operational use. Each release for each Navy platform will be delivered to the Government for retention.

CDRL Computer Software Product

3.2.4.1 Interface Requirements Specifications/Interface Design Description

The Contractor shall update and maintain the Interface Requirements Specifications (IRS) and IDD (both internal and external) for the integrated baseline.

CDRLs Interface Requirements Specification and Interface Design Description

3.2.4.2 Software Version Description

The Contractor shall document each software release and component interface from configuration management through a Software Version Description (SVD).

CDRL Software Version Description

The Contractor shall include all software used for testing. Software problems listed shall be annotated to indicate their impact (probable effect and special procedures/work-around to be followed) on hardware testing. These annotations shall appear in SVDs accompanying delivered operational software. The Contractor shall identify content by version identification, a summary of the changes implemented to create this release from the previous release, open problems, closed problems, compatibility between versions and subcomponents, installation procedures, operating environment, development environment, list of components included in the release and notes and assumptions. A description of the capabilities and limitations for each release shall be

included in this documentation. Software releases may include the release of individual software components along with supporting documentation and artifacts. Delivery of this documentation shall be IAW the approved SDP and Contractor's Configuration Management Plan (CMP).

CDRL Configuration Management Plan

3.2.4.3 Validation and Verification of Integrated Baseline System

The Contractor shall test all deliverable software releases with a full QA controlled configuration to support Navy acceptance and delivery to the fleet.

Within the Test and Evaluation Program Plan (TEPP), the Contractor shall propose an ACB product evaluation structure and sequence culminating in Government required Contractor executed System Qualification Test (SQT) followed by the Government Aegis Integration Event (AIE). The proposed test structure and sequence shall be composed of various levels of product evaluations including analysis, demonstrations, inspections and tests (i.e., hardware/software integration tests). The Contractor shall continually update test schedules as part of the IMS. The Contractor shall present detailed progress of testing to date and projections for near term activities at the System Engineering (SE)/IPT meetings. These presentations shall include test activities for production representative hardware, firmware and software deliveries. The Contractor shall provide the Joint Test Group (JTG) chairman, and the local Government Quality Assurance representative sufficient notice prior to the start of any test requiring government witnessing. JTG concurrence is required in the determination of impact and prior to doing informal or formal testing with software containing test impact problems.

For each ACB, the Contractor shall:

- a) Establish, document and use a Software Test Environment to support integration and testing
- b) Develop and execute unit and element level test to support integration
- c) Integrate and test the ACB computer programs and associated Surface Ship USW system changes required to support those changes
- d) Conduct and successfully complete formal External Interface Test (EIT) to demonstrate the compatibility of the AN/SQQ-89(V) with its associated sensors, network and shipboard subsystems interfaces defined in the system performance specification, as well as with the Aegis Weapon System (AWS) required interfaces
- e) Conduct System Qualification Testing (SQT) to show compliance with Surface Ship USW system SRVM requirements
- f) Support Developmental Test (DT) and other Government testing and certifications such as Combat System Ship Qualification Testing (CSSQT) of each ACB/TI baseline in a realistic environment.

The Simulation/Stimulation (SIM/STIM) components (which may include at sea tape data) of software included in the Software Test Environment shall successfully complete a fitness-for-use evaluation and receive PEO IWS5 approval before the Software Test Environment is used for Government witnessed testing.

The Contractor shall manage and coordinate platform external interface tests with the Aegis Weapon System (AWS) or the Aegis Combat System (ACS) (non AWS) elements. The Contractor shall develop simulation/stimulation requirements to support the ACB test program, develop and deliver ACB computer program Build to support all shore site testing.

The Contractor shall develop test plans and procedures for all required test events associated with the integration of an ACB. The Contractor shall document test results for each test performed in test reports.

CDRLs Test Plans, Test and Evaluation Program Plan, Test Procedures and Test Reports

The Contractor shall develop and deliver a SSDD for each new ACB.

CDRL System/Subsystem Design Description

The Contractor shall develop and deliver a Product Description Document (PDD) for each ACB/TI that provides a high level synopsis of the system functionality.

CDRL Technical Information Report: Product Description Document

3.2.5 Production

The Contractor shall provide the production facilities to fabricate or procure materials, perform factory acceptance testing, implement technology insertions/refresh, and provide production engineering support, as appropriate. The Contractor shall be capable of delivering up to ten (10) full TI configured systems annually including applicable modifications kits and approved FMS case systems. The number and configuration of each system to be produced will be defined under each Technical Instruction and will be based on the approved NAVSEA installation schedule. The installation schedule may require additional surge capacity to meet ship availability schedules.

3.2.5.1 Production Planning

Production planning shall include those Contractor efforts, utilizing the Contractor's corporate processes, which are necessary for delivery of quality Surface Ship USW and FMS(V)15 systems, subsystems and/or units by the required delivery dates. These planning efforts and processes shall include integration of Surface Ship USW and FMS(V)15 systems and/or units into the Contractor's existing or new quality assurance processes, material procurement strategies, and facilities.

3.2.5.2 Production Readiness Review

The Contractor shall prepare for and present to the Government their readiness for production. A Production Readiness Review (PRR) shall be conducted on each TI platform configuration system. Subsequent PRRs shall be held on future TI configurations and on each subsequent hardware tech refresh configuration or new ship class. The PRR shall verify that the production design, planning and associated preparations for an equipment/system have progressed to the point where a production commitment can be made without incurring unacceptable risks of breaching thresholds of schedule, performance, cost or other established criteria.

3.2.5.3 Engineering Documentation and Drawings

The Contractor shall develop, update and deliver engineering and drawing documentation to support all requirements of the system performance specification and the contract. Documentation and drawings shall be comprised of commercial drawings, product drawings and interface control drawings.

CDRLs Engineering and Drawing Documentation

3.2.5.4 Configuration Item Product Functional Specifications

The Contractor shall prepare, update, and maintain Configuration Item Product Function Specification (CIPFS) for each of the Contractor Furnished Equipment (CFE) hardware units of the Surface Ship USW and FMS systems for which the product baseline has not already been established and for any GFE changes. The CIPFS shall document:

- a) The complete performance requirements of the product for the intended use
- b) Necessary interface and inter-changeability characteristics
- c) Quality Assurance provisions including (as appropriate) qualification evaluation, pre-production, periodic production, and quality conformance inspection requirements

CDRL Configuration Item Product Function Specification

3.2.5.5 Material Procurement

The Contractor shall document the material procurement status in their monthly report detailing the following: items in process at the Contractor's facilities, items in process at a subcontractor's facility, items yet to be purchased, long lead status and COTS procurement concerns. The Contractor shall identify any items substituted in place of items ordered and identify tests performed or planned to ensure the substituted items suitability for use. The Contractor shall provide to the Government all licenses and documentation required by the Government to support any NDI that is modified by the Contractor.

