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Attachment 1

**STATEMENT OF WORK
FOR
TEAM SUBMARINE
COMMON PRODUCTION HARDWARE**

**DEPARTMENT OF THE NAVY
PROGRAM EXECUTIVE OFFICER, SUBMARINES (PMS425)
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1.0 SCOPE.

1.1 Purpose.

This Statement of Work (SOW) defines the efforts required for the program management, engineering, design, development, logistics, configuration management, production, test, evaluation, installation and support of displays, processors, network systems and other equipment associated with the Team Submarine Common Production Hardware project (hereinafter called CPH).

The Contractor shall design, develop, test, qualify, produce, deliver, install and support CPH equipment and enclosures In Accordance With (IAW) this SOW and the associated System Requirements Documents (SRD). The term “equipment” is used to refer to Advance Production Units (APU), systems, kits, parts, spares, units, products, and all other deliverable hardware/software/firmware contained within this SOW. An APU is any CPH component that has not yet been approved for production under this contract. An APU can be a ‘design qualification unit’ that is being developed to meet new requirements or to accommodate a system that has already entered the design phase by another Government sponsored activity.

1.2 Background.

CPH is the U.S. Navy’s latest generation of a continuously evolving family of display, processor and network systems which provide computer processing and memory, data storage and extraction, and Input/Output (I/O) interfaces to support specific host software applications of Navy Combat Control, Sonar and Imaging Systems. CPH is designed to support the Program Management and Program Executive Offices implementation of an Open Architecture (OA) way ahead for Navy systems. CPH will maximize flexibility and modularity by procuring a processing system designed around commercially available hardware and software, which will conform to Open Architecture Common Element (OACE) Technologies and Standards.

1.3 Collaborative Development Environment.

It is essential that the contractor demonstrate an ability to work in a collaborative environment with a consortium of Navy, Navy Laboratories, Academia, other Government & industry partners, and NATO foreign governments as part of the Navy's Foreign Military Sales Program to ensure continued success of the program. The contractor should 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.

1.4 Open Systems Architecture Approach.

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

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

1.5 Summary.

The work shall be performed as specified in Delivery Orders (DO) and Technical Instructions (TI) to include the following:

- Provide engineering services to include the design, development, fabrication, assembly, component level integration, test, delivery and install of equipment and or enclosures for CPH
- Develop CPH configurations to host the various platforms as applicable. Each initial delivery will include all baselined engineering documents, product lists, Integrated Logistic Support (ILS) products, support materials, and spares.
- Management of system level test and evaluation plans as part of system platform integration.
- Participate in the design and integration efforts to include technology insertion and refresh planning and validation.
- Support platform level installation and validation/verification, including participation in installation Integrated Product Teams (IPT), modernization planning and various reviews and working group meetings.
- Provide test software for equipment developed under this contract.
- Provide operating environment products, maintenance, and upgrades for equipment under this contract.
- Develop, deliver, and update Configuration Management (CM) products.
- Develop material for Interactive Electronic Technical Manuals (IETM) and Computer Based Training (CBT) and provide to the Government.
- Support in-service engineering and field service tasking, such as installation, field integration, repair and refurbishment efforts as required.
- Deliver spares/repair parts, technology insertion/refresh kits, pre-production/production hardware and associated firmware and test software, including ILS product support development, production, and installation.
- Provide reliability engineering and failure analysis.
- Provide Commercial component obsolescence management including vendor monitoring, replacement component qualification, testing, and ILS updates.
- Delivery of subsequent production systems will be accomplished, if required, under separate tasking.

1.6 Contract Data Requirements List Items.

Contract Data Requirements List (CDRL) items are specified in Contract Attachment 2. Whenever a CDRL requirement is referenced in this SOW, the CDRL number is provided.

2.0 REFERENCED DOCUMENTS.

2.1 Government Documents.

The following documents form a part of this SOW, but are not provided as attachments to this SOW. It is the Government's intention to adopt best commercial practices in completing system development and acquisition objectives.

MIL-HDBK-217	Reliability Prediction of Electronic Equipment
MIL-HDBK-251	Reliability/Design Thermal Applications 19 Jan 1978
MIL-HDBK-61	Configuration Management Guidance
MIL-HDBK-470A	Designing and Developing Maintainable Products and Systems Volume I and Volume II 04 Aug 1997
MIL-HDBK-502	Acquisition Logistics 30 May 1997
MIL-HDBK-881A	Work Breakdown Structure for Defense Materiel Items 30 Jun 2005
MIL-STD-882D	System Safety Program Requirements 10 Feb 2000
MIL-STD-130N	Identification Marking of U.S. Military Property 17-DEC-2007
MIL-STD-196	Joint Electronics Type Designation System
MIL-STD-461F	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment 10 Dec 2007
MIL-STD-2073	DOD Materiel, Procedures for Development and Application of Packaging Requirements
MIL-STD 1472F(1)	Human Engineering 05 Dec 2003
MIL-STD-3018	Department of Defense Standard Practice Parts Management 15 Oct 2007
MIL-S-901D	Shock Tests, H. I. (High-Impact) Shipboard Machinery, Equipment, and Systems, Requirements For 17 Mar 89
MIL-P-24534A	Planned Maintenance System: Development Of Maintenance Requirement Cards, Maintenance Index Pages, and Associated Documentation 7 May 1985
MIL-PRF-29612B	Training Data Products 31 Aug 2001
MIL-PRF-49506	Performance Specification Logistics Management Information 18 Jan 2005
MIL-DTL-31000C	Technical Data Packages 09 Jan 2001
DASN(L)	Diminishing Manufacturing Sources and Material Shortages (DMS/MS) Guidebook 1 Nov 2006
Provisioning, Allowance and Fitting Out Support (PAFOS)	Provisioning Technical Documentation(PTD) Requirements for NAVSEA Government Furnished and Contractor Furnished

Manual	Commodities http://www.nclc.navy.mil/TechLog/PolicyProc.htm)
NAVSEA 0924-062-0010 Rev C	Submarine Safety (SUBSAFE) Requirements Manual
NAS411 thru Rev 2.	Hazardous Materials Management 29 April 1994
NAVSEA-ST00-AA- IDX-010-TEI Rev 17	Test Equipment Index
DoDI 8500.2	Information Assurance (IA) Implementation 6 February 2003
DoD 4715.4	Pollution Prevention 18 June 1996

2.2 Industry Based Standards Documents.

ANSI/AIAA-R-100A2001e	Recommended Practice for Parts Management
IPC/J-STD-001D	Requirements for Soldered Electrical and Electronic Assemblies 2005
IEEE/EIA 12207.0/1/2	Software life cycle processes; life cycle data; implementation considerations March 1998 and April 1998
ANSI/EIA-748-A	Earned Value Management Systems 1998 (R2002) 2002
ANSI/EIA-632	Processes for Engineering a System 1999
ANSI/EIA-649-A	National Consensus Standard for Configuration Management 2004
ANSI/ASME Y14.24M	Types and Applications of Engineering Drawings 1989, revision 1996
ANSI/ASQC Q9001	

3.0 General Requirements.

The Contractor shall provide the services required by this SOW to the Contracting Officer or duly authorized representative. The SOW requirements specified in section 3.0 and 4.0 apply to all technical instructions and delivery orders executed under this contract. Delivery orders will be in a Government provided format and approved by the Contracting Officer.

3.1 Integrated Program Management.

The Contractor shall designate a Project Manager who shall have responsibility for all aspects of this contract and the authority to commit the Contractor to specific courses of action. 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.

The Contractor shall establish and perform business management functions to ensure contracting related actions, such as development and submission of proposals, negotiation of proposals, responses to requests for cost estimates and production order meet established need dates of the Government.

The Contractor shall provide management, including technical direction, risk management, administration and planning for all activities within this contract. The contractor shall provide program planning, budget allocations, cost control, cost estimates, proposal support and status reporting for tasks associated with this contract. The contractor shall be responsible for coordination with Contracting Officer, Program Office and other agencies in the execution of this contract.

3.1.1 Progress, Status and Management Report.

The Contractor shall develop and propose program management metrics appropriate to the Contract Line Item Number (CLIN) or phase of the contract to reflect program management. Metrics must accurately reflect cost, schedule, and performance. These proposed program management metrics shall be initially presented at a post award review. The Contractor shall report these metrics in the Progress, Status and Management Report and at each design review and program review.

The Contractor shall maintain technical and financial status and generate Progress, Status and Management Reports (CDRL A001). 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. Status should contain the current status of all orders including required, estimated and actual delivery dates.

The contractor shall support Program Management Reviews and Milestones as needed

3.1.2 Contract Performance Report.

The Contractor shall establish, maintain, and use in the performance of this contract, an integrated performance management system. An Earned Value Management System (EVMS) shall be used IAW the

EVMS guidelines contained in ANSI/EIA-748. To establish the integrated performance management system, the EVMS shall be linked to and supported by the Contractor's management processes and systems to include the Integrated Master Schedule (IMS), Contract Work Breakdown Structure (CWBS), change management, material management, procurement, cost estimating, and accounting systems. The correlation and integration of these systems and processes shall provide for early indication of cost and schedule problems, and their relation to technical achievement (CDRL A002).

