

STATEMENT OF WORK  
FOR  
DETAIL DESIGN  
MARITIME SECURITY CUTTER MEDIUM (WMSM)  
OFFSHORE PATROL CUTTER (OPC)

DRAFT

PREPARED BY  
U.S. COAST GUARD  
OFFSHORE PATROL CUTTER PROJECT

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## STATEMENT OF WORK FOR DETAIL DESIGN (DD)

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## STATEMENT OF WORK FOR DETAIL DESIGN

**1.0 SCOPE**

- 1.1. This Statement of Work is for the Detail Design (DD) of the U.S. Coast Guard's (USCG) Offshore Patrol Ship (OPC). This DD SOW supplements the OPC General SOW which is in Section C of the RFP. The objectives of Detail Design are to:
- 1.1.1 Mature the OPC design to a level suitable to support construction.
  - 1.1.2 Complete integration of Government Furnished Equipment into the design.
  - 1.1.3 Establish and document the interfaces between the HM&E design, the C4ISR system design, the Navy-Type, Navy Owned (NTNO) equipment, Aviation Equipment, Small Boats, and other Government Furnished Equipment (GFE).
  - 1.1.4 Develop a complete and fully-integrated Production Design and Engineering Drawing Package in sufficient detail to support the transition of the design to construction.
  - 1.1.5 Implement the Earned Value Management System.
  - 1.1.6 Support Quarterly Program Management Conferences (PMC).
  - 1.1.7 Support an Initial Critical Design Review (ICDR) to verify that the interim detailed design is integrated and internally consistent.
  - 1.1.8 Support a Final Critical Design Review (FCDR) to verify that the Detailed Design meets the Ship requirements.
  - 1.1.9 Support a Production Readiness Review (PRR) to verify that the Detailed Design fully supports Construction.
  - 1.1.10 Establish the Allocated Baseline (As-Contracted- View) to include the Engineering Drawing Packages.
  - 1.1.11 Identify Diminishing Material Sources (DMS) risks for equipment identified in the Allocated Baseline,
  - 1.1.12 Place the Allocated Baseline (as-contracted-view) under configuration control.
  - 1.1.13 Manage the certification processes and product matrix.
  - 1.1.14 Finalize the Build Strategy, Plans and Schedules.
  - 1.1.15 Establish a C4ISR Test and Integration Facility (TIF) and a C4ISR Production Facility (PF).
  - 1.1.16 Establish a Machinery Plant Control and Management System (MPCMS) Land Based Test Facility (LBTF).
  - 1.1.17 Finalize the Test and Trials Strategy, Plans and Schedules for the lead ship including Long Lead Time Material (LLTM).
  - 1.1.18 Manage technical, cost and schedule risks.

## STATEMENT OF WORK FOR DETAIL DESIGN

**2.0 REFERENCES AND DEFINITION**

- 2.1 Refer to Attachment J-X for references.
- 2.2 Refer to Attachment J-Y for definitions.

**3.0 REQUIREMENTS**

- 3.1 General Requirements.
  - 3.1.1 The Contractor shall the detailed design.
  - 3.1.2 The Contractor shall verify that the Detail Design meets the requirements and is ready for construction.

**040 Project Management**

- 040.1 Management Plan. The Contractor shall update the Management Plan through Lead Ship Delivery. [040-03-1001]
- 040.2 Integrated Master Schedule. The Contractor shall update the Integrated Master Schedule (IMS) through Lead Ship Delivery. [040-03-2288]
  - 040.2.1 The IMS shall be structured using the Contract Work Breakdown Structure (CWBS).
  - 040.2.2 The IMS shall be integrated with and used for EVMS calculations and reporting.
  - 040.2.3 The IMS shall include testing in the schedule.
- 040.3 Subsidiary plans. Subsidiary plans and schedules required herein shall be integrated with the MP and IMS.
- 040.4 Meetings.
  - 040.4.1 The Contractor shall prepare meeting agendas, presentation materials, action lists and track action. [040-03-1029].
  - 040.4.2 The Contractor shall schedule and conduct Major Reviews: IBR, ICDR, FCDR, and PRR.
    - 040.4.2.1 The Contractor shall provide Major Review Plans and Presentations. [040-03-1009].
    - 040.4.2.2 The Contractor shall conduct an IBR in conjunction with the Coast Guard's Phase II Kick-off Meeting.
      - 040.4.2.2.1 The Contractor shall conduct an IBR for each option awarded during this period of performance.
    - 040.4.2.3 The Contractor may recommend the substitution of a scheduled Major Review to satisfy the requirement for the Quarterly PMC.
    - 040.4.2.4 Technical Meetings shall be held in conjunction with the Major Reviews.

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- 040.4.3 The Contractor shall conduct the IBR to evaluate the risks inherent in the contract's planned performance measurement baseline for detail design and long lead time material for the lead ship.
- 040.4.3.1 The Contractor shall demonstrate to the Coast Guard that it has established a realistic contract Performance Measurement Baseline (PMB) which includes the scope of work, is consistent with contract schedule requirements, and has adequate resources assigned.
- 040.4.3.2 The Contractor shall demonstrate to the Coast Guard:
- 040.4.3.2.1 Ability of the project technical plan to achieve the scope of work;
- 040.4.3.2.2 Adequacy of the time allocated for performing the defined tasks to successfully achieve the project schedule objectives;
- 040.4.3.2.3 Ability of the Performance Measurement Baseline (PMB) to successfully execute the project and attain cost objectives, recognizing the relationship between budget resources, funding, schedule, and scope of work;
- 040.4.3.2.4 Availability of personnel, facilities, and equipment when required, to perform the defined tasks needed to execute the program successfully and
- 040.4.3.2.5 The degree to which the management process provides effective and integrated technical/schedule/cost planning and baseline control.
- 040.4.3.3 The Contractor shall document Risks identified during the IBR which are associated with the PMB and the Contractor's ability to adhere to the PMB.
- 040.4.3.4 Subsequent meetings to address areas of Coast Guard concern may be conducted as determined by the Coast Guard if the IBR did not adequately address the Contractor's ability to execute the scope of work.
- 040.4.4 The Contractor shall conduct an ICDR at the Contractor's facility.
- 040.4.4.1 Prior to conducting the ICDR the Contractor shall demonstrate to the satisfaction of the USCG, compliance with the following entrance criteria:
- 040.4.4.1.1 The design incorporates initial Vendor Furnished Information (VFI).
- 040.4.4.1.2 Results of hydrodynamic model testing incorporated into the design.
- 040.4.4.1.3 Required USCG deliverables and ABS submittals accepted and changes resulting from moderate to high risk comments incorporated.