3.2.5.6 Fabrication and Assembly

The Contractor shall fabricate and assemble all Surface Ship USW systems, kits and equipment including kits required for installation of such systems/equipments. Fabrication and assembly shall be in accordance with the quality provisions in the Contractor's QAPP.

3.2.5.7 Functional Configuration Audit

The Contractor shall prepare for Functional Configuration Audits (FCA) and present to the Government data to verify that the actual performance of each CSCI, Functional Segment and Hardware Configuration Item (HWCI) complies with its CIPFS, and the SRVM. The Contractor shall then notify the Government of its readiness to support the audit. The Government shall conduct a FCA for each TI of the Surface Ship USW system Baseline and subsequent baselines at the Contractor's facility. The FCA shall be conducted after the completion of the System/Software Qualification Test. Test data shall be reviewed to verify that the hardware and software performs as required by their functional/allocated configuration identification. The FCA shall be conducted on the Configuration Item (CI), which will be representative of the configuration to be released for production.

CDRL Functional Configuration Audit Plan

3.2.5.8 Production Acceptance Requirements

Contractor Furnished Equipment (CFE)/Contractor Furnished Material (CFM) manufactured by all vendors shall be shown to pass the New Supplier Qualification Tests (NSQT) identified in the AN/SQQ-89(V) Product Environmental Test and Quality Assurance Requirements.

The Contractor shall conduct production verification testing of the Surface Ship USW system equipment for each hardware line item procured under this contract. Production and testing shall consist of PIT and PRAT. Formal PIT is required, at the Surface Ship USW system level, for all systems offered for delivery. Once PIT has been completed, the Hardware system and associated Lowest Replaceable Units (LRU) shall remain packaged together as one tested configuration, to form the system's installation kit. The Contractor shall provide documentation of the system configuration as tested and include this documentation in the installation kit for traceability of LRU serial number and reference designator locations during PIT test.

CDRL System Configuration Document

Any equipment retained within the ship that forms a part of the AN/SQQ-89(V) system, need not be PIT tested. Retained equipment shall be included in PIT testing only if it is removed from the ship. Retained equipment modified but not removed from the ship shall have a verification test performed as part of the shipboard installation procedure. The Contractor shall comply with the test notification requirements for PIT performed at any level. Upon completion of each PIT, the Contractor shall deliver a test report for each system. The Contractor shall conduct a PRAT on each system, subsystem or Unit at the level offered for delivery. Successful completion of PIT at the level offered for delivery shall be a prerequisite to PRAT. Upon completion of each PRAT, the Contractor shall deliver a test report for each system.

CDRL Test Report, Production Readiness Acceptance Test Report

3.2.5.9 Other Shore Sites

The Contractor shall design, develop, fabricate, integrate, and test shore site kits (hardware and operational software) for shore sites to support the superset product baseline and subsequent superset product baselines. The Contractor may substitute Commercial Equivalent Enclosures in place of the Grade A cabinets using equipment and material similar to the SSES shore site installations. The Contractor shall assess impact on shore site kit requirements as a result of technology refresh.

3.3 TEST AND EVALUATION

3.3.1 Test and Evaluation Program

The Contractor shall generate a Test and Evaluation Program Plan (TEPP) to describe all required testing planned for the Surface Ship USW system components and equipment configurations procured under this contract and its associated sensors, shipboard subsystems and interfaces. As a minimum, the Contractor shall include all testing described in this SOW. The TEPP shall also address recent advances in Automated Testing and Re-Test capabilities that can be accommodated during government conducted test and Certification and regression testing.

CDRL Test and Evaluation Program Plan

3.3.2 Joint Test Group

The Contractor shall host and participate in Joint Test Group (JTG) meetings which will be made up of representatives from the Contractor and the TDA. A Government representative will chair

the JTG. The JTG shall be the forum for discussion and resolution of all test and integration issues.

3.3.3 Failure Reporting

System problem reports shall be prepared for all anomalous or noncompliant test results. The Contractor shall host and participate in a problem report review board. Submission of these reports shall not relieve the Contractor from other failure/fault reporting responsibilities under this contract (Software Problem Reports (SPR), Failure Reporting and Corrective Action System (FRACAS), etc.). The Government assumes responsibility for the classification of problem report severity. The Contractor shall also identify, to the JTG, software errors encountered during production acceptance testing, which the Contractor believes should not preclude acceptance of hardware products, and provide supporting rationale.

CDRL Failed Item Analysis Report

3.3.4 Government Test Monitoring and Witnessing

The Contractor shall provide access to the Surface USW system and its sensors in its development and test facilities for the Government to perform on-site independent tests or evaluations. The Government reserves the right to monitor all formal test activities performed by the Contractor.

3.3.5 Test Requirements

The Contractor shall develop, maintain and update the Specification Requirement Verification Matrices and Test Procedures.

CDRLs Specification Requirement Verification Matrices and Test Procedures

The Contractor shall generate a Test Report following the conduct of each test performed. The TEPP and SRVM shall describe all tests for each system configuration separately.

CDRLs Technical Report Study/Services: System Requirements Verification Matrices and Test Reports

3.3.6 Test Readiness Review

A Test Readiness Review (TRR) shall be conducted to determine the system's readiness to begin formal Government Developmental Testing. The results of these reviews shall be a certification that all the prerequisites for the test have been met, and that the item to be tested is ready for Government Developmental Testing. Documentation supporting the certification (previous test results, etc.) shall include, at a minimum, the results of prerequisite tests, final approved s, outstanding software and test problem reports, relevant specification and other documentation requirements and, as applicable, the Software Version Description Documents (SVD) for the operational software used in the test. Notification of the conduct of each TRR shall be made to the JTG chairman to enable Government monitoring.

CDRL Test Reports

3.3.7 Testing and Inspections

Within the TEPP, the Contractor shall propose a product evaluation structure and sequence culminating in Government required Qualification and First Article Inspections (FAI). The

structure and sequence shall be composed of various levels of product evaluations including analysis, demonstrations, inspections and tests (i.e., hardware/software integration tests).

The Contractor shall conduct development verification inspections of existing elements and components of the Surface Ship USW system. They shall include, as appropriate, Critical Item Tests (CIT), System Assessment Tests, Hardware Qualification Tests (HQT), First Article Inspections (FAI), Environmental Qualification Tests (EQT) and the Performance Monitoring/Fault Detection/Fault Location/Fault Isolation and Maintainability Demonstration (PM/FD/FL/FI&MD), Qualification and First Article Inspection tests. The Contractor shall be responsible to conduct analyses, examinations and tests required to verify system changes comply with the requirements of the Surface Ship USW system SRVM, the AN/SQQ-89(V) Product Environmental Test and Quality Assurance Requirements and this document and to verify compliance with the performance requirements of newly designed or modified equipment.

CDRL System Configuration Document and Test Report

3.3.7.1 Critical Item Test

The Contractor shall conduct Critical Item Testing (CIT) on critical prototyped items.