3.1.3 Contract Work Breakdown Structure.

The Contractor shall develop, deliver, and maintain a CWBS and CWBS dictionary using MIL-HDBK-881 as 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 the appropriate level 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 the SOW and system specifications and translate them into a structure representing the products and services that comprise the entire work effort under the contract. The Contractor's team or organizational entity responsible for the systems engineering of the system shall prepare the technical elements of the extended Contract WBS. The Contractor, if necessary, shall update the CWBS during the execution of the contract. Changes to the CWBS or associated definitions, at any reporting level, require approval of the Government (CDRL A003).

3.1.4 Integrated Master Schedule.

The Contractor shall develop, maintain, and deliver original and revisions of an IMS for all contract efforts, planned events, milestones and activities from contract award to the completion of the contract. Proposed changes to the program schedule must be approved by the Government prior to their implementation by the Contractor. The Contractor shall quantify risk in hours, days, or weeks of delay and provide optimistic, pessimistic, and the most likely duration for each IMS activity and event. (CDRL A004)

3.1.5 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. Contractor must receive Government approval to exceed the subcontractor portion reflected in the contract. In addition the Prime contractor shall:

- a. Establish, document, and maintain a purchasing system and develop a self-assessment program to ensure adequate controls;
- b. Acquire quality products at fair and reasonable prices, using best in class commercial purchasing practices and procedures and ensure fair and open competition;
- c. Flowdown contract requirements to subcontractors and audit subcontracts as needed;

- d. Conduct review and periodic appraisal of the sub-contractor's purchasing system and its self-assessment reports;

3.1.6 Reviews.

The Contractor shall coordinate, schedule, make preparations for, conduct, facilitate and participate in reviews, meetings, and conferences specified herein. The Contractor shall propose date(s) for the reviews to be approved by the Government. The Contractor shall provide agendas (CDRL A005), presentation materials, action items, action item status and minutes (CDRL A006). 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 shall include a summary of discussions, copies of handouts or graphics, and a listing of action items, and distributed electronically.

The Contractor shall develop and maintain a action item status and tracking system for all reviews to ensure actions are assigned to specific individuals, due dates are established, and accurate status is provided to the Government.

3.1.6.1 Post Award Review.

The Contractor shall conduct a post award review within 14 calendar days after contract award, to establish contacts with Government personnel and allow the Contractor to obtain clarification of contract requirements.

3.1.6.2 Program Reviews.

The Contractor shall conduct program reviews every three (3) months at its facility for a period not to exceed one (1) day. The Contractor shall conduct management meetings regarding technical instruction, delivery and production orders status on a regular basis (to be mutually agreed upon between the Government and Contractor) between the program reviews. These reviews will be used to assess the Contractor's progress and status. During these reviews, the Contractor shall provide, at a minimum, overall comprehensive status of:

- a. cost and schedule performance;
- b. design and technical issues;
- c. hardware and computer software engineering;
- d. risk analysis activities;
- e. reliability and maintainability;
- f. quality program;
- g. test and evaluation activities;
- h. production activities;
- i. logistics development and support efforts;
- j. safety program status;
- k. configuration management activities;
- l. Government Furnished Property/Information (GFP/I) status;
- m. efforts authorized under technical instructions.
- n. manpower utilization projection/actual (3 month history, 9 month future);
- o. data items delivery schedule; and
- p. hazardous material management efforts.

3.1.7 Government-Furnished Information/Property/Equipment/Material.

The Contractor shall manage and control Government Furnished Information/Property/Equipment/Material (GFI/P/E/M) identified in accordance with the provisions of this contract. The Contractor shall report to the Government any GFI/P/E/M found unsuitable for use. (CDRL A007, CDRL A008).

3.1.8 Risk Assessment and Management.

The Contractor shall perform a continuing analysis of program, technical, cost and schedule risks associated with this contract. 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 (CDRL A001) and presented during Program and Technical Reviews.

3.1.9 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 Combat Control, Sonar and Imaging 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 Contracting Officer 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 shall provide a list, entitled "Background Inventions--Identification and Licensing" (the BIIL List), identifying all inventions described in and covered by any patents or pending patent applications in which the Contractor (1) has any right, title, or interest; and (2) intends to include in any items, equipment, processes to be developed or delivered under the resulting contract, or that are described or disclosed in any Technical Data (TD), Computer Software (CS), or Computer Software Documentation (CSD) to be developed or delivered under the resulting contract. Such inventions are hereafter referred to as "background inventions."

The Contractor's failure to identify a background invention in the BIIL List, as set forth above, shall constitute a grant to the Government of a nonexclusive, nontransferable, irrevocable, worldwide, paid-up license to practice, and to have practiced for or on its behalf, such invention for Government purposes related to the affected CPH System(s).

3.1.10 Data Management.

The Contractor shall maintain Contract data status for recording, planning, scheduling, and reporting the status of program data requirements including electronic mail transmittals; and maintain a list of all contractor and subcontractor data generated in support of this contract. Data management shall adhere to the Team Submarine Information Security Policy.

3.1.10.1 Digital Data Management.

The Contractor shall use a Government established collaborative Integrated Digital Environment to be used among all participants in the contract. The Contractor shall be responsible for the digital generation, reception and electronic delivery of data. 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. The Government may request the Contractor to deliver internal data developed or modified under this contract. If required, establish SIPRNET communication capabilities for the transmission of sensitive and classified data and to provide support to the operating Fleet and its land based support activities.

3.1.10.2 Electronic CDRL Delivery.

The Contractor shall deliver all unclassified CDRL(s), by E-Mail or electronic media. Classified CDRL(s) that require digital media delivery shall be delivered in electronic media and hardcopy format. CDRL(s) 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 CDRL DD Form 1423.

3.1.11 Integrated Product Team.

The Contractor shall participate in joint IPT(s) as required to resolve particular problems and issues. The Contractor shall assist the Government in developing IPT charters. These IPT(s) will integrate cost, schedule and performance data to provide a global perspective with detailed insight into the managerial and technical aspects impacting Government and industry. The Contractor shall provide representatives to each IPT with the appropriate level of expertise, and degree of authority and responsibility to make decisions on behalf of the Contractor. To the extent specified in the established charter, the IPT(s) 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 (including obsolescence) associated with hardware and software engineering, production, integration, test, and 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 Integrated Logistic Support (ILS) effort; and
- g. Recommended approval of data items requiring approval under this contract.

3.1.12 Government On-Site Activities.

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.

The Contractor shall make available access to telephones, FAX transmission and reception, computer and network components, word processing, internet services, and copier machines to support analytical and tracking tasks.

3.1.13 Formal Proposals.

All formal proposals and budgetary estimates shall be prepared and submitted only in response to a Request for Proposal (RFP) received from the Contracting Officer or duly authorized representative. Contractor proposals shall include all costs, including material costs, technical costs, labor mix and man-hour estimates, required to complete tasking provided via technical instruction, delivery order.

Unless otherwise mutually agreed to by the parties, formal Research, Development, Test and Evaluation (RDT&E) proposals shall be submitted within 45 calendar days after request, formal non-RDT&E proposals within 30 calendar days, and task cost estimates within 15 calendar days. A change in the Government's requirements will reset the delivery schedule for proposals and budgetary estimates. Subsequent submission(s) of the same proposal will be at no cost to the Government, unless the resubmission is driven by a change in the Government's requirements or if updates are necessary to make proposals current for certification efforts. Incomplete or unknown information shall be identified within three (3) business days and concurrence obtained from the Contracting Officer or duly authorized representative, to preclude delays.

3.1.14 Rough Orders of Magnitude.

The Government may request Rough Orders of Magnitude (ROM) estimates in support of program affordability and feasibility analyses. Unless otherwise mutually agreed to by the Government and the Contractor, ROM estimates shall be submitted within five (5) calendar days of the request. Incomplete or unknown information shall be identified within three (3) business days and concurrence obtained from the Contracting Officer or duly authorized representative, to preclude delays. These ROM estimates are not contractually binding and shall be provided at no cost to the Government.

3.2 System Engineering.

3.2.1 Environmental Compliance.

The Contractor shall establish a process to identify, track and resolve Environmental, Safety, and Occupational Health (ESOH) hazards associated with the manufacture, test, repair and disposal of CPH

equipment. The Contractor shall report ESOH hazards and status of hazard resolution in the Progress, Status and Management Reports (CDRL A001) and at all design reviews and program reviews.

The Contractor shall eliminate (or minimize to the greatest extent possible) the use of hazardous materials in the design, development, qualification, and production of the CPH. The Contractor shall not use materials that are Class I or Class II Ozone Depleting Substances. The Contractor shall report and track hazardous materials that cannot be eliminated in the Health Hazard Analysis Report (CDRL A009) and provide Material Safety Data Sheets (MSDS) (OSHA Form 174).

3.2.2 Safety.

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

3.2.3 Human Factors Engineering.

The Contractor shall incorporate the Human Engineering Design Criteria Standard (MIL-STD-1472) into the Human Factors Engineering (HFE) design of equipment. HFE analyses and tradeoffs shall be reported at all technical reviews.

3.2.4 Open Systems Architecture Approach.

Systems developed under this contract will be built to comply with OA standards, incorporating functionally modular designs comprised of COTS/NDI software, hardware and firmware. The equipment will be integrated together using industry-accepted software and communication interface standards IAW the specifications.

As part of an open system architecture approach, the Contractor will identify to the Government all COTS/NDI equipment, their functionality and proposed use in the system, and provide copies of license agreements related to the use of this equipment for Government approval prior to use.