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- 040.4.4.1.4 Design margins and service life allowance documented in compliance with the OPC System Specification.
- 040.4.4.1.5 Establishment of the MPCMS Integrated Master Plan and demonstrated progress on the land based test facility to support the Contractor's ship delivery schedule.
- 040.4.4.1.6 Established GFE load out plans in the IMS for testing and/or shipboard installations that are supported by GFE delivery dates.
- 040.4.4.1.7 Technical risks are documented in the Risk Database. Risk mitigation plans are documented and executable. The mitigation steps scheduled for completion prior to ICDR have been completed.
- 040.4.4.1.8 Establishment of the C4ISR Integration Plan and demonstrated progress on the TIF to support the C4ISR design and development.
- 040.4.4.1.9 C4ISR system and component material selection.
- 040.4.4.1.10 Submitted C4ISR Functional Interface Diagrams highlighting any proposed changes for consideration.
- 040.4.4.1.11 Preliminary Interface Design Specifications (IDSs) and updated Interface Requirements Specifications (IRS) for Contractor responsible software/middleware submitted.
- 040.4.4.1.12 Preliminary C4ISR System Requirements Flow-Down shows allocation to Hardware Configuration Items (HWCIIs) and Computer Software Configuration Items (CSCIIs).
- 040.4.4.2 During the ICDR the Contractor shall:
  - 040.4.4.2.1 Demonstrate that the design is integrated and internally consistent.
  - 040.4.4.2.2 Task ABS to report the status of ABS Classification efforts.
  - 040.4.4.2.3 Present the status of the design. The following updated Phase I analysis and reports and/or Phase II analysis and drawings shall be reviewed during the ICDR:
    - 040.4.4.2.3.1 General Arrangement Drawing.
    - 040.4.4.2.3.2 Hydrodynamic Performance.
    - 040.4.4.2.3.3 Intact and Damaged Stability Analyses.
    - 040.4.4.2.3.4 Quarterly Weight Report.
    - 040.4.4.2.3.5 Integrated Topside Design Analysis Report.
    - 040.4.4.2.3.6 Calculation of Surface Ship Endurance Fuel Requirements.
    - 040.4.4.2.3.7 Master Equipment List (MEL).
    - 040.4.4.2.3.8 Strength Studies, Calculations and Analyses.
    - 040.4.4.2.3.8.1 Status of Long Lead Time procurement of steel plate.
    - 040.4.4.2.3.9 Propulsion System.
    - 040.4.4.2.3.10 Electric Plant Design Report.

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- 040.4.4.2.3.11 C4ISR.
- 040.4.4.2.3.12 Auxiliary Systems Calculations.
- 040.4.4.2.3.13 HVAC Heating and Cooling Load Calculations.
- 040.4.4.2.3.14 Deck Systems. [no consolidated report].
- 040.4.4.2.3.15 Aircraft Stowage, Handling and Launching General Arrangements.
- 040.4.4.2.3.16 Outfitting.
- 040.4.4.2.3.17 Weapons and Ammunition Handling Analysis and Flow Diagram.
- 040.4.4.2.3.18 Results and findings of the HETR.
- 040.4.4.2.4 Present status of deliverables.
- 040.4.4.2.5 Present status and schedule for VFI deliverables.
- 040.4.4.2.6 Present status of design margins and demonstrate they are adequate to deliver the ship with the required service life allowances with projected margin consumption.
- 040.4.4.2.7 Demonstrate that MPCMS software development status has met scheduled milestones and a credible mitigation plan to correct accrued software trouble reports.
- 040.4.4.2.8 Demonstrate integration of C4ISR including GFE, middleware and completed interface development.
- 040.4.4.2.9 Demonstrate budget EVMS cost and schedule performance to the integrated baseline.
- 040.4.4.2.10 Demonstrate C4ISR system and component material selections can meet contract performance requirements.
- 040.4.4.2.11 Demonstrate the necessity for any C4ISR Functional Interface Diagram changes by illustrating any diagrammatic technical issues.
- 040.4.4.2.12 Verify the OPC System Specification minimum ship to ship and ship to air range requirements by an accredited modeling tool.
- 040.4.4.2.13 Schedule adherence and technical issue review for preliminary Interface Design Specifications (IDSs) and updated Interface Requirements Specifications (IRS) for Contractor responsible software/middleware.
- 040.4.4.2.14 Demonstrate Preliminary C4ISR System Requirements Flow-Down allocation to Hardware Configuration Items (HWCI) and Computer Software Configuration Items (CSCI).
- 040.4.4.2.15 Demonstrate the C4ISR Software/Firmware development status:
- 040.4.4.2.15.1 Review of Development processes/methods as described in the Software Development Plan (SDP).
- 040.4.4.2.15.2 System design and architecture as documented in the System/Subsystem Specifications, Software Requirements Specification, and System Architecture Documents.

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- 040.4.4.2.15.3 System and Subsystem interface requirements as documented in the Interface Requirements Specification (IRS).
- 040.4.4.2.15.4 Identification and review of CSCI software development metrics.
- 040.4.4.2.15.5 Software testing plans down to the CSCI level as documented in the Software Test Plan (STP) and Software Test Description (STD).
- 040.4.4.3 The ICDR shall have the following minimum exit criteria:
  - 040.4.4.3.1 The ship design satisfies contract requirements.
  - 040.4.4.3.2 Progress against risk mitigation plans show that the risks will be acceptable at FCDR.
  - 040.4.4.3.3 Proposed C4ISR Functional Interface Diagram changes mitigate cost and performance risk.
  - 040.4.4.3.4 Risk mitigation for Preliminary Interface Design Specifications (IDSs) and updated Interface Requirements Specifications (IRS) for Contractor responsible software/middleware are in place and support Contractor schedule.
    - 040.4.4.3.4.1 Risk mitigation for any issues from Preliminary C4ISR System Requirements Flow-Down allocation to Hardware Configuration Items (HWCIs) and Computer Software Configuration Items (CSCIs) support Contractor's schedule.
  - 040.4.4.3.5 EVMS cost and schedule performance are in agreement with the integrated baseline.
  - 040.4.4.3.6 Closed Action Items are acknowledged by the contractor and USCG and documented.
- 040.4.5 The Contractor shall conduct the FCDR at the Contractor's facility.
  - 040.4.5.1 Prior to conducting the FCDR the Contractor shall accomplish the following Entrance Criteria:
    - 040.4.5.1.1 Conducted HSI reviews for access and operability by using the 3D TDP and software that allows anthropometric models 5th through 95th percentile men and women to move through the ship and perform their required functions.
    - 040.4.5.1.2 Incorporated final Vendor Furnished Information (VFI) into the design.
    - 040.4.5.1.3 Resolved USCG critical comments on approval deliverables.
    - 040.4.5.1.4 Resolved comments on ABS submittals.
    - 040.4.5.1.5 Documented the remaining design margins and the available service life allowance.
    - 040.4.5.1.6 Demonstrated progress on the MPCMS land based test site to support the Contractor's ship delivery schedule

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- 040.4.5.1.7 Demonstrate progress against GFE load out plans in the IMS for testing and/or shipboard installations that are supported by GFE delivery dates.
- 040.4.5.1.8 Technical risks are documented in the Risk Database. Risk mitigation plans are documented and executable. The mitigation steps scheduled for completion prior to FCDR have been completed.
- 040.4.5.1.9 Demonstrate progress against the C4ISR Integration Plan and demonstrated C4ISR design progress at the TIF to support the Contractor's ship delivery schedule.
- 040.4.5.1.10 Interface Design Specifications (IDSs) and updated Interface Requirements Specifications (IRS) for Contractor responsible software/middleware submitted.
- 040.4.5.1.11 C4ISR System Requirements Flow-Down shows allocation to Hardware Configuration Items (HWCIs) and Computer Software Configuration Items (CSCIs).
- 040.4.5.2 During the FCDR the Contractor shall:
- 040.4.5.2.1 Demonstrate that the design is integrated and internally consistent.
- 040.4.5.2.2 Present the status of the design. The following data shall be reviewed during FCDR:
- 040.4.5.2.2.1 General Arrangement Drawing.
- 040.4.5.2.2.2 Hydrodynamic Performance.
- 040.4.5.2.2.3 Intact and Damaged Stability Analyses.
- 040.4.5.2.2.4 Quarterly Weight Report.
- 040.4.5.2.2.5 Integrated Topside Design Analysis Report.
- 040.4.5.2.2.6 Calculation of Surface Ship Endurance Fuel Requirements.
- 040.4.5.2.2.7 Master Equipment List (MEL).
- 040.4.5.2.2.8 Strength Studies, Calculations and Analyses.
- 040.4.5.2.2.9 Propulsion System.
- 040.4.5.2.2.10 Electric Plant Design Report.
- 040.4.5.2.2.11 C4ISR.
- 040.4.5.2.2.12 Auxiliary Systems Calculations.
- 040.4.5.2.2.13 HVAC Heating and Cooling Load Calculations
- 040.4.5.2.2.14 Deck Systems.
- 040.4.5.2.2.15 Aircraft Stowage, Handling and Launching General Arrangements.
- 040.4.5.2.2.16 Outfitting.
- 040.4.5.2.2.17 Weapons and Ammunition Handling Analysis and Flow Diagram.
- 040.4.5.2.2.18 Product Configuration Baseline.
- 040.4.5.2.2.19 3D TDP Walk-through.