3.3.7.2 System Assessment Testing

System Assessment testing shall be coordinated with the Government to ensure that the system meets or exceeds minimum performance standards and to determine that no unacceptable conditions or hazards exist, which would prevent satisfactory, safe operation of the equipment.

3.3.7.3 Hardware Qualification Test

Hardware Qualification Tests (HQT) shall validate shock, vibration, Electro Magnetic Interference (EMI), humidity, temperature, noise, and altitude requirements of any units or configuration items that are not under a Government-established baseline.

3.3.7.4 Environmental Qualification Test

The Contractor shall perform Environment Qualification Test (EQT) on any units or configuration items that are not under a Government-established baseline IAW MIL-STD-901D. The Contractor shall document compliance with EQT performance specification requirements.

3.3.7.5 Performance Monitoring/ Fault Detection/Fault Location/Fault Isolation and Maintainability Demonstration

Compliance of the Surface Ship USW system to the Performance Monitoring/Fault Detection/Fault Location/Fault Isolation (PM/FD/FL/FI) requirements of the SRVM and the SOW shall be verified through testing by the Contractor. The Contractor shall conduct PM/FD/FL/FI&MD testing using MIL-HDBK-470 as guidance for each Surface Ship USW system configuration.

3.3.7.6 First Article Testing and Inspection

First Article Inspection (FAI) shall be required for equipment produced under this contract. The Contractor shall conduct First Article Testing (FAT) on all newly designed equipment offered for delivery. First Article Testing and Inspection shall be required on any Contractor modified

CFE or GFE. Previous FAI testing and/or analysis may be proposed to be substituted in lieu of formal testing. Additional environmental testing or analysis shall be limited to only those tests necessary to verify that any changes made to the cabinet or any new equipment added will not hinder the unit from meeting the requirements of the AN/SQQ-89 Product Environmental Test and Quality Assurance Requirements. FAI testing shall not be required for Legacy Build-to-Print equipment nor Government Furnished Equipment. However, if legacy or GFE equipment are components or subcomponents of a Principal Cabinet/Unit, this equipment shall be installed during the FAI tests of the Cabinet/Unit. Failures of legacy or GFE equipment not caused by Cabinet/Unit are not the responsibility of the Contractor. Failures of legacy or GFE equipment caused by the Cabinet/Unit and failures of the Cabinet/Unit caused by the legacy or GFE equipment are the responsibility of the Contractor. Satisfactory completion of Qualification and FAIs shall be a prerequisite to the establishment of a Product Baseline established by the Physical Configuration Audit (PCA).

3.3.7.7 Production Verification Testing

The Contractor shall conduct production verification testing of the Surface Ship USW system equipment for each TI hardware baseline procured under this contract. Production testing shall consist of PIT and PRAT. The Contractor shall provide documentation of the system configurations tested and include this documentation in the installation kit for traceability of LRU serial number and reference designator locations during PIT test. Upon completion of each PIT, the Contractor shall deliver a test report for each system configuration. The Contractor shall conduct a PRAT on each system, subsystem or Unit at the level offered for delivery. Successful completion of PIT shall be the prerequisite to PRAT. Upon completion of each PRAT, the Contractor shall deliver a test report for each system configuration.

CDRLs Test Reports and System Configuration Document

3.3.7.8 System Qualification Testing

System Qualification Test (SQT) is the Contractor's last formal test prior to delivery and acceptance by the Government. JTG concurrence is required before formal SQT is started. During SQT, there shall be a moratorium on changes to the hardware and software under test. SQT shall be conducted in the SSES to show compliance with the Surface Ship USW system SRVM requirements, and shall be conducted in a full up system configuration, with hardware identical to that designed for production systems. Each requirement listed in the SRVM contained in the Test and Evaluation Program Plan that cannot be shown in compliance by analysis shall be tested. The JTG shall provide overall guidance concerning the conduct of formal SQT. The Contractor shall develop a final SQT Report at the conclusion of SQT.

CDRLs Test and Evaluation Program Plan and Interface Design Description

The below listed are minimum prerequisites for the commencement of SQT:

- a) Software Development: Software development shall be complete through the highest level of functional segment validation and hardware/software integration testing and shall be certified by the Contractor's software quality assurance team with Government concurrence
- b) Hardware Development: The Contractor shall certify that hardware development is complete except for changes that may be required from the results of SQT or environmental and product quality testing

- c) Pre-requisite Testing: All scheduled hardware/software integration testing shall be completed. Specifically, the Functional Segment Configuration Item (FSCI)/Hardware Configuration Item (HWCI) integration testing described in the TEPP shall have been completed satisfactorily at the highest level
- d) Readiness Demonstration: A demonstration of readiness for formal SQT shall take place with Government witnessing. Tests to be run during the dry run shall be selected by Contractor and Government representatives. These tests shall contain no more than 25% of the total SQT procedures and shall be conducted over a period not to exceed 14 calendar days (double shift). At the conclusion of the demonstration, a recommendation shall be made to the JTG chair that the system is or is not certified to be ready for formal SQT. All test cases in which existing SPRs are likely to occur will be demonstrated. A two-shift (16 hour) period for Government representatives to independently use the system. A report of the results of the dry run will be provided to the Government
- e) All open SPRs shall have been provided to the Government with the following information at a minimum:
 - i. SPR Priority
 - ii. SPR Status
 - iii. Original SPR Number
 - iv. Origination Date
 - v. Originator
 - vi. Product Type
 - vii. Problem Item
 - viii. Problem Environment
 - ix. Problem Title
 - x. Problem Description
 - xi. Problem work around description if applicable

3.4 INTEGRATED LOGISTICS SUPPORT

The Contractor shall provide source data to the Government for incorporation into logistics products. The Contractor shall ensure effective communication with logistics personnel to ensure proper logistics support operation and maintenance of the systems. The Contractor is responsible for providing current and accurate logistics products in support of production systems.

3.4.1 Performance Based Logistics

The Contractor shall perform Performance Based Logistics (PBL) Business Case Analyses (BCA) as a part of the systems engineering process to ensure that PBL is a primary concern in system design changes. The study shall consider the most cost effective balance of logistics support capabilities to maintain the required operational availability (Ao), or readiness, of the system over its expected life cycle. The BCA shall address primary ILS elements, such as, supply support, technical manuals, and training and alternatives for fulfilling associated requirements. The Contractor shall report progress and results of the study at the ILS IPT meetings and in a final report. The final report shall include the cost model used for the analysis

3.4.2 Joint Production and Supportability Working IPT

The Contractor shall participate in the Joint Production and Supportability Working Integrated Product Team (JPS WIPT). The Contractor shall provide input to the agendas prior to each JPS

WIPT and generate minutes, including action items for each JPS WIPT. The JPS WIPT shall include: provisioning conferences, technical manual In Process Reviews (IPR), training development IPRs and supportability analysis IPRs.