The Contractor shall demonstrate compliance with open systems architecture during all technical and design reviews, and at a minimum:

- Describe requirements traceability process.
- 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 equipment wherever practicable.
- Describe its rationale for the modularization choices made to generate the design.
- Provide rationale that explicitly address any tradeoffs performed, particularly those that compromise the modular and open nature of the system.
- Provide rationale for maintaining continued access to cutting edge technologies and products from multiple suppliers
- Describe how it will mitigate the risks associated with technology obsolescence
- 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.

The contractor shall utilize the following system architecture approach characteristics:

- 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, and middleware that utilize non-proprietary or non-vendor-unique, key Application Programming Interfaces (API). The Contractor’s design approach shall be applied to all subsystems and equipment. 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.

3.2.5 Problem Reporting System.

The Contractor shall establish a single system for the identification, tracking, and resolution of all hardware, software, firmware and baseline documentation problems identified during system development, component level integration and testing. In addition, the Problem Reporting (PR) System shall be used to track test documentation problems and technical manual errors. Documentation problems shall be included with the Contractor’s Progress, Status and Management Report. (CDRL A001)

3.3 Hardware Engineering.

3.3.1 Non-Developmental Items (NDI) Licenses.

The Contractor shall be responsible for the procurement of all licenses for non-GFE NDI products delivered in this contract including both Contractor developed and third party 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.

3.3.2 Modified NDI.

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.

3.3.3 Technology Refreshment

The Contractor shall implement a technology refreshment program to ensure the components used in the design phase are procurable at final acceptance. The technology refreshment program should focus on Obsolescence risk, new technology benefit, and requirement changes.

3.3.4 Engineering Documentation and Drawings

The Contractor shall develop and update engineering and drawing documentation to support all requirements of the system specifications and the contract. Documentation and drawings shall be comprised of commercial drawings, product drawings and interface control drawings. The Contractor shall provide developmental design/engineering drawings and associated lists IAW ASME Y14.24M and governing CDRL to support the Preliminary Design Review (PDR) and Critical Design Review (CDR).
(CDRL A010, CDRL A011, and A012)

The Contract shall provide step by step procedures and instructions required to build a production unit.
(CDRL A058)

3.4 Test and Evaluation.

The Contractor shall plan, program, schedule, conduct, support and document all hardware, software, firmware and human performance tests necessary to demonstrate that equipment designed, developed, and produced under this contract is compliant with the specifications and will operate in the users environments. The Contractor shall provide all test hardware, software, tools, support equipment, test stimuli and operating systems necessary to conduct qualification and Production Acceptance Tests (PAT). The Contractor shall provide access to the CPH systems in its development and test facilities for the Government to perform on-site independent tests or evaluations.

3.5 Software Engineering.

The Contractor shall provide the necessary software engineering to design, develop, qualify, test, produce, and support CPH equipment.

3.5.1 Software Engineering and Management.

The Contractor shall establish and implement a software development process for CPH equipment. The Contractor shall identify specific software reviews to be held during each software development process, and ensure Government participation during these reviews.

3.5.2 Operating Environments.

The Contractor shall provide the base system Operating Environment (OE). The Contractor shall minimize the number of different OE baselines used on the CPH program. The OE(s) shall be designed to maintain compatibility and interoperability between previous and current configurations of CPH equipment. With the concurrence of the Government, more than one OE baseline may be established if deemed necessary in order to meet diverse specification requirements.

The contractor shall develop and deliver a Software Version Descriptions (SVD) that defines the OE baseline and establishes the initial software product baseline. (CDRL A040)

The Contractor shall manage this baseline until a successful qualification is held. Once an OE baseline has been qualified, it will be transitioned to Government control. Changes to the OE baseline shall be processed IAW the Government approved Contractor's CM Plan. The Contractor shall obtain Government approval of any OE change before proceeding with software development. The Contractor shall, at no additional cost to the Government, update OE baseline(s) system software found not to meet requirements.

3.5.3 Commercial-Off-The-Shelf-Software.

The Contractor shall provide to the Government all necessary COTS based software products, along with supporting documentation and all required licenses for delivered CPH systems and equipment. The Contractor shall eliminate to the best extent possible the use of contractor-unique or non-commercial software. The Contractor shall minimize the total license costs for software included in the OE, with a goal of a license-free copy of the OE for any deployed system. The Contractor must ensure interoperability of such software with the OE and shall document any interdependencies in the appropriate SVD (CDRL A040). All licensing requirements/restrictions for each COTS product shall be documented in the Software Product Specification (SPS) (CDRL A039). This documentation requirement includes all delivered software licenses necessary to provide the processing system software capabilities and support full lifecycle implementation.

3.5.4 Developmental Software.

The Contractor shall be responsible for the development of any software not available in the open market. OA conventions shall be used in this development, and they must be described in the Contractor's Software Development Plan (SDP) (CDRL A037) prior to implementation. The Contractor shall deliver all source code as well as all software tools and utilities to the Government after functional qualification testing of the developmental software.

3.5.5 Software Maintenance.

The Contractor shall perform software maintenance activities to support the CPH equipment during the period of performance of this contract. Software maintenance shall include an active trouble reporting and resolution system, an annual update of the OE baseline(s), and interim patches to correct emergent (e.g. impacts safety or mission) problems. The annual update shall correct deficiencies, as prioritized by the Government.

3.6 Configuration Management.

The Contractor shall implement and maintain a CM Program. The Contractor's CM efforts shall include configuration identification, configuration change control, hardware and software Configuration Status Accounting (CSA), configuration verification and audits, and configuration data management to support the Hardware, Firmware, and Computer Software Configuration Items (HWCI/FWCI/CSCI) produced under this contract.

The Contractor shall establish a CM process capable of processing required configuration changes in a time frame that enables identification, evaluation, and implementation of proposed changes without impact to production schedules using MIL-HDBK-61 and ANSI/EIA 649 as guidance.

The Contractor shall control the configuration baseline documentation until submitted to, and approved by, the Government. Configuration documentation baselines are established upon Government approval; subsequent changes shall be processed IAW this SOW and the associated CDRL(s).

3.6.1 Configuration Management Plan.

The Contractor shall perform and maintain CM for the Submarine CPH Systems. The Contractor shall be responsible for developing and conducting a CM program in support of the Hardware, Firmware, and Computer Software Configuration Items produced under this contract.

3.6.2 Configuration Identification.

The Contractor shall establish a configuration identification process that includes the following:

- a) Selecting Configuration Items (CI) at appropriate levels of the product structure to facilitate the documentation, control and support of those items and their documentation;
- b) Determining the types of configuration documentation required for each CI to define its performance, functional and physical attributes, including internal and external interfaces. Configuration documentation shall include the documentation the Contractor uses to develop and procure software/parts/material, fabricate and assemble parts, inspect and test items, and maintain systems;
- c) Determining the appropriate configuration control authority for each configuration document consistent with logistic support planning for the associated CI;
- d) Issuing identifiers for the CI(s) and documenting those identifiers within the configuration documentation;
- e) Maintaining the configuration identification of CI(s) to facilitate effective logistics support of items in service;
- f) Releasing configuration documentation; and
- g) Establishing configuration baselines for the configuration control of CI(s).

3.6.3 Configuration Baselines.

The Contractor shall develop, maintain, and deliver configuration baselines as part of the end item deliverables under this contract.

3.6.4 Configuration Control.

Any requested change(s) to or Request for Deviation (RFD) from the Government controlled functional or product baseline shall be submitted to the Government Configuration Control Board (CCB) IAW the Government approved Contractor's CM Plan and the applicable CDRL.

3.6.5 Configuration Control Board.

The CCB is responsible for the evaluation and disposition of all proposed configuration changes. The Contractor shall provide appropriate membership and information as requested by the Government to

support CCB review and decision meetings. The CCB will review and disposition (approve or disapprove) as required. The Contractor shall obtain Contracting Officer or duly authorized representative concurrence with the classification Engineering Change Proposal (ECP(s) and RFD(s) prior to their execution. Class II ECP(s) and Minor RFD(s) may be executed by the Contractor without specific Government approval; however, the CCB shall be kept informed of all such actions.

The Contractor shall make revisions to ECP(s)/RFD(s) for the CPH as necessary. Proposed changes that would affect the form, fit, function, schedule or cost of the Government controlled baseline, shall be implemented only after a Class I ECP is approved and authorized by the Contracting Officer via a contract modification.

When practical, ECP(s) or RFD(s) 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.

3.6.6 Engineering Change Proposals.

The Contractor shall prepare and submit Class I and II ECP(s) to the Government for approval or disapproval as required for all Contractor-proposed configuration changes, including changes implemented by vendors. If a Class I ECP is proposed, the Contractor shall include rationale explaining why the proposed system change cannot be accomplished by a Class II ECP. The Contractor shall include schedule or cost impact estimates and or updates as part of the ECP. (CDRL A013)

As a general rule, unsolicited Class I and II ECP(s) are discouraged. However, at the discretion of the procuring activity, a preliminary ECP may be submitted to allow evaluation of the desirability of expending resources to fully document a proposed change. Changes that impact the following areas are instances where unsolicited ECP(s) may be justified:

- Safety
- Compatibility.
- Correction of Defects.
- Survivability.
- Security.
- Product improvement(s) that may significantly reduce life cycle costs, including Value Engineering Change Proposals (VECP) consistent with the DFAR Value Engineering clause of the contract
- Technology improvements

The Contractor (ECP Originator) should notify the Government immediately by electronic message (e.g. E-mail, Fax) when the need for an emergency or urgent priority ECP is determined. Follow-up to a message ECP should be in the form of a formal ECP submittal, within 30 days. However when this is impracticable, a preliminary ECP may be used as an interim measure. Both the preliminary ECP (if used) and the final ECP resulting from a message ECP would be identified as revisions of the initial message ECP.