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- 040.4.5.2.2.20 Results and findings of the HETR.
- 040.4.5.2.3 Present the status of deliverables
- 040.4.5.2.4 Present status of design margins and demonstrate they are adequate to deliver the ship with the required service life allowances with projected margin consumption.
  - 040.4.5.2.4.1 Present the MPCMS software development status.
- 040.4.5.2.5 Demonstrate integration of C4ISR including GFE, GFI, firmware and completed interface development.
- 040.4.5.2.6 Demonstrate budget EVMS cost and schedule performance to the integrated baseline.
- 040.4.5.2.7 Demonstrate C4ISR system, software design and component material selections meet contract performance requirements.
- 040.4.5.2.8 Schedule adherence and technical issue review for Final Interface Design Specifications (IDSs) and updated Interface Requirements Specifications (IRS) for Contractor responsible software/firmware.
- 040.4.5.2.9 Demonstrate C4ISR System Requirements Flow-Down allocation to Hardware Configuration Items (HWCIIs) and Computer Software Configuration Items (CSCIIs).
- 040.4.5.2.10 Verify the OPC Specification minimum ship to ship and ship to air range requirements by an accredited modeling tool.
- 040.4.5.2.11 Demonstrate the C4ISR Software/firmware development status to include:
  - 040.4.5.2.11.1 Development processes, metrics, and configuration as described in the Software Development Plan (SDP).
  - 040.4.5.2.11.2 System design, architecture, and allocated requirements as documented in the System/Subsystem Specifications, Software Requirements Specification, and System Architecture Documents.
  - 040.4.5.2.11.3 System and System interface requirements as documented in the Interface Design Documents (IDD).
  - 040.4.5.2.11.4 Review of plans for Software testing plans down to the CSCI level as documented in the Software Test Plan (STP) and Software Test Description (STD).
- 040.4.5.3 The FCDR shall have the following minimum exit criteria:
  - 040.4.5.3.1 The ship design satisfies contract requirements.
  - 040.4.5.3.2 Progress against risk mitigation plans show that the risks will be acceptable at PRR.
  - 040.4.5.3.3 C4ISR system and component material selections meet contract performance requirements.
  - 040.4.5.3.4 Risk mitigation for Preliminary Interface Design Specifications (IDSs) and updated Interface Requirements Specifications (IRS) for Contractor responsible

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- software/middleware are in place and support Contractor schedule.
- 040.4.5.3.4.1 Risk mitigation for any issues from Preliminary C4ISR System Requirements Flow-Down allocation to Hardware Configuration Items (HWCIs) and Computer Software Configuration Items (CSCIs) support Contractor's schedule.
- 040.4.5.3.5 EVMS cost and schedule performance are in agreement with the integrated baseline.
- 040.4.5.3.6 Software development processes are fully defined and accepted as appropriate for coding and test.
- 040.4.5.3.7 CSCI requirements are defined and accepted as stable.
- 040.4.5.3.8 Interfaces between the CSCI and other configuration items both internal and external to the system are defined and stable.
- 040.4.5.3.9 Software user interfaces are identified, including critical formats and interactions.
- 040.4.5.3.10 Closed Action Items are acknowledged by the contractor and USCG and documented.
- 040.4.6 The Contractor shall conduct the Production Readiness Review (PRR).
- 040.4.6.1 The PRR shall be successfully completed and approved by the USCG prior to the exercise of the option for construction of the lead ship.
- 040.4.6.2 The PRR entrance criteria are as follows:
- 040.4.6.2.1 Construction Drawings have been completed and Accepted or Approved to the following levels:
- |               |                         |     |
|---------------|-------------------------|-----|
| 040.4.6.2.1.1 | Group 100, Structures:  | 95% |
| 040.4.6.2.1.2 | Group 200, Propulsion:  | 95% |
| 040.4.6.2.1.3 | Group 300, Electrical:  | 85% |
| 040.4.6.2.1.4 | Group 400, Electronics: | 45% |
| 040.4.6.2.1.5 | Group 500, Auxiliary:   | 80% |
| 040.4.6.2.1.6 | Group 600, Outfitting:  | 55% |
| 040.4.6.2.1.7 | Group 700, Weapons:     | 95% |
- 040.4.6.3 During the PRR the Contractor shall demonstrate:
- 040.4.6.3.1 The updated Build Strategy to include the detailed schedule for the Production effort (e.g., integration of material purchase, vendor furnished equipment under contract, subcontractor effort, utilization of shipyard resources, manpower requirements and loading, production work packages including outfitting and integrated logistics support activities) will support start of construction.

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- 040.4.6.3.2 Demonstrate that action items from the Final Contract Design Review (FCDR) have been successfully addressed and closed out.
- 040.4.6.3.3 Technical risks are documented in the Risk Database. Risk mitigation plans are documented and executable. The mitigation steps scheduled for completion prior to PRR have been completed.
- 040.4.6.3.4 EVMS (Earned Value Management System) trends and analysis support established program cost and schedules that demonstrate contract performance
- 040.4.6.3.5 Required Contractor staffing levels (with proper qualifications) are in place for Program Management, Engineering and Production (by Trade) for the Project's duration.
- 040.4.6.3.6 A facility utilization assessment has been conducted (including other on-going and future scheduled work) that ensures that appropriate facilities, e.g., cranes, jigs, special fixtures, are in place to support production.
- 040.4.6.4 The PRR shall have the following minimum exit criteria:
- 040.4.6.4.1 80% of the Detailed Design is complete as accepted by the USCG.

**041 Configuration Management**

- 041.1 Configuration Management Plan. The Contractor shall update and implement the CM Plan. [041-03-1013].
- 041.2 Allocated Baseline. The Allocated Baseline (as contracted) shall be re-established at the Kick-off Meeting.
- 041.3 Engineering Change Request. The Contractor may submit unsolicited changes to the configuration baseline via the Engineering Change Request (ECR). [041-03-2306]. The ECR shall document preliminary costs, technical, and logistics impacts from the proposed change.
- 041.3.1 The Contractor shall submit Engineering Change Proposals (ECP) after USCG approval of the ECR. [041-03-1022].
- 041.4 Justification for Technical Determination. The Contractor shall, if alternatives to NVR requirements are proposed, submit Justification for Technical Determination (JTD) forms. [041-03-1043].
- 041.5 Primary Reference Document. The Contractor shall provide and maintain an up to date Master Index of Primary Reference Document (MIPRD) Report. The index shall include first tier references, the location within the contract where cited, the hull applicability, and the effective issue. The Contractor shall update the MIPRD indicating the current issue for each cited primary reference. The MIPRD shall

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identify the document(s) approval(s) obtained for using any issue other than the effective issue. [041-03-1046].