3.4.3 Integrated Logistics Support Plan

The Contractor shall perform in compliance with NAVSEA Integrated Logistics Support Plan (ILSP). The ILSP establishes the requirements for supportability analyses and user requirements. **CDRL Integrated Logistics Support Plan**

3.4.4 Parts Management Program

The Contractor shall maintain a Parts Management Program that shall ensure the use of parts that meet system requirements, reduce proliferation of parts through standardization, enhancement, equipment reliability and supportability, and proactively manage obsolescence. Processes and procedures for identifying common hardware consistent with the overall TI baselines, accepting parts at the Contractor facility and vendor locations shall be established prior to PDR. The Contractor's Parts Management Program shall follow the guidelines described in MIL-STD-3018 and ANSI/AIAA-R-100A.

3.4.5 Supportability Analyses

The Contractor shall conduct supportability analyses as an integral part of the systems engineering process to ensure that supportability is a primary concern in system design and to demonstrate that the AN/SQQ-89(V) is cost effectively supportable. These analyses shall be performed using MIL-HDBK-502, as guidance. At a minimum, the analyses shall include Failure Modes, Effects and Criticality Analysis (FMECA) and Reliability Centered Maintenance (RCM) Analysis as follows. Functional Requirements Identification with appropriate feedback to the design process

- a) Testability and Diagnostic Procedure Development
- b) Maintainability Optimization to include accessibility, testing and change out of components
- c) Identification of Maintenance Assist Modules (MAMs), if required to support trouble shooting of the equipment
- d) Identification of Unique Support and Test Equipment (S&TE)
- e) Reliability Block Diagram including component criticality and failure rates for input to the Readiness Based Sparing process.

3.4.6 Support and Test Equipment

The Contractor shall identify and document Organizational (O), Intermediate (I), and Depot (D) level support and test equipment for AN/SQQ-89(V), including GFP, based on the operation and maintenance requirements determined as a part of the supportability analyses process. Support and test equipment identified shall consider scheduled and unscheduled maintenance at each maintenance level. The Contractor shall minimize the number of different types of support equipment needed for the system and shall identify the test equipment as General or Special Purpose Electronic Test Equipment (GPETE or SPETE). The Contractor shall provide justification for the use of SPETE.

3.4.7 Supply Support Analysis

The Contractor shall support the Government in formulating installation and checkout kit, provisioning spares, repair parts and support material requirements for each level of maintenance.

3.4.8 Diminishing Manufacturing Sources and Material Shortages Parts Management

The Contractor shall map the system's current technology (e.g., processor speed, size, capacity, performance, etc.) against the industry technology, and the planned market over the proposed life of the system. The mapping shall identify significant forecasted changes to capacity, reliability and design for the system's technologies so that informed decisions on potential upgrades and technology insertion and refreshment can be made. The Contractor shall maintain the parts control program that accommodates vendor design data using ANSI/AIAA-R-100A and MIL-STD-3018 as guidance. The Contractor shall develop a process to monitor, plan and implement corrective action to mitigate Diminishing Manufacturing Sources and Material Shortages (DMS/MS) risk associated with environmental impacts such as Restriction on Hazardous Substances (RoHS) (which restricts the use of Leaded solder, see <http://leadfree.ipc.org/>) to ensure system reliability, maintainability and supportability.

3.4.8.1 DMS/MS Management Requirements

The Contractor shall use a Government approved tool for the purpose of exchanging obsolescence information across the DoD enterprise. More information on DMS/MS data sharing is available at <http://www.dmsms.org/>. The Contractor shall track DMS/MS cost and performance metrics using DASN(L) DMS/MS Management Plan Guidance and report on these metrics as part of the scheduled JPS WIPT. The Contractor shall develop and maintain sources and source lists of all components, materials, assemblies, subassemblies and piece parts to the LRU throughout the system's life cycle that may be at risk for DMS/MS. The Contractor shall flow-down DMS/MS contract requirements to subcontractors. The Contractor shall manage and maintain visibility of its suppliers' DMS/MS capabilities and efforts.

3.4.8.2 DMS/MS Forecasting and Notifications Requirements.

The Contractor shall establish and maintain a process for forecasting and identifying DMS/MS issues and report on these issues at System Engineering and JPS WIPT.

3.4.9 Unique Identification Requirements

The Contractor shall identify and mark all parts requiring Unique Item Identifier (UID) marking. The Contractor shall also provide for the inputting of the data into the UID registry as specified in the UID plan and the updating of the drawings as necessary.

CDRL Unique Identifier Data

3.4.10 Packaging, Handling, Storage and Transportation

The Contractor shall establish a Packaging, Handling, Storage and Transportation (PHS&T) program that utilizes existing PHS&T programs to the maximum extent possible. The PHS&T program shall prevent both damage to the material and physical harm to personnel and shall not adversely affect the material operating characteristics. The Contractor shall account for shipment of system equipment to foreign destinations to support US and FMS installation in foreign sites.

3.4.11 Radio Frequency Identification

The Contractor shall use passive Radio Frequency Identification (RFID) tags that comply with the Electronic Product Code (EPC) Global Generation 2, Class 1 RFID tag specifications in accordance with the Supplier Implementation Plan and the DoD Suppliers' Passive RFID Information Guide at <http://www.acq.osd.mil/log/rfid/index.htm>.

3.4.12 Provisioning Data

The Contractor shall generate data required to support the ICAPS format that includes data elements provided via the JPS WIPT and, as available, OEM source data, drawings, technical information, and photographs for maintenance planning and PPL.

CDRLs Technical Manual Source Data, Configuration Item Drawings, Provisioning Technical Data and Provisioning Parts List

The Contractor shall provide a complete list of end items being delivered. The Contractor shall interface with Naval Inventory Control Point (NAVICP) and the Program Office for support data planning and provisioning conferences. If any changes are made to the equipment after the provisioning data is submitted and approved by the government, changes shall be provided via a Design Change Notice.

3.4.13 Access to Subject Matter Experts

The Contractor shall provide access to system designers, engineering and technical Subject Matter Expert personnel as required to facilitate ILS product development. The Contractor shall host meetings at his facility or support WEB based meetings or conferences with ILS development personnel as directed by PEO IWS5 to resolve technical issues impacting ILS product development. The Contractor shall identify a point of contact and process for scheduling and coordinating meeting support.

3.4.14 Technical Documentation

The Contractor shall develop, update and deliver Surface Ship USW Systems technical and design documentation in accordance with this SOW as outlined in Technical Instructions. These documents, which are supplemental documents to the delivered maintenance products (i.e., technical manuals), shall be developed as a result of the technical development or change to baseline Surface Ship USW integrated systems, whether software or hardware-related systems, firmware, and/or software. The Contractor shall deliver Technical Manual source data, as requested, for the purpose of Government Technical Manual development, validation, verification, and/or clarification. Source data is recorded information of a technical or scientific nature that does not constitute a complete Weapon Specification (does not include computer software source code or data incidental to contract administration such as financial or management information).