Class I ECP(s) must be dispositioned (approved or disapproved) for implementation by a properly constituted Government Configuration Control Board (CCB). After the CCB direction is issued, it is important to proceed expeditiously with the "definitization" process (obtaining a pricing proposal, auditing, fact finding, and negotiating the final price) for this change and issuing a supplemental agreement. Until the contract modification is received and bi-laterally agreed to by the Government and the contractor, the Contractor is not authorized to proceed with the implementation of the proposed change.

The contractual approval or disapproval of an ECP should not be confused with the acceptance and approval of the ECP as a data deliverable. Approval of the ECP data delivery required by CDRL/DD Form 1423 signifies only that the ECP satisfies the requirements of the ECP DID and is considered acceptable for government processing. Acceptance of the data deliverable does not signify "technical approval" of the change proposed by the ECP and should not be interpreted as authorizing the performing activity(s) to proceed with the work proposed by the ECP.

3.6.7 Specification Change Notice.

The Contractor shall generate and submit 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 A014)

3.6.8 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 Provisioning Technical Documentation (PTD) (CDRL A045) revisions and associated Engineering Data for Provisioning (EDFP) (CDRL A048) via the Design Change Notices (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 A015)

3.6.9 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 units, systems or Kits.

3.6.10 COTS Module Substitutions.

Substitution of COTS modules for a previously selected module for use in the hardware design is only allowed after completion of the testing demonstrates that a change to the configuration baseline is not required. The substitution shall be treated as a Class II ECP. However, if such testing discloses that a change to the configuration baseline is required then the Contractor shall generate a Class I ECP.

3.6.11 Correction of Deficiencies.

The Contractor is responsible for the development of ECP(s) 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 (i.e. operation and maintenance manuals, provisioning technical documentation, and maintenance spare/repair parts, etc.) to reflect any changes to be accomplished by the ECP. Changes that are directed by the Government shall be incorporated in accordance with the contract "CHANGES" clauses. The Contractor shall develop and execute deficiency resolution plans to resolve Contractor and/or Government identified deficiencies once the product baseline is approved.

3.6.12 Request for Deviation.

The Contractor shall generate a RFD to request approval for a temporary departure from a specific requirement(s) of an approved baseline. RFD(s) may be submitted against the appropriate approved baseline during design and development, prior to production, during production, or after the configuration item has been submitted for Government inspection and acceptance. (CDRL A016)

RFD(s) will be prepared and submitted to the government in accordance with the configuration management requirements of this contract including the CDRL/DD Form 1423 citing the latest approved DID for RFD(s). RFD(s) must be approved or disapproved based on the merits of the initial submittal. However, changes to a previously submitted RFD not yet approved, may be addressed as a revision to the initial RFD number.

3.6.13 Configuration Status Accounting.

The Contractor shall establish, update, and maintain a CSA database to record and track hardware, software and firmware configuration items (HWCI/FWCI/CSCI) status and configuration history. This database shall be online prior to the initial Production Readiness Review (PRR). The Contractor shall provide the Government with view only access to this database throughout the term of the contract. The Contractor shall record CSA data for each system in this database when each system is delivered and when any change is made to a configuration item. Information to be recorded includes, but not limited to: 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. The Contractor shall deliver CSA data in accordance with the associated CDRL. (CDRL A017)

The Contractor shall include a summary report of CSA database activities in the Contractor's Progress, Status and Management Report (CDRL A001).

3.6.14 Beta Test Samples.

When appropriate or requested by the Government, the Contractor shall provide beta samples of changes/kits which are the subject of a class I change (ECP) or a class II change. A beta sample shall

consist of all hardware, associated firmware/software and vendor maintenance agreements required to evaluate the proposed change. After the Contractor determines the suitability, the Contractor shall provide the Government beta test samples for independent evaluation by host programs as separately tasked and funded. The process for determining the timeframe for this independent evaluation shall be specified in the CM Plan and provide a balance between the needs of the CPH and host programs.

3.6.15 Engineering Release Process.

The Contractor shall establish an engineering release system to issue configuration documentation to functional activities (e.g., manufacturing, logistics, quality assurance, purchasing, etc) and to authorize the use of configuration documentation associated with a Government approved configuration. For software, the engineering release system shall be limited to one operating environment based on one COTS operating system.

3.7 Integrated Logistics Support.

The Contractor shall maintain an Integrated Logistics Support (ILS) Program in support of CPH configurations. The Contractor is responsible for providing current and accurate logistics products in support of production systems as well as to coordinate and facilitate processes and infrastructure to provide for total life cycle support. The Contractor shall establish a program to proactively identify all production issues which impact logistics and overall supportability. The program shall identify specific actions and associated schedules required to resolve each issue, and track these to completion. Status shall be provided to the Government as required.

3.7.1 Performance Based Logistics.

The Contractor shall perform a Performance Based Logistics (PBL) Business Case Analysis (BCA) as part of the system 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 operation 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 (TM), 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 analysis. (CDRL A018)

3.7.2 ILS Reviews.

The Contractor shall conduct teleconferences (four per year) with appropriate Government representatives to address ILS issues, and work collectively toward problem resolution. Reviews shall include maintainability analyses.

3.7.2.1 ILS Working Group Meetings.

The Contractor shall participate in Integrated Logistics Support Working Group (ILSWG) meetings, nominally scheduled No Later Than (NLT) 180 days following PRR and semi-annually thereafter. At this meeting, the Contractor shall present status on the ILS program for each product baseline. At the initial ILSWG the Contractor shall address its understanding of all the ILS requirements for supportability of the CPH program and identify its processes and procedures to execute these requirements.

3.7.2.2 ILS Management Team Meetings.

The Contractor shall participate in the annual CPH ILS Management Team Meetings (ILSMT), which is a Government-chaired forum for planning and execution of the CPH ILS program. The Contractor shall present status on the ILS program for each CPH configuration baseline, ILS action items and tasks at these meetings. The Contractor shall provide status as directed by the Government. The Government and the Contractor shall jointly decide upon specific representation needed to support the meeting.

3.7.3 Integrated Logistics Support Plan.

The Contractor shall develop an Integrated Logistics Support Plan (ILSP). The ILSP shall reflect the processes and requirements for current and future CPH logistics product development and support. (CDRL A019)

3.7.4 Parts Management Program.

The Contractor shall maintain a parts management program that ensures the use of parts that meet contractual requirements; reduce proliferation/sparing of parts through standardization, enhancement, equipment reliability and supportability; and, proactively manage obsolescence. Processes and procedures for identifying common hardware consistent with the overall Submarine Warfare Federation Tactical System (SWFTS) TI baselines, and 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.

3.7.5 Supportability Analyses.

The Contractor shall conduct a Supportability Analysis (SA) 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 CPH is cost effectively supportable. These analyses shall be performed using MIL-HDBK-502 and MIL-PRF-49506, as guidance. At a minimum, the analyses shall include Failure Mode Effects and Criticality Analysis (FMECA) (CDRL A020) and Reliability-Centered Maintenance Analysis (CDRL A021) as follows:

- a. Functional requirements identification with appropriate feedback to the design process;
- b. Testability and diagnostic procedure development;
- c. Maintainability optimization to include accessibility, testing and change out of equipment;
- d. Identification of Maintenance Assist Modules (MAM), if required to support trouble shooting of the equipment;
- e. Identification of unique Support and Test Equipment (S&TE);

- f. Reliability block diagram including component criticality and failure rates for input to the Readiness Based Sparing (RBS) process. (CDRL A022)

3.7.6 Interactive Electronic Technical Manuals.

The Contractor shall develop, update and maintain an IETM to support operation, maintenance training and curriculum development. The IETM shall address all aspects of operations and maintenance as identified by supportability analyses and as required by the support strategy. The Contractor shall establish and/or maintain a technical manual quality assurance program, including validation planning, and validation certification. (CDRL A054). The Government will determine usability of the IETM in support of operation and maintenance of the CPH enclosure once it is fully integrated into a user/host system. (CDRL A053)

The Contractor shall conduct a start-of-work meeting 30 days prior to commencing IETM development efforts to review and clarify task requirements. The Contractor shall conduct In-Process Reviews (IPR) (50% and preliminary final) for all IETM source data developments. The Contractor shall provide an XML instance and associated digital files for preliminary and final deliveries. The Contractor shall support the Government verification, which shall be completed prior to conduct of Maintainability Demonstration (M-DEMO). As part of the M-DEMO and PRR exit criteria, the Government will determine usability of the IETM in support of the operation and maintenance philosophy. Revisions to IETM(s) may be required as complete IETM products, or in the form of IETM source data (source material) for use by the Government to maintain/update existing IETM(s).