- 041.6 Data Accession List. The Contractor shall update the Data Accession List (DAL) that describes the technical and program data generated in the execution of the SOW. [041-03-2225].
- 041.6.1 Non-CDRL data generated by the contractor and subcontractors in the performance of the effort under this SOW shall be identified in the DAL.
- 041.7 Configuration Status Accounting.
- 041.7.1 The Contractor shall provide recurring Configuration Status Reports. [041-03-1000].
- 041.7.1.1 The Contractor shall conduct Configuration Status Accounting (CSA) to capture and maintain ship configuration information by hull, to the level of the lowest identified repairable unit. The Contractor shall ensure that current and historical configurations of the ship can be accurately determined throughout the contract performance period.
- 041.7.1.1.1 The Contractor shall maintain a Configuration Status Accounting (CSA) system in the US Navy's Configuration Data Managers Database-Open Architecture (CDMD-OA) at the CDMD-OA website (www.cdmd.navy.mil). The Contractor shall obtain the required certifications and user training for access and use of CDMD-OA.
- 041.7.1.1.2 The CSA system shall be established prior to the Initial Critical Design Review (ICDR), maintained during lead ship construction, continue through the construction contract, and shall provide necessary information for a complete, accurate and verified "as delivered" configuration baseline for each ship.
- 041.7.1.1.3 The Contractor shall assign Hierarchical Structure Codes (HSC) to each GFE and CFE configuration item. using the approach required in CDRL 041-03-1000.
- 041.7.1.1.4 The CSA system shall maintain change status for Configuration Items and reflect the current system/equipment configuration Engineering Change Proposal (ECP) and RFD status.
- 041.7.1.1.5 The USCG will support platform creation and role assignment within CDMD-OA.
- 041.7.2 Configuration Control.
- 041.7.2.1 Request for Deviation (RFD). The Contractor may propose deviations from a particular requirement of an item's configuration baseline documentation, for a specific hull by providing a RFD. [041-03-1025].
- 041.7.2.2 Upon Coast Guard approval the Contractor shall implement the RFD.

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- 041.7.3 Configuration Identification.
- 041.7.3.1 The Contractor shall identify, define, and incorporate Configuration Items in accordance with MIL-HDBK-61.
- 041.7.3.2 The following shall be additional Configuration Items:
- 041.7.3.2.1 Government Furnished Equipment (GFE).
- 041.7.3.2.2 Any item that is the subject of an OEM maintenance requirement.
- 041.7.3.3 The Contractor shall support the USCG's Physical Configuration Audit (PCA) on the first ship.
- 041.7.3.3.1 The Contractor shall provide personnel to resolve questions arising during the PCA.
- 041.7.3.3.2 Discrepancies resulting from the PCA shall be resolved and incorporated before delivery.
- 041.7.3.3.3 The Contractor shall provide a Physical Configuration Audit (PCA) Summary Report. [041-03-1021].
- 041.7.3.4 On-site Validation.
- 041.7.3.4.1 The contractor shall provide a 100% verification system for parts and materials. The system shall verify that:
- 041.7.3.4.1.1 Replacement and spare parts received are in accordance with/support the configuration and parts lists.
- 041.7.3.4.1.2 The quantity of items received is in accordance with established allowance quantities. The USCG will establish quantities and provide the contractor with appropriate reconciliation job aids.
- 041.7.3.4.1.3 Components received are in accordance with the configuration.
- 041.7.3.4.1.4 Materials received are packaged in accordance with applicable PHS&T requirements.
- 041.7.3.4.1.5 Parts and components at installation or stowage agree with the configuration.
- 041.7.3.4.2 The Contractor shall make quarterly reports of the verifications conducted and the status of noted discrepancies.

**042 General Administrative Requirements**

- 042.1 Earned Value Management System. The Contractor shall implement the Earned Value Management System (EVMS) for each option awarded during the period of performance.
- 042.1.1 The Contractor shall update the Earned Value Management System Plan. [042-03-2343]

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- 042.1.2 The Contractor shall provide Cost Performance Reports (CPR) in both CWBS and Organizational Breakdown Structure (OBS) formats for labor hours, labor dollars and material dollars.
- 042.1.2.1 The following reports shall be included: [042-03-2341]
- 042.1.2.1.1 CPR Format 1 - WBS Oriented Cost Report
- 042.1.2.1.2 CPR Format 3 - Baseline Report
- 042.1.2.1.3 CPR Format 5 - Problem Analysis Report / Variance Narrative
- 042.1.2.1.4 Contract Funds Status Report (CFSR).
- 042.1.2.2 Dollarized reports shall segregate labor, material, and indirect under the CWBS and OBS for labor and material.
- 042.1.2.3 Indirect costs shall be segregated from labor and material dollars and broken into the respective elements (G&A, IR&D, Material Adder, Production/Engineering Pools) and listed as a line item adder to labor and material cost.
- 042.1.3 The contractor shall provide supplemental CPR support data. [042-03-2342]
- 042.1.3.1 Real Time Data: The contractor shall provide current and cumulative Schedule (S), Performance (P), and Actual (A) labor hour data at the lowest level of detail where Budget, Earnings, and Actuals come together (Work Package Level).
- 042.1.3.2 SPA Charts with Metrics at the Control Account level shall be made available Weekly.
- 042.1.3.2.1 The labor hour data, "SPA" Charts with Metrics shall be that used by the contractor to perform and manage the Engineering/ILS effort and the Manufacturing effort on the Ship or in the Shops.
- 042.1.3.3 Baseline changes shall be reflected in the IMS and the EAC review documentation.
- 042.1.4 The Contractor shall perform A Bottoms-Up Estimate At Completion (EAC) review semi-annually and detailed results shall be provided to the Coast Guard in accordance with the EVMS Plan which complies with the requirements of this contract.
- 042.1.5 Surveillance Review - The Contractor shall support an annual EVMS surveillance review to assess the continued compliance of the EVMS system to ANSI/EIA standards and the requirements of this contract.
- 042.1.6 The Coast Guard reserves the right to review the EVMS to verify compliance.
- 042.2 Build Strategy and Producibility Report. The Contractor shall update and finalize the OPC Build Strategy and Producibility Report. [042-03-1023]