CDRL Technical Manual Source Data

The Contractor will supply technical data for COTS items to the extent that the OEM provides such data with the equipment. Tasks shall be initiated as a result of fleet feedback, failure analyses, engineered process improvements, Ordnance Alteration/Ship Alteration/Force Modernization/Post Shakedown Availability/Regular Overhaul/Ship's Restricted Availability (ORDALT/SHIPALT/FM/PSA/ROH/SRA) activities, computer program updates, or direction from PEO IWS5.

- a) The Contractor shall develop, update, maintain, and deliver the Technical Data Packages (TDP)s for all Aegis Weapon System (AWS) equipment procured under this contract. These TDPs shall contain all data sufficient to provide life cycle support for all Surface Ship USW Systems products down to the LRU level.

CDRL Product Baseline Technical Data Package

The TDP shall contain, as a minimum, the following data:

- i. Documentation generated to support Contractor developed software specifications
 - ii. Software developed under this contract to include testing, maintenance, and verification/validation programs
 - iii. COTS software, to the extent available
 - iv. Listings of all Contractor engineering change orders (ECOs) or drawing change authorizing documents categorized by Systems Change Notice/Engineering Change Proposal (SCN/ECP)
 - v. Outstanding SCNs/ECPs along with SCN/ECP implementation, or cut-in date
 - vi. Listings of all TDP documentation
 - vii. ECOs or authorizing drawing changes documents that describe in detail changes incorporated into engineering drawings
 - viii. Training Curriculum (Training Material, Corrective Maintenance Exercises (CMEs))
- b) Logistics Data including Preventative Maintenance System (PMS) Data
 - c) Presentation Materials
 - d) Audio/Visual Data
 - e) Reliability Data (Mean Time Between Failures (MTBF) Reliability Block Diagrams)
 - f) Failure Analysis
 - g) Government Property Records
 - h) Parametric Data
 - i) Change Control Data
 - j) Equipment/Hardware data related to system development and qualification
 - k) Equipment/Hardware data for firmware and embedded software
 - l) The Contractor shall procure software and training that enables development to conform to Department of Navy (DoN) Policy on Digital Product/Technical Data, dated 23 October 2004.

3.5 CONFIGURATION MANAGEMENT

The Contractor shall perform and maintain Configuration Management (CM) for the AN/SQQ-89(V) System. The Contractor shall be responsible for developing and conducting a CM program in support of the Hardware, Firmware, and Computer Software Configuration Items (HWCIs/FWCIs/CSCIs) produced under this contract.

3.5.1 Contractor CM Policy and Procedures

The Contractor's CM policies and procedures must be documented, and integrated with its program management, engineering, supportability and quality processes. IEEE 828-1998 and MIL-HDBK-61A provide guidance on product and data configuration management to material items in each phase of their life cycle. Electronic Industry Association (EIA)/IS-649 provides

best practices guidance for the development of Contract CM processes and methods.
CDRL Contractor Configuration Management Plan

3.5.2 CM Data Distribution/Access

The Contractor shall determine the most cost effective method of providing the CM data electronically that is specified in the contract data requirements list.

3.5.3 Configuration Identification

The Contractor shall ensure that the following configuration identification requirements are implemented:

3.5.3.1 Configuration Baseline

The Surface Ship USW system production Configuration Baseline (CB) for this acquisition is defined by the end item deliverables developed under this contract.

CDRL Configuration Baseline Listing

3.5.3.2 Hardware Identification/Marking

The Contractor shall physically identify electronic hardware (parts, assemblies, units) in accordance with the requirements specified in the CB. If not specified in the CB, the Contractor shall mark electronic hardware with its part number or affix an identification plate/nameplate to the item containing information that uniquely identifies the features of that item.

3.5.3.3 Software Identification/Marking

The Contractor shall physically identify each software entity under configuration control in accordance with the requirements specified in the configuration baseline documentation. If not specifically marked, the Contractor shall mark and label each software entity with a unique identifier and the version/revision level. Where appropriate, this information must be embedded in the code header. The Contractor shall mark each software media (e.g., magnetic tape, disk) containing copies of tested and verified software entities with a label containing, or providing cross-reference to, a listing of the applicable software identifiers of the entities it contains. The Contractor shall label media for deliverable CSCIs with the Government contract number; software identifier; Commercial and Government Entity (CAGE) code; media number (e.g., 1 of 2, 2 of 2) if there are multiple tapes/disks per set; and serial number of the media or media set (if there is more than one copy being delivered). Media copy numbers shall distinguish each copy of the software media from its identical copies. New or modified identifier numbers must be assigned each time a new version of software is issued.

3.5.3.4 Firmware Identification/Marking

The Contractor shall mark and label firmware in accordance with the requirements specified in the CB. If not specified, the Contractor shall mark the part number on the firmware device or on the next higher assembly:

- a) Where both the hardware device and the embedded firmware are documented and controlled via the same engineering document, the Part/Item Identification Number (PIN) for the device with the code embedded identifies the firmware. The PIN shall be marked on the device or traceable from the next higher assembly
- b) Where the hardware device and the software to be embedded are documented and controlled separately, the hardware device is identified by a PIN; the embedded

software is identified separately. The hardware device PIN and the serial number shall be marked on the item. The software identifier shall either be embedded in the code and a means to display the identifier to the user provided or a label shall be attached to the device containing or providing cross-reference to a listing of software identification.

3.5.4 Configuration Control

The Contractor shall provide systematic evaluation, coordination, and implementation of all proposed/approved changes or deviations to the approved configuration baseline documentation. The Contractor shall prepare Engineering Change Documentation as required for the below paragraphs.

3.5.5 Engineering Change Proposals

The Contractor shall prepare and submit Class I Engineering Change Proposals (ECP) and Class II ECPs for the Surface Ship USW system to the Government for approval or disapproval as required. Proposed changes that would affect the form, fit, function, or cost of the Government controlled baseline, shall be implemented only after a Class I ECP is approved and authorized by the Procuring Contracting Officer via a contract modification. Proposed changes that would not affect the form, fit, function or cost of a configuration item identified in a Government controlled baseline, shall be submitted to the Administrative Contracting Officer (ACO) as Class II ECPs for concurrence in classification only. Class II changes that receive such concurrence shall be implemented by the Contractor.

CDRL Engineering Change Proposals

3.5.6 COTS Module Substitutions

The Contractor shall verify through testing that substitution of a COTS module for a COTS module previously selected for use in the hardware design has demonstrated that a change to the CB is not required. The substitution shall be treated as a Class II ECP. However, if such testing discloses that a change to the CB is required then the Contractor shall generate a Class I ECP.

3.5.7 Correction of Deficiencies

The Contractor is responsible for the development of ECPs and for all aspects of the implementation of the ECP which are required to correct deficiencies. Implementation shall include, but is not limited to, retrofit of all configuration items and provision of support resources called for under the contract to reflect any changes to be accomplished by the ECP to the extent necessary to allow all configuration items provided under this contract to be operated and maintained with the same support resources, such as operation and maintenance manuals, provisioning technical documentation, and maintenance spare/repair parts for such items. Changes that are directed by the Government shall be incorporated in accordance with the contract "CHANGES" clauses.