Detailed schedules for IETM source data development, reviews, and deliveries shall be provided in the IMS (CDRL A004) for all CPH development or upgrades

3.7.7 Support and Test Equipment.

The Contractor shall identify and document Organizational (O), Intermediate (I), and Depot (D) level S&TE for CPH, including GFP, based on the operation and maintenance requirements determined as a part of the Supportability Analysis process (CDRL A020, A021). This information shall be included in the Technical Data Package (TDP) (CDRL A029).

Identified S&TE shall include scheduled and unscheduled maintenance at each maintenance level (CDRL A023, A024). 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. (CDRL A025)

3.7.8 Supply Support Analysis.

The Contractor shall support the ILS IPT in developing installation and checkout kit(s), provisioning for spares, repair parts and support material required for each level of maintenance. Contractor supply support actions that require changes to the Government approved TDP shall be submitted IAW the Government

approved Contractor's CM Plan. The Contractor shall update the TDP and PTD with current supply support data. Actions taken under the Contractor's supply support services shall not require any changes to, recompilations or distributions / re-distribution of host software applications.

3.7.9 **Obsolescence & Diminishing Manufacturing Sources & Material Shortages Management.**

The Contractor shall be responsible for managing obsolescence over the entire period of the contract to ensure compliance with all performance and contract requirements. The Contractor shall develop a process for managing the loss, or impending loss, of manufacturers or suppliers of equipment, assemblies, or materials used in the system. The Contractor's Obsolescence process shall include participation in Government Industry Data Exchange Program (GIDEP).

Actions to resolve obsolescence management issues shall be initiated with sufficient lead-time to preclude impact to Government delivery requirements while meeting the other requirements of this SOW.

Associated changes to product baseline(s) shall be processed IAW the Government approved Contractor's CM Plan. The Contractor shall include a summary of obsolescence and DMSMS issues in the Contractor's Progress, Status and Management Report (CDRL A001) and at Program Reviews.

3.7.10 **Diminishing Manufacturing Sources & Material Shortages 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 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.

3.7.11 **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 CM and ILS IPTs.

The Contractor shall develop and maintain sources and source lists of all components, materials, assemblies, subassemblies and piece parts to the Lowest Replaceable Unit (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.

3.7.12 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 ILS IPTs. (CDRL A052)

The Contractor shall include a summary of vendor issues in the Contractor's Progress, Status and Management Report (CDRL A001).

3.7.13 Training.

The Contractor shall provide training material and support for all CPH equipment configurations to be delivered under this contract. The Contractor shall develop a Training Program Development and Management Plan in accordance with MIL-PRF-29612. The Contractor shall update and deliver, upon request, training curricula whenever an IETM and/or TM source data update is made. The Contractor shall conduct training courses for CPH users upon request by the Government. (CDRL A055)

3.7.13.1 Training Materials.

The Contractor shall develop, update and maintain training materials IAW the Training Program Development and Management Plan. For example: Performance Profile Tables or Task Based Tables, Training Path System Reports, Training Course Control Documents, Lesson Plans, Trainee Guides, Fault Insertion Guides, Test Packages, and Critique Sheets. (CDRL A056, A057)

The Contractor shall develop, update and maintain Lesson Plans and Trainee Guides using the Authoring Instructional Material (AIM) software. Where possible, the training material shall allow for the direct utilization of IETM graphics vice a separate media. The Training Materials shall support knowledge and skills learning objectives associated with the curriculum. The Contractor shall host In-Process Reviews. After completion of validation, the Contractor and the Government will perform a verification of the Interactive Multimedia Instruction (IMI).

3.7.14 Packaging, Handling, Storage & Transportation.

The Contractor shall establish a Packaging, Handling, Storage & 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. Applicable PHS&T requirements, PHS&T component designs and procedures shall be documented in the IETM source data, TDP and provisioning data documentation.

The Contractor shall generate PHS&T procedures and elements that conform to MIL-STD-2073 and are IAW best commercial practices. Unique or special packaging, handling, storage or transportation requirements shall be identified and reported to the Government.

3.7.15 Unique Identification Requirements.

The Contractor shall identify and mark all parts requiring Unique Identification (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. The markings shall contain data qualifier, data syntax, construct and semantics, as outlined in MIL-STD-130, and utilizing the UID as the common data point for the marking of Lowest Replaceable Units (LRU) and enclosures. (CDRL A026)

3.7.16 Radio Frequency Identification.

The Contractor shall use passive Radio Frequency Identification (RFID) tags that comply with the 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>.

3.7.17 Nomenclature, Serialization, Marking and Identification Plates.

The Contractor shall provide Joint Electronics Type Designation System (JETDS) Nomenclature Requests or approved ECP(s) using MIL-STD 196E as guidance:

- a. New CPH equipments and product baselines to include unit technical and physical characteristics, LRU data and quantities, and unit and LRU Contract Control Numbers (CCN),
- b. Revisions for Nomenclatures shall be provided if component configuration is modified (e.g., as a result of Environmental Qualification Test (EQT)/ Power Qualification Test (PQT)), and
- c. Major modifications (e.g. prime power input, processor and operating system changes) to existing product baselines as directed by the Government.

Requests for Nomenclature shall be provided by the Contractor at the CDR to allow sufficient time for JETDS submittal and processing with no impact to development and delivery of associated production equipment or ILS products. The Government will provide authorization for use of an interim nomenclature assignment.

3.8 Quality Assurance.

The Contractor shall implement and maintain a Quality Assurance (QA) program that meets program objectives during the performance of the contract. The QA program shall address development, production

and post delivery phases of CPH equipment. The Contractor shall have established manufacturing processes that ensure equipment produced under this contract is delivered without defects. 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; and
- e. Continuous process improvement.

3.9 Information Assurance.

The Contractor shall establish and maintain an Information Assurance (IA) program to support the customer's system security certification and accreditation requirements.

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 Submarine 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 System Engineering Management Plan (SEMP). (CDRL A027)

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 A028)

4.0 SERVICES.

To support the entire range of potential tasks envisioned under this contract, Section 4.0 of the SOW supports the conduct of design, development, and test, reverse engineering, technology insertion/refreshment, engineering services, field engineering services and system support. These requirements are in addition to the requirements under SOW Section 3.0. Efforts related to submarine safety shall support the requirements of the NAVSEA SUBSAFE requirements manual. The services identified in this section of the SOW will be as tasked under specific Technical Instructions and Delivery Orders executed during performance of this contract.

4.1 Integrated Baseline Reviews.

The Contractor shall engage jointly with the Government's Program Manager in Integrated Baseline Reviews (IBR) to evaluate the risks inherent in the Contractor's planned performance measurement baseline. The initial IBR for each order shall occur within one month after issuance of the order.

Subsequent IBR(s) shall occur following Class I Engineering Changes to the product baseline. Each IBR shall verify that the Contractor is using a reliable performance measurement baseline, which includes the entire Scope of Work for the supply item, is consistent with contract schedule requirements, and has adequate resources assigned.

4.2 Engineering Services.

4.2.1 Systems Engineering Management.

The Contractor shall provide a System Engineering Management Plan for how development will progress with the incorporation of inputs from the various supporting working groups (CDRL A027). The Contractor shall describe how the various technical inputs to the systems engineering effort will be integrated into a collaborative development environment. A description of each major technical review shall be included.

4.2.2 Technical Data Package.

The Contractor shall develop, deliver, update and maintain the TDP for each CPH product baseline (APU(s), and production units) IAW MIL-DTL-31000. The TDP shall contain all data, specifications, and information necessary and sufficient for a third party to manufacture and provide life cycle support for CPH configurations developed and qualified under this contract. The TDP shall be verified by the Contractor at least 30 days prior to any required Physical Configuration Audit (PCA). Additionally, the TDP shall contain digital photographic images of step-by-step assembly procedures and cable dressing techniques. The Contractor shall incrementally deliver each complete TDP to the Government's specified website upon completion of the required element. For software and firmware, updates and maintenance of the TDP shall only be required for one operating environment based on one COTS operating system. (CDRL A029)

4.2.3 Reviews and Audits.

Technical reviews shall be held at the Contractor's facility to discuss and evaluate design status. Design reviews will be conducted on a periodic basis to determine progress and resolve issues and shall include maintainability analyses. The structure and intervals will be defined in the IMS (CDRL A004). The Contractor shall clearly explain how events or milestone requirements will be achieved/accomplished.

4.2.3.1 System Requirements Review/System Design Review.

The Contractor shall conduct a System Requirements Review (SRR)/System Design Review (SDR). At the SRR, the Contractor shall demonstrate interpretation/understanding of system requirements including:

- a. System functional requirements
- b. System inter-operability requirements
- c. System interface characteristics
- d. Platform interface requirements (e.g. power, cooling requirements)
- e. System physical constraints (e.g. size/weight)

f. System supportability requirements

Successful completion of the SRR/SDR and Government approval of the specification shall result in the establishment of the functional baseline(s). The Contractor shall propose entrance and exit criteria for each SRR/SDR for approval by the Government. The Contractor shall propose a SRR/SDR checklist for validation by the Contracting Officer or duly authorized representative.

4.2.3.2 System Functional Review/Preliminary Design Review.

The Contractor shall conduct a System Functional Review (SFR)/Preliminary Design Review (PDR) to show compliance with the system functional and performance requirements contained in the technical instructions, and delivery orders. The completion of the SFR shall result in the establishment of the system hardware and software functional (performance) baseline. Successful completion of the PDR and approval of the preliminary component design by the Government shall establish the initial allocated baseline. Changes in requirements from the SRR and associated technical, cost, and schedule impacts shall be addressed. Entrance and exit criteria for the PDR shall be submitted to the Government for approval. All entrance criteria shall be achieved as a prerequisite to conducting the PDR. The Contractor shall provide a life cycle cost estimate at the PDR.