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- 042.2.1 The Contractor shall update the Build Strategy based on the detailed design, finalized Long Lead Time Materials & Equipment (both CFE and GFE) and provide updates to manpower, organization and facilities.
- 042.2.2 The Contractor shall provide a GFE Load-out and Installation Plan. [041-03-1646]
- 042.3 Purchase orders.
- 042.3.1 The Contractor shall provide purchase orders and an Index of Purchase Orders. [042-03-1072]
- 042.3.2 Purchase orders shall contain specifications and drawings, firm name, address of sub-contractor or vendor, the location of the material, time of completion, and tests and inspections required. The Contractor shall insert in subcontracts and purchase orders for articles that may require stock repair parts or stock components, a provision to permit the USCG to purchase such parts or stock components.
- 042.3.3 Communications relative to purchase orders shall refer to the number and date of such order and shall give the name or USCG designation of the ship for which the material is intended.
- 042.4 Integrated Data Environment.
- 042.4.1 The Contractor shall provide access to their Integrated Data Environment (IDE) to support the exchange and archiving development and management of design and logistic data and allow access to their 3D TDP. Formal deliverables shall be delivered via the USCG IDE.
- 042.4.2 The Contractor shall post in-process documents to the IDE on a periodic basis as drawings, analyses and reports mature.
- 042.4.3 The Contractor's IDE shall, at a minimum, provide the following capabilities:
- 042.4.3.1 Authorized Users. Access to the IDE shall be restricted to authorized users through a controlled access web-enabled application.
- 042.4.3.1.1 Access to the IDE shall be controlled by an initial challenge upon access and requires PKI for access.
- 042.4.3.1.2 The Contracting Officer, or their representative, will provide the Contractor with the names of authorized users, which will include contracted support personnel, and the level of access authorized for each.
- 042.4.3.1.3 The Contractor shall maintain and controls authorized user's access and provide an online list of valid users throughout the performance period.
- 042.4.3.2 Access. The IDE shall be internet accessible. Authorized personnel shall be able to access the IDE via the Internet

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- using a standard web browser without the need to install or download additional client software.
- 042.4.3.3 Archive Library. The IDE shall include an archive library of submittals and other data developed for the program.
- 042.4.3.4 Back up capability shall be provided and back up media shall be kept, at a minimum, for the length of the performance period. Back up media shall be indexed to provide straightforward access. In the event of an IDE failure (including compromise due to hacker or virus attacks), lost information shall be limited to activities that have occurred within the preceding 24 hour period. Back-ups shall be stored off-site.
- 042.4.4 The Contractor shall provide a cost effective mix of IDE user support for a USCG user population estimated at approximately 100 users at any given time. User support shall promote rapid acquisition of the skills needed to use the IDE and quick access to assistance when encountering problems during use, and may consist of classroom instruction, help desk support, printed desk guides, online help, Frequently Asked Questions (FAQs), and other similar methods. The mix of support formats should consider turnover of IDE users, estimated at approximately every two years.
- 042.4.5 The Contractor shall periodically provide the contents of the archive library to the USCG.
- 042.4.5.1 The data may be transferred via secure network connection or by transportable media.
- 042.4.6 The USCG shall have unrestricted rights to download data from the IDE.
- 042.5 The Contractor shall provide a Contractor / ABS Communications Report. [042-03-1032]
- 042.6 Software Development.
- 042.6.1 Software developed for the OPC shall be developed in accordance with the Contractor's Top Level Software Development Plan (TLSDP) and Schedule.
- 042.6.2 The Contractor shall acquire, manage, and document information required to install, manage, test, and verify the software baseline.
- 042.6.3 The Contractor shall ensure that software products are internally consistent with Software QA Standards as called out in the SDP.
- 042.6.4 The Contractor shall manage the configuration of the software product line and associated materials in accordance with Software CM Standards as called out in the SDP.

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- 042.6.5 For any software developed and delivered, the Contractor shall demonstrate that:
- 042.6.5.1 Software Requirements have been met;
  - 042.6.5.2 Software Trouble Reports have been resolved;
  - 042.6.5.3 Load-out and installation procedures are complete.
- 042.6.6 The Contractor shall provide updates to the following documents:
- 042.6.6.1 Software Development Plan (SDP). [042-03-1550]
  - 042.6.6.2 System/Subsystem Requirements Specification. [042-03-1420]
  - 042.6.6.3 Software Requirements Specification. (SRS) [042-03-1420]
  - 042.6.6.4 Software Requirements Traceability Matrix & Verification Plan. [068-03-1081]
  - 042.6.6.5 Software Architecture Document (SAD) with the top-level system architecture defined in accordance with Department of Defense Architectural Framework (DoDAF) Specifications. [042-03-1424]
  - 042.6.6.6 Interface Requirements Specifications. [042-03-1420]
  - 042.6.6.7 Display Screen Designs/Layouts, Button Actions, and Operator Actions for Console & Work Stations [042-03-2347]
- 042.6.7 The Contractor shall provide the following:
- 042.6.7.1 Software Development Schedule [042-03-2350] including the Software Build Plan.
  - 042.6.7.2 Interface Design Description. [042-03-2061]
  - 042.6.7.3 COTS, NDI Software, Firmware Support Manuals. [042-03-2060]
  - 042.6.7.4 Database Design Description Documents (DBDD). [042-03-1558]
- 042.6.8 The Contractor shall conduct the following events in conjunction with PMCs:
- 042.6.8.1 Software Specification Review.
  - 042.6.8.2 Human-Machine-Interface Design Review.
  - 042.6.8.3 Software Preliminary Design Review.
  - 042.6.8.4 Software Critical Design Review.
  - 042.6.8.5 Processing Hardware Preliminary Design Review.
  - 042.6.8.6 Processing Hardware Critical Design Review.
  - 042.6.8.7 Test Readiness Review(s).
  - 042.6.8.8 Physical Configuration Audit(s).

**045 Care of Shipping During Construction**

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045.1 Care of Ship during Construction Plan. The Contractor shall provide and maintain current a Care of Ship during Construction Plan. [045-03-1077]

**068 Integration and Engineering**

- 068.1 Systems Engineering Master Plan. The contractor shall update and implement the Systems Engineering Master Plan (SEMP). [068-03-2285].
- 068.2 Contractor's Risk Management Plan and Database. The Contractor shall update and execute the Contractor's Risk Management Plan and Database (CRMP). [068-03-1083] The CRMP shall identify, document, assess, and provide strategies for mitigating risks.
- 068.3 Risk management. The Contractor shall integrate risk management with design deliverables. The Contractor shall provide a cross reference between moderate and high risks, including their associated mitigation actions, with impacted design deliverables including but not limited to:
- 068.3.1 Integrated Master Schedule;
  - 068.3.2 Reservations on drawing deliverables;
  - 068.3.3 Margins applied to calculations.
- 068.4 Master Equipment List. The Contractor shall provide a Master Equipment List (MEL). [068-03-2106].
- 068.5 C4ISR Integration Plan. The Contractor shall update and implement the C4ISR Integration Plan (CIP). [068-03-2317].
- 068.6 Requirements Traceability and Verification Matrix. The contractor shall update the Requirements Traceability and Verification Matrix. [068-03-1081].
- 068.6.1 The Contractor shall include Software Requirements Traceability and Verification.

**070 General Requirements for Design and Construction**

- 070.1 General Arrangements Drawings. The Contractor shall update the General Arrangements Drawings. [070-03-1105].
- 070.2 Integrated Topside Design. The Contractor shall update the Integrated Topside Design. The Contractor shall continue to develop the Integrated Topside Design (ITD) that is effective, safe, and interoperable, perform an Integrated Topside Design Analysis and provide an updated Integrated Topside Design Analysis Report addressing the following topics. [070-03-1956].

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- 070.2.1 The Contractor shall develop and implement an ITD Process, using the "Integrated Topside Design and Certification Process for New Construction Ships," NAVSEA 05D, as a guide.
- 070.2.2 The Contractor shall include ship missions and operations, physical and electromagnetic environmental conditions, human factors engineering, as well as equipment and material configurations and limitations.
- 070.2.3 The Contractor shall develop descriptive evidence that the ship's topside design is safe, interoperable, meets the OPC System Specification requirements.
- 070.3 Topside Design Arrangement Drawings. The Contractor shall maintain the integrated topside design and provide the Topside Design Arrangement Drawings. [070-03-1091].