3.5.8 Requests for Deviation

The Contractor shall prepare critical and major RFDs and minor RFDs for the AN/SQQ-89(V) for Government review and approval. Authorized RFDs shall apply to a specific quantity of items for manufacture and will not permanently change the established baseline. RFDs may not be submitted for changes to software code listings; an ECP must be used to effect such a change. Submittal of recurring RFDs is discouraged.

CDRL Request for Deviation

3.5.9 Class II ECPs, Minor RFDs

The Contractor shall prepare Class II ECPs and minor RFDs for the AN/SQQ-89(V) for submittal to the ACO for concurrence in classification. If the ACO or the ACO's representative does not notify the Contractor otherwise within fifteen (15) working days after submittal, concurrence may be assumed. In the event of non-concurrence, the Contractor shall stop further implementation of the proposed Class II ECP or minor RFD at no increase in the price of this contract. The Contractor may resubmit the ECP as a Class I ECP or major RFD or request review by the PCO within five (5) days following the ACO non-concurrence. The Contractor shall perform as directed by the PCO; in the event that the Contractor disagrees with the PCO's direction, the Contractor may file an appeal under the "DISPUTES" clause of this contract. Pending resolution, however, the Contractor shall continue to perform pursuant to the PCO's direction.

3.5.10 Revisions to ECPs/RFDs

The Contractor shall make revisions to ECPs/RFDs for the AN/SQQ-89(V) as necessary.

CDRLs Engineering Change Proposals and Request For Deviation

3.5.11 Data Classification

When practical, ECPs or RFDs should be unclassified. Classified data essential to the evaluation and disposition of an ECP/RFD must be submitted separately in accordance with the security procedures established in accordance with the contract and referenced in the unclassified portion of the ECP.

3.5.12 Specification Change Notices

The Contractor shall prepare a proposed Specification Change Notice (SCN) concurrent with a Class I ECP for each specification, as that would require revision if the ECP were approved. The SCN shall be used to describe where and how the specification change will be made and provide instructions for pen and ink changes for minor changes or provide replacement specification pages.

CDRL Specification Change Notice

3.5.13 Notice of Revision

After ECP approval, the Notice of Revision (NOR) shall be forwarded to the custodian of each specification, drawing, associated list, or other applicable documents(s) so they can make the required documentation changes.

CDRL Notice of Revision

3.5.14 Design Change Notice

The Contractor shall notify the Government of all changes, whether of a production or modification type, which impact the end item or its supporting equipment's provisioning. The Contractor shall submit PTD revisions and associated Engineering Data for Provisioning (EDFP) via the Design Change Notice (DCN). When the design change significantly impacts the system or equipment configuration, and when directed by the Government, a changed system or equipment shall be provisioned as a new end item and documented by new PTD with associated

EDFP.

CDRL Design Change Notice

3.5.15 Engineering Change Installation

The Contractor shall provide engineering support for the preparation of Government-generated engineering change instruction documents necessary to retrofit approved Class I Engineering Changes into delivered Kits.

3.5.16 Configuration Status Accounting System

The Contractor's configuration status accounting (CSA) system shall provide for recording and reporting of information that is necessary to effectively manage the hardware and software delivered under this contract. Information to be recorded includes: indented product listings, specification revision level and history, drawing revision level and history, software /firmware version level and history, active change preparation and processing status, approved change implementation status, operational configuration level and history. Within the Contractor's information management systems, duplicate databases or files are to be avoided.

3.5.17 As-Built Configuration List

The Contractor shall generate and maintain an As-Built List (ABL) throughout the assembly and test of each kit. Prior to entering any formal test the IPT will perform an ABL verification spot check, as required, and then the units shall be placed under Breakseal control. Under Breakseal control no parts can be exchanged without notifying the Program Office On-Site team representative or Defense Contract Management Agency (DCMA) Quality Assurance representative. Any changes required to the ABLs shall be accomplished prior to Contractor delivery.

CDRL As-Built Configuration List

3.5.18 Physical Configuration Audit

The Physical Configuration Audit (PCA) review shall compare the ABL provided by the Contractor to the actual equipment in order to verify functional part numbers and locations of subassemblies and parts. A PCA shall be done on each hardware subset. Each unique subset (unique combination of units/items) will only be audited once. The PCA shall not start until successful completion of FCA. At specific points in time, successive parts of the AN/SQQ-89(V) superset Product Baseline will be declared under Government CM Control. AN/SQQ-89(V) System ECPs shall be required to change those portions of the system that have been placed under Government CM control.

The Contractor shall provide the Technical Data Package and engineering documentation, including inspection and acceptance test requirements to define the AN/SQQ-89(V) Product Baseline.

CDRL Product Baseline Technical Data Package

The Product Baseline shall describe the initial production configuration of the system and all authorized changes. The Product Baseline shall also include all system LRU level Inspection and Test Requirements and Procedures and computer program design documentation.

The Product Baseline shall be established at the successful completion of Physical Configuration Audit (PCA) and resolution of all PCA findings. The Contractor shall transition Surface Ship USW drawings and maintenance and control of the drawings to the Government 120 days after successful completion of the Physical Configuration Review.

3.6 TRAINING

The Contractor shall develop training materials in support of the Surface Ship USW Systems integrated baseline(s) for each ACB/TI and IAW NAVEDTRA 131 series and the Navy Instructional Content Style Guide Interactive Multimedia Instruction and Instructor led Training format. The Contractor shall develop and integrate training material changes that reflect the capability changes to the combat system capabilities. The Contractor shall provide support for the training of DoD civilian and Navy personnel at Land Based Test Sites (LBTSS) as directed by Technical Instructions. **CDRL Training Materials**

3.6.1 Technical Data

The Contractor shall provide data to the Government that will be used to develop, update and maintain operation, maintenance training and curriculum data.

3.6.2 Training and Training Support

The Contractor shall provide source data to be used by the Government in the development of training materials.

CDRL Training Materials

The Contractor shall provide support as required for ship force and support personnel training in support of CSSQT/DT/OT events and other training events as identified by PEO IWS5. Training materials will be provided as GFI. The number and location of training events shall be specified in separate Technical Instructions. The Contractor shall provide a training conduct report within 10 days of the conclusion of each event.

CDRL Training Conduct Report

3.6.3 Support for ILS Development and Production Site

The Contractor shall provide engineering services, equipment architecture and configuration support for the ILS Development and Production Site (IDAPS), Chesapeake, Virginia. IDAPS is a facility for development of Surface Ship USW ILS and training material. The facility utilizes the Supportability Functional Segment Software to drive the processing performed in the Data Processing Units. The Contractor shall provide assistance to IDAPS Personnel to configure the IDAPS system to be compatible with the software configurations including kernel configuration, IP Addressing and Node Identification. The Contractor shall provide periodic updates to IDAPS software as a result of integration and testing activities being performed in the SSES. The Contractor shall assist in the installation of software baseline configurations at IDAPS, performance of checkout testing to validate proper operation, and verification of proper operation of installed SIM/STIM and tape relay hardware and software. Software shall be installed IAW schedule negotiated with IDAPS and Contractor personnel. The Contractor shall perform Quality Assurance of software images provided by the Surface Ship USW system Software Reproduction and Distribution Facility. These images shall be tested for proper operation utilizing equipment at the Contractor facility and the Contractor shall provide a report

on their suitability to be used as Master Media files in support of further distribution for tactical shipboard system use.