4.2.3.3 Software Specification Review.

The Contractor shall present system performance elements defined for all CSCI(s). The completion of the Software Specification Review (SSR) shall result in the establishment of a system software performance allocated baseline.

4.2.3.4 Critical Design Review.

The Contractor shall conduct a combined Hardware/Software/Firmware CDR for each processing system configuration, no later than 60 days after completion of Preliminary Design Review (PDR). Changes in requirements from the PDR and associated technical, cost, and schedule impacts shall be addressed. Entrance and exit criteria for the CDR shall be submitted to the Government for approval. The Contractor shall update and present the requirements traceability matrix (SRVM) and any changes to the life cycle cost estimate.

The purpose of the CDR shall be to:

- a. Determine that the detail design of the HWCI/CSCI/FWCI and the overall system satisfies the performance and specialty/integration engineering requirements of the specifications.
- b. Establish the detailed design compatibility between the CI(s) (subsystem integration), the CPH system and external interfaces (system/external integration), and elements of HFE.
- c. Assess producibility of design.
- d. Assess HWCI/CSCI/FWCI design and performance risk areas. A risk assessment shall be conducted IAW this SOW.
- e. Review the preliminary product specifications and engineering drawing package.
- f. Review the logistic support package and development schedule including interim support plan(s) as required.

4.2.3.5 Test Readiness Review.

The contractor shall complete a Test Readiness Review (TRR) a minimum of two (2) weeks prior to each test via a meeting between the Joint Test Group (JTG) Chairman, or designated representative, and the Contractor.

The purpose of a TRR is to determine the Contractor's readiness to proceed with formal testing. All relevant test plans, procedures, preliminary IETM(s), associated resources and schedules shall be approved prior to start of TRR. A performance baseline shall be established prior to the start of environmental qualification testing. The Contractor shall not proceed with testing prior to receiving Government approval of the TRR.

4.2.3.6 Production Readiness Review.

The Contractor shall conduct a PRR at each facility the Contractor intends to produce production qualified CPH equipment. A PRR must be approved by the Government prior to the subject facility commencing production of CPH equipment intended for sell-off and delivery to the Government. Subsequent PRR(s) for that facility shall only be required if the Government determines that significantly different manufacturing processes or unique manufacturing equipment are required for the manufacture of CPH equipment.

Successful completion of a PRR is defined as Government approval of the following:

- a. Assembly processes,
- b. Production testing compliance with the test documentation,
- c. Production facilities adequate to sustain required delivery quantities and rates,
- d. Provisions for product quality included in production documentation, and
- e. Action items generated during the PRR resolved to the mutual satisfaction of both the Government and the Contractor.

4.2.4 System Integration.

The Contractor shall develop a System Integration Plan (SIP) (CDRL A030). The Contractor shall identify and provide the necessary development facilities, and conduct system integration, in accordance with the SIP. The Contractor shall address all problems identified by the Government during interface testing. The Contractor shall support integration and testing of all applicable shipboard subsystems at the appropriate Contractor site. Interface testing and logistics integration events will typically occur annually.

4.2.5 System Engineering and Design Analyses.

The Contractor shall develop System/Subsystem Design Descriptions (SSDD) (CDRL A031) in accordance with ANSI/EIA-632. In addition, the requirements outlined in the following paragraphs shall be included in the SSDD.

4.2.5.1 Requirements Analysis.

The Contractor shall conduct detailed system engineering and design analyses of the proposed software/firmware/ hardware system(s) in accordance with the specifications included in individual technical instructions and delivery orders. Materials and equipment to be incorporated into the system or subsystems shall be specified 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 performed on both the system and component levels. ANSI/J-STD-001 shall be used as guidance for any soldering requirements.

The Contractor shall develop Specification Requirement Verification Matrices (SRVM) for each configuration to ensure traceability between the test requirements and the performance specifications. (CDRL A028)

The Contractor shall develop engineering design data packages (CDRL A032). Materials and equipment 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 equipment from the environment shall be identified using MIL-S-901, MIL-STD-461, and 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-1472 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 guidance for minimum practical manning, personnel and training requirements.

4.2.6 Failure Modes, Effects and Criticality Analyses.

The Contractor shall perform FMECA (CDRL A020). The FMECA shall be performed to the LRU level and shall include an analysis of mission impact due to loss of functionality. All potential hardware and software failure modes shall be postulated at the LRU level and the effects of all higher levels shall be determined.

4.2.7 Maintainability Analysis.

The Contractor shall develop, maintain and update Reliability Centered Maintenance (RCM) products and the reliability and maintainability predictions for the equipment and software using MIL-HDBK-217 as guidance. The Contractor shall conduct reliability and maintainability analyses throughout design and development to support availability predictions (CDRL A021, A033, A034). The Contractor shall use the 12 Phase RCM process in accordance with MIL-P-24534. The Contractor shall develop Planned Maintenance System (PMS) Documentation including Maintenance Index Pages/Maintenance Requirement

Cards (MIP/MRC) in New PMS Editor (NPE) software format. MRC(s) shall be validated and verified on the equipment at the contractor's facility. (CDRL A023, A024)

4.2.8 Failure Reporting Analysis and Corrective Action System.

The Contractor shall analyze failure data to include: historical operating time and data; determination of the cause of each failure down to the LRU and component level; identification of LRU(s) and equipment that have had more than one failure; planned corrective actions; and implementation and results of corrective actions, including resultant reliability. The Contractor shall analyze the root cause for all pattern failures (more than one) and shall submit for Government approval a failed item analysis report. If corrective actions are required, the Contractor shall include that data in the Contractor's Progress, Status and Management Report (CDRL A001) until the corrective action is completed. If deemed necessary by the government, the Government will examine at the contractor's facility, the data from all failure and corrective action analyses.

The Contractor shall be responsible for correcting deficiencies discovered during the reliability test and for incorporating engineering change orders into the production baseline accordingly. Throughout the Test, Analyze and Fix and Failure Reporting Analysis and Corrective Action System (FRACAS) processes the Contractor shall plot failure data on a Reliability Growth Curve to assess system reliability. The Contractor may recommend additional specific testing to assess unique system characteristics. Failure Summary and Analysis Report. (CDRL A035)

4.3 Hardware Engineering Services.

4.3.1 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 Submarine Common Production Hardware. (CDRL A036)

4.3.2 Hardware Manuals.

The Contractor shall develop and update the computer operator procedures for computers and any peripheral equipment in the operator manual. (CDRL A051) The Contractor shall provide COTS Manuals and associated supplemental data with each kit or unit or system delivery. (CDRL A052)

4.4 Software Engineering Services.

The Contractor shall manage, develop, perform corrective actions, test and deliver computer software in accordance with the SDP. (CDRL A037)

4.4.1 Software Development Files.

The Contractor shall establish uniform Software Development Files (SDF) containing technical information describing the format, content and procedures of the SDF(s) and made available to the software developers

producing the latest version of the CSCI(s). The SDF shall include preliminary and detailed design data and a description of known problems (open Problem Reports) and test results for the CSCI(s). The Government shall be provided access to these files without restriction.

4.4.2 Software Design Requirements.

The Contractor shall develop, update and maintain Software Requirements Specifications (SRS) and Interface Requirements Specifications (IRS). (CDRL A038)

4.4.3 Software Guides.

The Contractor shall update software operating procedures in a User's Guide. (CDRL A041)

4.5 Test and Evaluation Services.

The Contractor shall provide test and evaluation services to meet the requirements of the contract. The Contractor shall implement and maintain a Test and Evaluation (T&E) program. The Contractor shall successfully pass all test requirements defined in the Test and Evaluation Program Plan (TEPP) (CDRL A042) for any system/unit/component (APU(s), LRU(s), kit(s), spare(s)) prior to Government approval for production deliveries.

In the event individual testing is desired to be waived due to previous qualification testing or for qualification by similarity, the Contractor shall submit the individual qualification test results along with the Contractor's proposed justification rationale to the Government for approval with the waiver request. Following successful qualification testing, the Contractor shall refurbish each APU prior to delivery and acceptance by the Government. If desired, the Contractor may request retention of an APU for use as an engineering unit/sample unit after the Government is finished with any inspection, testing or integration. If such retention is approved, the Contractor shall maintain the unit in operational condition while in the Contractor's possession. The unit shall be designated Government Furnished Property and returned as required by the Government.

As separately tasked and funded, the Contractor shall make CPH equipment available for Government suitability testing by the user. Government suitability testing verifies the CPH component operation in the user system environment. The Contractor shall provide on-site engineering and support personnel as required to the user testing staff during the suitability testing. The Government reserves the right to witness testing.

4.5.1 Test Plans.

The Contractor shall develop, maintain, update and deliver a Test and Evaluation Program Plan (TEPP) to define all testing (hardware/software/firmware) required for each CPH component to achieve Government approval for production (CDRL A042). 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.

4.5.2 Joint Test Group.

The Contractor shall host and participate in the JTG meetings which will be made up of representatives from the Contractor and the Technical Design Agent (TDA). A Government representative will chair the JTG. The JTG shall be the forum for discussion and resolution of all test and integration issues.