**071 Access**

- 071.1 Compartment and Access Drawings. The Contractor shall provide Compartment and Access Drawings. [071-03-1965].
- 071.2 Shipboard Access Study. The Contractor shall update Shipboard Access Study. [071-03-1124].
- 071.3 Equipment Removal and Maintenance Access Arrangement Drawings. The Contractor shall update the Equipment Removal and Maintenance Access Arrangement Drawings. [071-03-2109].
- 071.4 Flow Diagram. The Contractor shall provide a Flow Diagram showing the primary and secondary stores flow paths to the various storerooms. [071-03-1849].

**073 Noise and Vibration**

- 073.1 Noise Control Program Implementation Plan. The Contractor shall provide and execute a Noise Control Program Implementation Plan. [073-03-1135].
- 073.2 Noise Control Program Implementation. The Contractor shall:
- 073.2.1 Develop an approach, procedures, and organizational controls to be implemented to demonstrate compliance with noise control aspects of the OPC System Specification.
- 073.2.2 Plan for inspection surveys including:
- 073.2.2.1 Inspection of noise control measures including resilient mounts, flexible hose assemblies, and resilient pipe hanger installations.
- 073.2.2.2 Inspection for sound shorts, to validate that equipment meets material and performance requirements, and properly installed.
- 073.2.3 Perform and review airborne noise analysis.

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- 073.2.4 Perform and review machinery resilient mount selection analysis, machinery resiliently mounted system and foundation resonance analysis.
- 073.2.5 Perform and review hull mast, kingpost, and superstructure vibration analysis. Review procurement specifications and installation procedures for acoustic treatments and machinery purchased to airborne noise criteria.
- 073.2.6 Conduct noise control review of engineering diagrams and drawings.
- 073.2.7 Develop and review guidance and instruction documents for design and installation of noise control features.
- 073.3 Airborne Noise Category Assignment List. The Contractor shall review noise categories to compartments and update the Airborne Noise Category Assignment List. [073-03-2079]
- 073.3.1 The Contractor shall provide justification for any changes made to the noise category assignments.
- 073.4 Airborne Noise Control/Design History Booklet. The Contractor shall analyze ship and equipment noise and vibration, develop and analyze noise control features and update the Airborne Noise Control/Design History Booklet. [073-03-2081]
- 073.4.1 The Contractor shall include a modified compartment and access drawing showing the locations of the various types of bulkhead and overhead acoustic treatments.
- 073.5 Propulsion System Vibration Analysis. The Contractor shall update the Propulsion System Vibration Analysis. [073-03-1139].
- 073.6 Resilient Mount Index. The Contractor shall provide the Resilient Mount Index in accordance with the OPC System Specification (NVR 0-3-8/2.4). [073-03-1147].
- 073.7 Hull Girder, Superstructure, Mast and Foundations Vibration Analysis and Report. The Contractor shall provide a Hull Girder, Superstructure, Mast and Foundations Vibration Analysis and Report. [073-03-1142].

**074 Welding and Fabrication**

- 074.1 Welding and Fabrication Procedures and Sequences documents. The Contractor shall provide Welding and Fabrication Procedures and Sequences documents. [074-03-1378]
- 074.2 Qualification testing. The Contractor shall notify the PRO 24 hours prior to any welder qualification testing.

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**076 Reliability, Maintainability and Availability**

- 076.1 Reliability, Maintainability and Availability Assessment Report. The Contractor shall update the Reliability, Maintainability and Availability (RM&A) Assessment Report. [076-03-1152]
- 076.2 Failure Reporting and Corrective Action System. The Contractor shall implement a Failure Reporting and Corrective Action System (FRACAS) that complies with GEIA-STD-0009-2008, and provide a FRACAS Report. [076-03-2105]
- 076.2.1 Failure Reporting and Corrective Action System Report. The Contractor shall provide a Failure Reporting and Corrective Action System (FRACAS) Report. The contractor shall submit FRACAS Reports for failure incidents that occur to lowest replaceable units that are included on the MECL and on test items.
- 076.2.2 FRACAS reports shall include failures that occur on test items.

**077 System Safety**

- 077.1 System Safety Program Plan. The Contractor shall update the System Safety Program Plan (SSPP) and implement the System Safety Program. [077-03-1170].
- 077.2 System Safety Program Progress Summaries Reports. The Contractor shall provide System Safety Program Progress Summaries Reports (SSPPSR). [077-03-1174].
- 077.3 Web-based Hazard Tracking System. The USCG will provide the Contractor access to a Web-based Hazard Tracking System (HTS).
- 077.3.1 The USCG will approve read/write access for administrators on the Contractor's System Safety Team as needed.
- 077.3.2 The Contractor shall enter and track identified hazards (e.g., System Safety, Environmental Safety and Occupational Health (ESOH)), recommended mitigations and associated risk level in the Web-based HTS.
- 077.3.3 Hazardous Materials (HAZMAT) data, as defined in the OPC System Specification (NVR 5-7-12), shall be entered and managed utilizing the Web-based HTS. A separate record shall be entered for each identified hazardous material. The following HAZMAT related information shall be provided at a minimum:
- 077.3.3.1 A list of compartment locations of each identified HAZMAT within the system during its entire lifecycle.
- 077.3.3.2 Quantity of each identified HAZMAT within the system during its entire lifecycle.
- 077.3.3.3 Process or activity whereby quantities of HAZMAT are used or generated during its entire lifecycle.

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- 077.3.3.4 A listing of anticipated hazardous materials that are used or generated during the lifecycle of the system.
- 077.3.3.5 Reasonably anticipated hazardous materials to be used or generated in emergency situations (e.g., exhaust, fibers from composite materials released during accidents, combustion byproducts, etc.).
- 077.3.3.6 Special HAZMAT control, training, handling measures, and personal protective equipment needed, including provision of Material Safety Data Sheets (MSDS).
- 077.3.4 The Contractor shall support reviews of the hazards when identified to determine the validity and language of each hazard for the purpose of updating the HTS. The Contractor shall provide for participation by the responsible engineer and the person who identified the hazard for the hazards that will be discussed.
- 077.4 Hazardous Material Management Program. The Contractor shall provide a Hazardous Material Management Program (HMMP) Plan for hazardous materials in accordance with the OPC System Specification (NVR 5-7-12). [077-03-1162]
- 077.4.1 The HMMP shall include a list identifying and disclosing each HAZMAT procured, used, generated, and disposed of during the lifecycle of the system.
- 077.4.1.1 The Contractor, with coordination by the USCG, shall generate and provide to the USCG a list of targeted Restricted (Controlled) HAZMAT materials for elimination or minimization.
- 077.4.1.2 The Contractor shall obtain USCG approval before including Prohibited HAZMAT materials in systems, subsystems, and support equipment or planned for system operations and support.
- 077.4.1.2.1 The request for approval shall be included in the Hazard Tracking System (HTS) and contain, the following:
- 077.4.1.2.1.1 Proposed HAZMAT.
- 077.4.1.2.1.2 MSDS.
- 077.4.1.2.1.3 Quantity.
- 077.4.1.2.1.4 Locations used and stored.
- 077.4.1.2.1.5 Proximity to incompatible HAZMATs.
- 077.4.1.2.1.6 Alternatives to utilizing the HAZMAT considered.
- 077.4.1.2.1.7 Justification for not substituting the HAZMAT.
- 077.5 Hazardous Spaces Classification Report. The Contractor shall classify each room, space, section, or area on the ship in accordance with the IEEE Std. 45 and NEC-NFPA 70-2005 Article 500.5 and provide the Hazardous Spaces Classification Report. [077-03-2349]