3.7 INSTALLATION, CHECKOUT AND FIELD SUPPORT

The Contractor shall provide installation and checkout services to meet the requirements of the contract and achieve required performance. The Contractor shall develop, update and maintain documentation to support the installation of the new/modified equipment. The Contractor shall provide copies of the System PITs for the AN/SQQ-89(V) System that verify the hardware is assembled and operating correctly, including interfaces within the hardware units, between the hardware units, and external to the AN/SQQ-89(V) system for use by PEO IWS5 in developing the shipboard Installation and Checkout (INCO) Test Procedures. The Contractor shall provide updated PITs as the AN/SQQ-89(V) hardware and/or software is changed. Time and technical support in Contractor's test facility for validation and verification of the INCO tests shall be provided. The Contractor shall provide engineering drawings, parametric data, and technical system information required for PEO IWS5 to develop Installation Control Drawings IAW MIL-D-23140D. Information shall include all system interface requirements, recommended cable types, cable running sheets, connector/backshell required and cable EMI category. Engineering drawings and data for each unit to include Unit name, Unit number, Wet Weight, Crated Weight, Cubical Content, Power Requirements, AC Voltage, Voltage Tolerance, Frequency Tolerance, Phase, Current, Power, Power Factor Lead/Lag, DC Voltage, Voltage, Heat Dissipation To Air, Heat Dissipation To Water, Relative Humidity, Base Plate Loading (Lbs/Sq. Ft), and Operating Temperature (Fahrenheit). Each unit drawing shall include a connector chart with reference designator, Type Connector, X & Y Coordinates, Mating Plug, and Aegis and Non-Aegis Backshells. For water cooled units include connector locations shown and dimensioned, connection reference designations identified, max and min inlet cooling temperatures, max and min flow rate, and design flow rate. For units requiring ground straps include grounding studs shown and dimensioned, and grounding hardware (for equipment end only) identified in correct mounting order arrangement. Contractor shall provide a listing of all installation material, mounting hardware, and modification kits being provided with AN/SQQ-89(V) Equipment.

CDRL Installation Control Drawings

3.7.1 Installation Support

The Contractor shall provide Installation Support as directed by IWS5. Support shall include, but not limited to onsite troubleshooting of software issues in support of the AN/SQQ-89(V) Platforms, physical software loads and onsite troubleshooting of hardware issues. The Contractor shall respond to the PEO IWS5 Government request for technical assistance aboard AN/SQQ-89(V) platforms. Tasking may include reconfiguration of network switches, troubleshooting software issues, reassigning processing from one node to another. The Contractor shall coordinate efforts with the PEO IWS5 Government Aegis Integration Team (AIT) lead/local Regional Maintenance Centers (RMC) and resolve issues to their satisfaction and provide all tools and test equipment to adequately resolve AN/SQQ-89(V) system issues.

3.7.2 Post-Delivery Support

The Contractor shall support the Government specified Lifetime Support Engineering Agent (LSEA) for delivered computer programs.

These tasks include:

- a) Supporting the Government in establishing and maintaining multiple computer program baselines supporting various configurations
- b) Systems engineering and logistics analysis to support problem resolution with installed computer programs
- c) Managing the coordination of computer program problem corrections to delivered computer program baselines
- d) Implementing and testing computer program problem corrections to delivered computer program baselines and modifying associated documentation
- e) Transmitting or redelivering computer program updates and code, including tools, firmware updates, operating systems and all the licenses required for new updates, for problems on delivered computer program software applicable to the relevant class of ships in construction, on delivered computer program software
- f) Maintaining a comprehensive Software Trouble Report / System Incident Report Trouble Observation Report (TOR)/ Computer Program Change Request (CPCR) status tracking and reporting system
- g) Development and maintenance of additional Computer Program operations and training documentation.

3.7.3 Field Engineering Services

The Contractor shall provide field engineering services to meet the requirements of the contract and achieve system performance. The Contractor shall provide qualified electrical/electronic, mechanical and software engineers and technicians where required for on-site technical advisory service to assist Government personnel in support of system checkout, integration testing, system operational verification testing, repair, training, and to resolve other technical issues, as directed by the Government. The Contractor shall submit a summary of field maintenance and repair services as a part of the quarterly Contractor's management report.

3.7.4 Maintenance Support Services

The Contractor shall provide maintenance support services to meet the requirements of the contract and achieve system performance. The Contractor shall provide qualified electrical/electronic, mechanical and software engineers and technicians where required for field maintenance repair to support the fleet. Field maintenance support shall include on-site assistance to surface platforms for troubleshooting and repair. Any problems that affect safety or the ability to operate (no workaround) shall be directed to the Government within 24 hours. Additionally, the Contractor shall establish a worldwide, 24-hour toll-free telephone hotline when providing fleet support. Within 24 hours of the receipt of any call, the Contractor shall provide assistance to the caller for corrective action, acknowledge receipt of the call to the Government, maintain a database of the call received (for trend analysis), and request further direction from the Government as needed. The Contractor shall submit a summary of telephone calls and their disposition as part of the quarterly Contractor's management meetings.

3.7.5 System Support

The Contractor shall provide on-site engineering support, both waterfront and at-sea, as directed by the Government. The Contractor shall identify and maintain visibility of all Combat System related problems and potential problems arising during contract performance that could impact the shipyard design, and upgrade schedule. The Contractor shall support activities with the Government design teams to resolve Combat System design issues that impact shipyard design,

fabrication, construction, and testing. The Contractor, working with PEO IWS 5, shall ensure that the Surface Ship USW system requirements for hull, mechanical and electrical support systems are incorporated in the ship design. The Contractor shall assist in the verification and validate that the Program Acquisition Resource Manager (PARM) equipment to be integrated is in conformance with the combat system requirements. The Contractor shall define, in quantitative terminology, and document the functional and physical interfaces of the combat system, including open systems architecture to the combat system and those interfaces to external or interacting systems.