4.5.3 Problem Report Review Board.

The Contractor shall host and participate in the Problem Report (PR) Review Board. The Government will assume responsibility for classification of PR severity.

4.5.4 Test Requirements.

The Contractor shall develop, maintain and update the Specification Requirement Verification Matrices (CDRL A028) and Test Procedures (CDRL A043). The Contractor shall generate and retain Test/Inspection Report (CDRL A044) following the conduct of each test performed. In the event of a test failure, the results shall include documentation of the circumstances of the failure, identification of the equipment under test, the testing step conducted when the failure occurred, physical observations, and meter readings (as applicable). The test results shall include an analysis of the test failure and corrective measures to be taken to prevent further test failures.

The TEPP (CDRL A042) and SRVM (CDRL A028) shall describe all tests for each system configuration separately.

4.5.5 Test Events.

The Contractor shall present detailed progress of testing to date and projections for near term activities at the System Engineering (SE)/IPT meetings or other reviews as required. These presentations shall include test activities for production representative hardware, firmware and software deliveries, test support and any significant problems affecting test progress.

4.5.5.1 Interface Testing.

The Contractor shall plan, develop, and perform system level (external) interface tests to verify the CPH conformance to system hardware and software interface requirements including user suitability testing. The interface test plan shall be detailed in the TEPP (CDRL A042).

4.5.5.2 Performance Verification Testing.

The Contractor shall perform a formal Performance Verification Testing (PVT) to demonstrate that the system satisfies the requirements of the system specifications and approved TEPP (CDRL A042) prior to Government acceptance of the first unit offered for delivery.

4.5.5.3 System Design Certification Test.

The Contractor shall schedule, conduct and successfully complete a formal System Design Certification Test (SDCT) to demonstrate all system performance requirements are met.

4.5.5.4 Maintainability Demonstration Test Plan.

The Contractor shall develop and deliver an M-DEMO Test Plan for each system configuration. (CDRL A043)

The Contractor shall plan and successfully conduct an M-DEMO to verify maintainability requirements of the specification(s) using MIL-HDBK-470 as guidance. This demonstration shall be conducted according to the requirements of the Contractor's M-DEMO plans and procedures approved under this contract. The Contractor shall ensure that all ILS products are in place prior to the M-DEMO.

The Contractor shall simulate system faults during the M-DEMO using a variety of techniques, including Pre-Faulted Modules (PFM) or disabling of functional LRU(s). Technicians performing M-DEMO tasks will be Government personnel who have been trained using the proposed final IETM and training products. The Contractor shall ensure ILS products specified in the approved M-DEMO test plan are available 30 days prior to start of the M-DEMO. The Contractor shall report the results of the M-DEMO to the Government. (CDRL A044)

4.5.5.5 Qualification Test.

The Contractor shall conduct environmental and design qualification tests to verify compliance with the performance specification requirements. The Contractor shall prepare EQT/PQT plans as part of the TEPP (CDRL A042, A043, A044) for each APU that identifies the specific EQT/PQT requirements and verification methods. In the event of testing failures, corrective action shall be implemented prior to continuation of testing.

4.5.5.6 Acceptance Testing.

The Contractor shall perform Factory Acceptance Testing (FAT) on all CPH hardware, software and firmware delivered under the contract. FAT includes the functional, electrical, mechanical and visual tests performed to verify that the system is operational. When specified and included in the price, the Contractor shall perform FAT on CPH kits delivered under the contract to verify that the kit components and spares, either individually or collectively, are operational. The Contractor shall identify if FAT is included in the pricing. (CDRL A043, A044)

4.5.5.7 System Confidence Test.

CPH component system level tests shall include a 72-hour confidence test period; with the last 24 hours being fault free. Confidence test shall be completed prior to the performance of Factory Acceptance Testing (FAT). (CDRL A043, A044)

4.6 Integrated Logistics Support Services.

4.6.1 Provisioning Technical Data.

The Contractor shall develop PTD for all CPH equipment procured (production and development) under this contract. In addition, the Contractor shall provide PTD for all items defined by Contractor and/or Government approved engineering changes. The Contractor shall provide new and or updated PTD when equipment configuration changes or per Government direction.

The Contractor shall submit all PTD using the Interactive Computer Aided Provisioning System (ICAPS) format to include data elements provided via the ILS IPT and, as available, Original Equipment Manufacturer (OEM) source data, drawings, allowance equipment list, technical information, and photographs for maintenance planning and Provisioning Parts List development (CDRL A045, A046, A047, A048). The Contractor shall provide a LRU List for the end item being delivered. The Contractor shall interface with NAVICP and the Program Office for support date 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 (CDRL A015)

The latest version of ICAPS is available for downloading at <https://icaps.navsea.navy.mil>.

4.6.2 Configuration Audits.

The Contractor shall support the Government in conducting a Functional Configuration Audit (FCA) / Physical Configuration Audit (PCA) as required. This support shall include providing technical documentation, equipment, facilities and services to conduct the audit, including disassembly and reassembly of APU(s). The Contractor shall respond to audit findings, recommend corrective actions, and resolve all deficiencies identified during the audits. (CDRL A042, A043, A044)

4.7 Installation and Checkout Services.

The Contractor shall provide installation and checkout services to meet the requirements of the contract and achieve Submarine systems performance. The Contractor shall develop, update and maintain documentation and design installation aids necessary to support the installation of the new/modified equipment. The Contractor shall develop, update and maintain Pre-cable Kits, Installation Aids, and provide Installation Planning Information to support Submarine CPH Systems installation requirements (CDRL A022). Documentation change packages shall be updates to existing documentation to the maximum extent practicable. (CDRL A049)

4.7.1 Pre-cable Kit (PCK).

The Contractor shall define an initial Pre-cable Kit List which defines all connectors, contacts, backshells, strain relief hardware, etc. required for external (to equipment) cabling to interface the Common Production Hardware units with each other and ship system(s). The Contractor shall also define PCK containing all

materials required, individually packed and labeled in accordance with the approved PCK list. (CDRL A050)

4.7.2 Installation Aids

The Contractor shall define initial installation aids consisting of 2D-Mockups and (if required) special handling devices and drawer lifting devices. Special handling devices and drawer lifting devices, if required shall be delivered with the 2D-Mockups. (CDRL A050)

4.7.3 Two Dimensional (2D) Mockups

The Contractor shall define requirements for a 2D Mockup (CDRL A050) for each of the Submarine CPH Systems units. Each mockup shall duplicate the following features and be built so that it can be used to locate and drill/tap unit mounting holes and attach cables and water fittings:

- a. unit base, width and depth at base, with all mounting holes;
- b. other than base mounting, any other attachments required to install the unit;
- c. unit rear (to full height) and connector panels with all jacks, using dummy receptacles/actual connectors. All Jacks shall be labeled with associated "Jack" numbers; and
- d. (if water cooled) unit water fittings with input and output connected inside the mockups with hose/fitting which has been tested to the appropriate psig.

4.8 Manufacturing and Production.

The Contractor shall produce CPH equipment IAW the contract, SOW, requirements specification, technical instructions, delivery order(s).

The Contractor shall provide, update and maintain an web based automated ordering system available for use by the Government and their support contractors. The system shall:

- a. Contain current pricing information,
- b. Initiate an order with proposed pricing,
- c. Be able to duplicate an existing order.

4.8.1 Rate Production.

APU(s), Production systems and items (including kits and spares) shall be delivered in accordance with the required delivery date specified on the delivery order or 9 months After Receipt of Order (ARO), whichever is later.

4.8.2 Production Capacity and Allocations.

The Contractor shall establish the production capability to deliver thirty (30) CPH systems per month (there is no minimum quantity specified); there shall be no quantity limitations for other CPH equipment (kits, parts, LRU(s), components, etc). Variability in production rate (0 units to 30 units delivered per month)

shall not affect the requirement for CPH unit delivery to meet the Required Delivery Date (RDD) as stated on each delivery order or 9 months ARO whichever is later.

The Contractor shall perform workload planning to ensure requirements of all host programs are balanced against the production capacity of the Contractor and host program requirements are met.

4.8.3 Manufacturing.

The Contractor shall establish and implement manufacturing processes that ensure all CPH equipment produced under this contract are delivered without defects.

The Contractor shall recommend changes to the system baselines as necessary, fabricate or procure materials, perform factory acceptance testing, implement technology insertions/refreshments, Production Engineering Support, and support the requirements of the NAVSEA SUBSAFE requirements manual as appropriate.

4.8.4 Enclosures.

The Contractor shall design, build, test and integrate the required Submarine enclosures IAW the delivery order.

4.9 Software.

4.9.1 Software Problem Reports and Software Patches.

The Contractor shall respond to software Problem/Change Report/Requests (P/CR), Incident Reports (IR) and Navy Casualty Reports (CASREP), as assigned by the Government. Navy CASREP(s) related to CPH problems shall be collected from Fleet units, and P/CR(s) or IR(s) shall be collected from shore installations, developmental laboratories, and any other Navy facilities that have the CPH family of equipment present. These software problem reports shall be analyzed for validity, and a solution to correct the difficulty reported by the software problem reports proposed. This methodology to service software problem reports during the in-service period of this contract shall be proposed as part of the Contractor's Software Development Plan (CDRL A037).