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Appendix A

List of Acronyms

ACB	Advanced Capability Build
ACO	Administrative Contracting Officer
ACS	Aegis Combat System
Aegis	Advanced Electronic Guidance and Instrumentation System
AIAA	American Institute of Aeronautics and Astronautics
AIE	Aegis Integration Event
AIT	Aegis Integrations Team
AMOD	Aegis Modernization
ANSI	American National Standards Institute
A _o	Operational Availability
API	Application Programming Interface
ASW	Anti-Submarine Warfare
ATD	Actuals To Date
AWS	Aegis Weapon System
BCA	Business Case Analysis
C4ISR	Command, Control, Communication, Computers, Intelligence, Surveillance and Reconnaissance
CADM	Core Architecture Data Model
CAGE	Commercial and Government Entity
CASE	Computer Aided Software Engineering
CB	Configuration Baseline
CDR	Critical Design Review
CES	Common Enterprise Server
CFE	Contractor Furnished Equipment
CI	Configuration Item
CIPFS	Configuration Item Product Functional Specification
CIT	Critical Item Test
CM	Configuration Management
CME	Corrective Maintenance Exercises
CMP	Configuration Management Plan
COR	Contracting Officer Representative
COTS	Commercial Off-The-Shelf
CPCR	Computer Program Change Request
CPDD	Computer Program Design Document
C/S	Client/Server
CSA	Configuration Status Accounting
CSCI	Computer Software Configuration Item
CSSQT	Combat System Ship Qualification Test
CWBS	Contract Work Breakdown Structure

CUI	Controlled Unclassified Information
D	Depot
DAL	Data Accession List
DASN(L)	Deputy Assistant Secretary of the Navy
DAU	Defense Acquisition University
DCMA	Defense Contract Management Agency
DCN	Design Change Notice
DISA	Defense Information Services Agency
DMS/MS	Diminishing Manufacturing Sources and Material Shortages
DoD	Department of Defense
DoDD	Department of Defense Directive
DON	Department Of Navy
DSS	Defense System Security
DT	Developmental Test
EAC	Estimate At Completion
ECO	Engineering Change Order
ECP	Engineering Change Proposal
EDFP	Engineering Data For Provisioning
EIA	Electronics Industries Association
EIT	External Interface Test
ELIN	Exhibit Line Item Number
EMI	Electromagnetic Interference
EPA	Environmental Protection Agency
EPC	Electronic Product Code
EQT	Environmental Qualification Test
ETC	Estimate To Complete
EVMS	Earned Value Management System
FAI	First Article Inspections
FAR	Federal Acquisition Regulation
FAT	First Article Test
FCA	Functional Configuration Audit
FIPS	Federal Information Processing Standards
FM	Force Modernization
FMECA	Failure Modes, Effects and Criticality Analysis
FMS	Foreign Military Sales
FRACAS	Failure Reporting, Analysis and Corrective Action System
FS	Functional Segment
FSCI	Functional Segment Configuration Item
GFE	Government Furnished Equipment
GFI	Government Furnished Information
GFM	Government Furnished Material
GFP	Government Furnished Property
GFS	Government Furnished Software
GPETE	General Purpose Electronic Test Equipment

HATFS	Hull Active Transmit Functional Segment
HQT	Hardware Qualification Test
HWCI	Hardware Configuration Item
I	Intermediate
IA	Information Assurance
IAW	In Accordance With
IBR	Integrated Baseline Review
I&C	Installation and Checkout
ICAPS	Interactive Computer-Aided Provisioning System
IDAPS	ILS Development and Production Site
IDD	Interface Design Description
IEEE	Institute of Electrical and Electronics Engineers
ILS	Integrated Logistics Support
ILSP	Integrated Logistics Supportability Plan
IMS	Integrated Master Schedule
INCO	Installation and Checkout
iPDM	Integrated Product Data Management
IPR	In Process Review
IPT	Integrated Process Team
IRS	Interface Requirements Specification
JTG	Joint Test Group
LAMPS	Light Airborne Multi-Purpose System
LCS	Littoral Combat Ship
LRU	Lowest Replaceable Unit
LSEA	Lifetime Support Engineering Agent
M&S	Modeling and Simulation
MAMS	Maintenance Assist Modules
MIL-HDBK	Military Handbook
MIL-STD	Military Standard
MSDS	Material Safety Data Sheets
MTBF	Mean Time Between Failures
NAVEDTRA	Naval Education Training
NAVICP	Naval Inventory Control Point
NAVSEA	Naval Sea Systems Command
NDI	Non-Developmental Item
NDIA	National Defense Industry Association
NISPOM	National Industrial Security Program Operating Manual
NOR	Notice of Revision
NRE	Non-Recurring Engineering
O	Organizational
OA	Open Architecture
OEM	Original Equipment Manufacturer
OPNAV	Operational Navy
OPNAVINST	Operational Navy Instruction

ORDALT	Ordnance Alteration
OS	Operating System
OSHA	Occupational Safety and Health Administration
OT	Operational Test
PARM	Program Acquisition Resource Manager
PBL	Performance Based Logistics
PCA	Physical Configuration Audit
PCO	Procuring Contracting Officer
PDD	Product Description Document
PDR	Preliminary Design Review
PEO IWS	Program Executive Office for Integrated Warfare Systems
PHS&T	Packaging, Handling, Storage and Transportation
PIT	Production Inspection Test
PKI	Public Key Infrastructure
PM	Program Manager
PMP	Program Management Plan
PRAT	Production Readiness Acceptance Test
PRR	Production Readiness Review
PM/FD/FL/FI & MD	Preventative Maintenance/Fault Detection/Fault Localization/Fault Isolation and Maintenance Demonstration
PMS	Preventative Maintenance System
PPL	Provisioning Parts List
PSA	Post Shakedown Availability
PTD	Provisioning Technical Documentation
PUB	Publication
QA	Quality Assurance
QAPP	Quality Assurance Program Plan
RCM	Reliability Centered Maintenance
RFD	Request For Deviation
RFID	Radio Frequency Identification
RFW	Request For Waiver
RMC	Regional Maintenance Center
ROH	Regular Overhaul
RoHS	Restriction of Hazardous Substances
S&TE	Support & Test Equipment
SCN	Specification Change Notice
SDD	Software Design Document
SDP	Software Development Plan
SE	Systems Engineering
SECNAVINST	Secretary of the Navy Instruction
SFR	System Functional Review
SHIPALT	Ship Alteration
SIP	System Integration Plan
SIM/STIM	Simulation/Stimulation

SOW	Statement of Work
SPETE	Special Purpose Electronic Test Equipment
SPR	Software Problem Report
SPS	Software Product Specification
SQT	System Qualification Test
SRA	Ship's Restricted Availability
SRR	System Requirements Review
SRS	Software Requirements Specification
SRVM	System Requirements Verification Matrix
SSDD	System/Segment Design Document
SSES	Surface Ship Engineering Site
SSR	Software Specification Review
SVD	Software Version Description
TDP	Technical Data Package
TEPP	Test and Evaluation Program Plan
TI	Technology Insertion
TOR	Trouble Observation Report
TR	Technology Refresh
TRI	Toxic Release Inventory
TRR	Test Readiness Review
UCFS	Undersea Warfare Control Functional Segment
UID	Unique Item Identifier
UML	Unified Modeling Language
U.S.	United States
USW	Undersea Warfare
WBS	Work Breakdown Structure
XML	Extensible Markup Language