Patches to correct Priority 1 and 2 problems shall be delivered to the Government (NLT) forty-five (45) days after the Contractor has received formal notification of the problem. Receipt of software problem reports (i.e. CPH P/CR(s) and/or notification of CASREP messages) constitutes formal notification of the problem. Priority to be established by the Government.

4.9.2 Deliver Software Updates.

The Contractor shall deliver to the Government annual software updates to address reported problems subsequent to the production period, but still within the period of performance of this contract. Immediate

action shall be taken to mitigate trouble reports which represent a significant hazard to personnel safety, or a significant impact to required performance.

The Contractor shall update the OE(s) annually. OE updates shall follow the CM process identified in the approved CM Program. With the delivery of each software OE baseline update, the Contractor shall deliver to the Government all source code developed under this contract to support CPH operations and/or maintenance, as well as all updated software product specifications. Software maintenance shall be addressed in the transition plan.

4.10 Technical and Engineering Services.

The Contractor shall provide technical and engineering services as separately tasked and funded in Technical Instructions and Delivery Orders, for all work not specifically described in other sections of this SOW.

APPENDIX A: Acronym List.

ACSN	Advance Change/Study Notice
AEL	Allowance Equipment List
AIM	Authoring Instructional Material
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
API	Application Programming Interfaces
APU	Advance Production Unit
ARO	After Receipt of Order
ASME	American Society of Mechanical Engineers
ATD	Actuals To Date
BCA	Business Case Analysis
BDD	Baseline Description Document
BIIL	Background Inventions--Identification and Licensing
CASREP	Casualty Report
CBT	Computer Based Training
CCB	Configuration Control Board
CCN	Contractor Control Number
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CI	Configuration Item
CLIN	Contract Line Item Number
CM	Configuration Management
COTS	Commercial-Off-The-Shelf
CPR	Contract Performance Reports
CSA	Configuration Status Accounting
CSCI	Computer Software Configuration Item
CSD	Computer Software Documentation
CUI	Controlled Unclassified Information
CWBS	Contract Work Breakdown Structure
DLA	Defense Logistics Agency
D-Level	Depot-Level
DMS/MS	Diminishing Manufacturing Sources/Material Shortages
DO	Delivery Order

DoD	Department of Defense
DQU	Design Qualification Unit
EAC	Estimate at Completion
E-mail	Electronic Mail
ECP	Engineering Change Proposal
EDFP	Engineering Data for Provisioning
EIA	Electronic Industries Alliance
EQT	Environmental Qualification Test
ESOH	Environmental, Safety, and Occupational Health
ETC	Estimate to Complete
EVMS	Earned Value Management System
FAT	Factory Acceptance Testing
FCA	Functional Configuration Audit
FMECA	Failure Mode Effects and Criticality Analysis
FRACAS	Failure Reporting Analysis and Corrective Action System
FWCI	Firmware Configuration Item
GFI/P/E/M	Government Furnished Information/Property/Equipment/Material
GIDEP	Government Industry Data Exchange Program
GPETE	General Purpose Electronic Test Equipment
HFE	Human Factor Engineering
HWCI	Hardware Configuration Item
IA	Information Assurance
IAW	In Accordance With
IBR	Integrated Baseline Review
ICAPS	Interactive Computer Aided Provisioning System
ICD	Interface Control Documentation
IETM	Interactive Electronic Technical Manual
I-Level	Intermediate-Level
ILS	Integrated Logistics Support
ILSMT	Integrated Logistics Support Management Team
ILSP	Integrated Logistics Support Plan
ILSWG	Integrated Logistics Support Working Group

IMI	Interactive Multimedia Instruction
IMS	Integrated Master Schedule
I/O	Input/Output
IPR	In-Progress Review
IPT	Integrated Product Team
IRS	Interface Requirements Specification
JETDS	Joint Electronics Type Designation System
JTG	Joint Test Group
LRU	Lowest Replaceable Unit
MAM	Maintenance Assist Modules
M-DEMO	Maintainability Demonstration
MIP	Maintenance Index Pages
MOSA	Modular Open Systems Approach
MRC	Maintenance Requirement Card
MSDS	Material Safety Data Sheets
NAVSEA	Naval Sea Systems Command
NDI	Non-Developmental Item
NLT	No Later Than
NPE	Navy PMS Editor
OA	Open Architecture
OACE	Open Architecture Computing Environment
OE	Operating Environment
OEM	Original Equipment Manufacturer
O-Level	Organizational-Level
P/CR	Problem/Change Report/Request
PAT	Production Acceptance Testing
PBL	Performance Based Logistics
PCA	Physical Configuration Audit
PDR	Preliminary Design Review
PFM	Pre-Faulted Module
PHS&T	Packaging, Handling, Storage & Transportation

PMS	Planned Maintenance System
PPL	Provisioning Parts List
PQT	Power Qualification Test
PR	Problem Report
PRR	Production Readiness Review
PTD	Provisioning Technical Documentation
PVT	Performance Verification Testing
QA	Quality Assurance
RBS	Readiness Based Sparing
RCM	Reliability Centered Maintenance
RDD	Required Delivery Date
RDT&E	Research, Development, Test and Evaluation
RFD	Request For Deviation
RFID	Radio Frequency Identification
RFP	Request For Proposal
ROM	Rough Order of Magnitude
S&TE	Support and Test Equipment
SA	Supportability Analysis
SCN	Specification Change Notices
SDCT	System Design Certification Test
SDF	Software Development Files
SDP	Software Development Plan
SDR	System Design Review
SEMP	System Engineering Management Plan
SFR	System Functional Review
SIP	System Integration Plan
SOW	Statement Of Work
SPETE	Special Purpose Electronic Test Equipment
SPS	Software Product Specification
SPTD	Supplemental Provisioning Technical Data
SRD	Systems Requirements Document
SRR	System Requirements Review
SRS	Software Requirements Specification
SRVM	Specification Requirements Verification Matrix

SSAA	System Security Authorization Agreement
SSDD	System/Subsystem Design Descriptions
SSR	Software Specification Review
SVD	Software Version Description
SWFTS	Submarine Warfare Federation Tactical System
T&E	Test and Evaluation
TD	Technical Data
TDA	Technical Design Agent
TDP	Technical Data Package
TEPP	Test and Evaluation Program Plan
TI	Technical Instructions
TM	Technical Manuals
TRR	Test Readiness Review
UID	Unique Identification
XML	Extensible Mark-up Language

**Team Submarine
Common Production Hardware (CPH)
Tentative CLIN Structure**

Contract Overview:

- ID/IQ
- ~80% hardware production
- ~20% engineering services
- Overarching Statement of Work (SOW)
 - After contract award work will be directed by Technical Instructions and Delivery Orders (DO)
 - There will be separate DOs for each Program Office for each Technical Insertion (i.e. TI-12)

Tentative CLIN Structures:

1. Production Orders (CLIN 1000)
 - Firm Fixed Price – Award Fee (FFP-AF)
2. Data Submittals (CLIN 2000)
 - Not Separately Priced
3. Other Direct Cost (CLIN 3000)
 - Cost Only, No Fee
4. Engineering & Other Services (CLIN 4000)
 - Cost Plus Award Fee (CPAF)
5. Royal Australian Navy (RAN) ODC (CLIN 5000)
 - Cost Only, No Fee
6. Royal Australian Navy (RAN) NRE (CLIN 6000)
 - Cost Plus Award Fee (CPAF)

Details regarding each CLIN:

- 1 ITEM/CLIN 1000 – Production Orders
 - Firm Fixed Price – Award Fee (FFP-AF)
 - Production
 - Spares and Installation

1 orders CLIN to cover entire POP
2. ITEM/CLIN 2000 – Data Submittals
 - Not Separately Priced
 - Data (CDRLs, Drawings, TDP, ILS, etc)

3. ITEM/CLIN 3000 – Other Direct Costs

– Cost only, No Fee

- Material, Travel and Subsistence in support of Item 4000
- Travel
- Misc materials
- Procure test/lab Hardware for upgrades

Base Year	3000	(Supports Item 4000)
Option Year 1	3001	(Supports Item 4001)
Option Year 2	3002	(Supports Item 4002)
Option Year 3	3003	(Supports Item 4003)
Option Year 4	3004	(Supports Item 4004)

4. ITEM/CLIN 4000 – Engineering Services

– Cost Plus Award Fee

- Non Recurring Engineering (NRE)
- Requirements development
- Hardware design / development and functional testing
- Advanced Production Units
- Environmental Quality Testing
- Final design
- Installation and field support

Base Year	4000
Option year 1	4001
Option year 2	4002
Option year 3	4003
Option year 4	4004

5. ITEM/CLIN 5000 – RAN Other Direct Costs

– Cost only, No Fee

- Material, Travel and Subsistence in support of Item 6000
- Travel
- Misc materials
- Procure test/lab Hardware for upgrades

Base Year	5000	(Supports Item 6000)
Option Year 1	5001	(Supports Item 6001)
Option Year 2	5002	(Supports Item 6002)
Option Year 3	5003	(Supports Item 6003)
Option Year 4	5004	(Supports Item 6004)

6. ITEM/CLIN 6000 – RAN Engineering Services

– Cost Plus Award Fee

- Non Recurring Engineering (NRE)
- Requirements development
- Hardware design / development and functional testing
- Advanced Production Units
- Environmental Quality Testing
- Final design
- Installation and field support

Base Year	6000
Option year 1	6001
Option year 2	6002
Option year 3	6003
Option year 4	6004