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- 077.6 Hazard Tracking System Update. The Contractor shall update the HTS as each new HAZMAT is introduced or identified for the ship.
- 077.6.1 The Contractor shall update the Web-based HTS database with the HAZMAT information indicating approval or disapproval for the use of each HAZMAT utilized in the system.
- 077.7 Sub-System Hazard Analysis. The Contractor shall develop and provide a Sub-System Hazard Analysis (SSHA) that includes Government Furnished Equipment (GFE). The document shall reflect the maturity of the design in its contents. [077-03-2308]
- 077.8 System Hazard Analysis. The Contractor shall develop and provide a System Hazard Analysis (SHA) that includes GFE. The document shall reflect the maturity of the design in its contents. [077-03-2046]
- 077.9 Health Hazard Assessment. The Contractor shall develop and provide a Health Hazard Assessment (HHA) that includes GFE. The document shall reflect the maturity of the design in its contents. [077-03-2309]
- 077.10 Operating and Support Hazard Analysis. The Contractor shall conduct and provide an Operating and Support Hazard Analysis (O&SHA) that includes GFE. [077-03-1165]
- 077.10.1 The Contractor shall ensure mitigations from this document are incorporated into any procedures, technical manuals and Maintenance Procedure Cards (MPC) provided by the Contractor.
- 077.11 Material Safety Data Sheets. The Contractor shall provide Material Safety Data Sheets (MSDS) for hazardous chemicals to be delivered to the USCG in performance of this contract. [077-03-1177]

**079 Hull Form and Hydrodynamics**

- 079.1 Intact and Damage Stability Analyses. The contractor shall update the Intact and Damage Stability Analyses. [079-03-1202]
- 079.2 Flooding Water Levels Report and V-Lines Analysis. The contractor shall update the Flooding Water Levels Report and V-Lines Analysis. [079-03-1201]
- 079.3 Hull Form and Hydrodynamic Model Tests Reports. The Contractor shall plan, conduct, and provide reports for hull form and hydrodynamic model tests. [079-03-2220]
- 079.3.1 The Contractor shall update the Detail Design Model Test Plan that includes planning and test readiness review for hydrodynamic model testing for the ship. [079-03-1196]
- 079.3.1.1 The Contractor shall present in the Plan the details and the supporting rationale for the proposed model tests of the ship. It shall provide specific information and direction to the model test facility for the costing and the execution of the

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program and provide information to the USCG. The Contractor shall provide details of requirements for model construction, model tests, data analyses, photography and video recording and associated report preparation to be carried out by the model test facility.

- 079.3.2 Test facility. The Contractor shall select a test facility and conduct the planned model tests to verify the ship design satisfies requirements.
- 079.3.2.1 The Contractor shall conduct the following tests:
- 079.3.2.1.1 Open Water Design Propeller Test.
- 079.3.2.1.2 Self Propulsion Shaft Horsepower (SHP) Test (with Design Propeller).
- 079.3.2.1.3 Design Propeller Cavitation Test.
- 079.3.2.2 Contractor shall conduct a complete set of resistance tests for a range of speeds from 4 to 26 knots at 2 knot increments. At a minimum, resistance tests shall be performed at Full Load Displacement, 110% of Full Load Displacement, and 90% of Full Load Displacement for each speed.
- 079.3.2.3 Self Propulsion tests shall be conducted at the self propulsion point and at also for 5% of the thrust over the self propulsion point. Rudder zero-angle shall be determined for each test.
- 079.3.2.4 If significant change to the principal characteristics of the ship (including but not limited to +/- 10% change in Full Load Displacement, and/or +/- 5% change in Length and/or Beam) occur any time after PD, CD, or DD model testing, the Contractor shall be responsible for planning, conducting, and preparing reports for any additional hydrodynamic model tests necessary to verify performance of the new ship configuration.
- 079.3.2.5 The Contractor shall notify the Government 60 days prior to model tests so that the Government may witness the tests.

**080 Integrated Logistics Support**

- 080.1 Integrated Logistics Support Plan. The Contractor shall update the Integrated Logistics Support Plan (ILSP) that defines the Contractor's approach to provide data to support the USCG's OPC logistics program. [080-03-2211]
- 080.2 Integrated Logistics Support Products. The contractor shall develop ILS products in the following priority:
- 080.2.1 Components in the Critical Item List (CIL).

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- 080.2.2 Components not in the CIL, but are part of the "mission systems."
- 080.2.3 Other systems, subsystems, and equipment.
- 080.3 Program Review meetings. The Contractor shall conduct joint ILS Program Review meetings to coincide with the PMC/TMC meetings. The ILS portions of the meetings shall address at a minimum the following:
- 080.3.1 Configuration Status Accounting.
- 080.3.2 Reliability, Maintainability and Availability.
- 080.3.3 Supply Support.
- 080.3.4 Drawings.
- 080.3.4.1 The Contractor shall provide the latest issue of drawings relevant to the logistics topics being reviewed at these meetings.
- 080.3.5 Technical Manuals and Other Data.
- 080.3.5.1 Technical data for the specific equipment being provisioned shall be available for review at these meetings.
- 080.3.6 Training and Training Support.
- 080.4 Interim Support Plan. The Contractor shall provide an Interim Support Plan that defines the Contractor's plans for supporting the ship during the interim support period. The interim support period extends until 1 year after expiration of the warranty. [080-03-1210]
- 080.5 Logistics Support Data. The Contractor shall provide logistics support data in accordance with GEIA-STD-0007. (Note that the US Army Materiel Command Logistics Support Activity (LOGSA) PowerLOG-J tool is in compliance with GEIA-STD-0007 and is available at no cost.)
- 080.5.1 GEIA-STD-0007A Guidance. In order to ensure the data is provided in a logical manner, the contractor shall provide LSA data with the following requirements
- 080.5.1.1 End Item Acronym Code (EIAC). The EIAC for the project shall be "OPC"
- 080.5.1.2 Useable On Code (UOC). Each OPC hull shall have its own UOC. The UOC shall be the last three digits of the hull number. For example, if the first hull is to be numbered "950", then its UOC is "950".
- 080.5.1.3 Logistics Analysis Control Number and Alternate Logistics Analyses Control Number. This value shall be assigned in accordance with the ESWBS based HSC requirements for Configuration Management.
- 080.6 MTTR verification. The contractor shall provide MTTR verification of the following systems/components:

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- 080.6.1 Main Propulsion Diesel Engine.
  - 080.6.1.1 Cylinder head renewal.
  - 080.6.1.2 Lubricating oil pump renewal.
  - 080.6.1.3 Starter renewal.
- 080.6.2 Controllable Pitch Propeller system
  - 080.6.2.1 Pitch actuator renewal/calibration.
  - 080.6.2.2 Hydraulic oil pump/renewal.
- 080.6.3 Main Reduction Gear
  - 080.6.3.1 Lubricating oil pump renewal.
- 080.6.4 Fuel Oil Purification and Transfer system.
- 080.6.5 Air Conditioning & Refrigeration Systems
  - 080.6.5.1 Compressor renewal.
  - 080.6.5.2 Motor renewal.
- 080.6.6 Sewage System
  - 080.6.6.1 Level sensing unit renewal.
  - 080.6.6.2 Transfer pump renewal.
- 080.6.7 Firemain
  - 080.6.7.1 Fire pump renewal.
- 080.6.8 Ship Service Diesel Generator
  - 080.6.8.1 Starter renewal.
  - 080.6.8.2 Cylinder head/power pack renewal.
  - 080.6.8.3 Governor renewal.
- 080.6.9 Electrical Distribution System
  - 080.6.9.1 Switchboard circuit breaker renewal.
- 080.6.10 Machinery Plant Control and Monitoring System
  - 080.6.10.1 PLC renewal/programming.
  - 080.6.10.2 CPU renewal.
- 080.6.11 Differential Global Positioning System
  - 080.6.11.1 Antenna renewal.
  - 080.6.11.2 Receiver renewal.
- 080.6.12 Gyrocompass
  - 080.6.12.1 Power supply renewal.
  - 080.6.12.2 Programmable Logic Controller (PLC) renewal/programming.
- 080.6.13 Surface Search Radar
  - 080.6.13.1 Power supply renewal.
  - 080.6.13.2 Circuit card renewal.
- 080.7 Diminishing Manufacturing Sources and Material Shortages Forecast Report. The Contractor shall provide a Diminishing Manufacturing Sources and Material Shortages Forecast Report. [080-03-1209]

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**081 Maintenance Planning**081.1 General.

081.1.1 The Contractor shall integrate maintenance planning with ship design, reliability and maintainability, manpower optimization, human system performance factors, material selection, and other logistics processes. When conducting trade-off analyses, the Contractor shall give preference to the following labor and cost savings considerations:

081.1.1.1 Automated and self-diagnostic equipment.

081.1.1.2 Modular replacement equipment vice piece-part repair.

081.1.1.3 Increased corrosion resistance.

081.1.2 Equipment Condition Based Monitoring. The Contractor shall provide an Equipment Condition Based Monitoring Report identifying the initial set of candidates for monitoring. [081-03-1224]

081.1.2.1 Machinery Plant Control and Monitoring System (MPCMS). The Contractor shall integrate equipment selected by the USCG for Condition Based Monitoring with the MPCMS.

081.1.2.1.1 The Contractor shall recommend data collection rate and degradation indicators.

081.1.2.1.2 The equipment monitoring shall include equipment, system and performance parameters, and relevant environmental and equipment condition monitoring parameters

**083 Supply Support**

083.1 Data and Materials. The Contractor shall provide data and materials to the USCG for supply support development. This includes special components and repair parts, provisioning, provisioning monitoring, and the material requirements herein.

083.2 Definitions, Abbreviations and Acronyms.

083.2.1 Engineering Data for Provisioning (EDFP). (also referred to as Supplemental PTD)

083.2.1.1 Technical data (graphic segment of PTD) used to describe each part/equipment and consists of data such as specifications, standards, drawings (general arrangement, assembly, detail, schematic, schematic diagrams, one line diagrams, wiring and cabling diagrams, etc.), photographs, sketches, written descriptions required to physically and electrically identify

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- an item, indicate the location, form, fit and function of the item.
- 083.2.1.2 As a minimum, EDFP shall provide for: technical identification for maintenance and repair support considerations; review for potential interchangeability and substitutability; preparation of allowance/issue lists; physical dimensions, material, mechanical, electrical and other unique descriptive characteristics for the purpose of assigning National Stock Numbers (NSNs); standardization; item entry control; management coding and procurements.
- 083.2.1.3 Form, fit, and function.
- 083.2.1.3.1 Form: the shape, size, dimensions, mass and/or other visual parameters which uniquely characterize an item and may include components that are different material than the replaced components but does not affect fit or function, item corrosion resistance, or create bi-metallic corrosion. Balance and center of mass are considerations in 'form'.
- 083.2.1.3.2 Fit: the ability of an item to physically interface or interconnect with, mount to, or become an integral part of another item or assembly. This relates to the associativity of the part in relation to the assembly, or to other parts, and includes tolerances.
- 083.2.1.3.3 Function: the action[s] that an item is designed to perform. This is the reason for the item's existence, which also includes secondary applications.
- 083.2.1.3.4 For computer software, "form, fit, and function" means data identifying source, functional characteristics, and performance requirements but specifically excludes the source code, algorithms, processes, formulas, and flow charts of the software.
- 083.3 Provisioning Guidance Conference. The Contractor shall convene a Provisioning Guidance Conference (PGC) as a splinter to the kick-off meeting to establish provisioning requirements.
- 083.3.1 Facilities to accommodate up to 30 people for at least one week per review shall be made available at the Contractor's site.
- 083.3.2 The contractor shall provide an agenda. [042-03-1029]
- 083.3.2.1 The conference will address USCG and Contractor efforts in supply support development. During the PGC it will be determined if additional conferences are required.
- 083.3.2.2 The Contractor shall document the results of the PGC. [083-03-1213]
- 083.4 Provisioning Technical Documentation. The Contractor shall provide a Provisioning Technical Documentation (PTD) Submission Schedule. [083-03-2298]

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083.5 Provisioning.

- 083.5.1 The Contractor shall plan and implement provisioning, including responsibilities, schedules, and interfaces.
- 083.5.2 Provisioning data shall be developed and provided for:
- 083.5.2.1 Any equipment or component obtained from any source of supply.
- 083.5.2.2 Any unique or special tools, test and support equipment
- 083.5.2.3 The Contractor shall ensure provisioning data include information to identify the end item as well as related components, subcomponents, or assemblies, and related support items.
- 083.5.2.4 The Contractor shall perform provisioning screening on systems, equipment, components, and repair parts provisioned, for the purpose of identifying National Stock Numbers (NSN). For any provisioned item with an assigned NSN, the Contractor shall include the NSN in the provisioning data. The contractor shall review, at a minimum, the following sources to determine if the component has an existing NSN: The Federal Logistics Information System Web Search (WebFLIS) and the NATO Master Catalogue of References for Logistics (NMCRL).
- 083.5.2.5 The Contractor shall provide Provisioning Technical Documentation (PTD). The Contractor shall assign a Provisioning Contract Control Number (PCCN) to provisionable equipment and component submissions. [083-03-1231]
- 083.5.3 EDFP.
- 083.5.3.1 EDFP shall be provided for each item appearing on a PTD submittal, first appearance only. [083-03-1226]
- 083.5.3.2 For those items that require a Type 1 NSN, the Contractor shall utilize the Federal Item Identification Guide indicated in Lead Allowance Parts List EDFP Guidance. For those items that do not require a Type 1 NSN, EDFP shall be provided to identify the components' form, fit and function.
- 083.5.3.3 For end items with embedded software or firmware, such as the engine control management systems, propulsion control systems, and systems employing Programmable Logic Controllers (PLCs), the provisioning data information shall include the version or other identifying information of the embedded software or firmware.
- 083.5.3.4 For end items requiring related support items consisting of software used to update or maintain embedded software or firmware, such as diagnostics and/or programming software for engine control management systems, propulsion control systems, and the radios, the provisioning data information shall include the version or other identifying information of the support software.

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- 083.6 Outfitting Material and Spares Procurement.
- 083.6.1 Outfitting.
- 083.6.1.1 An Outfitting Operations Plan shall be provided in accordance with MIL-STD-1339 for onboard material. [083-03-1229]
- 083.6.2 Design Change Notice (DCN). The Contractor shall provide DCNs, detailing changes to previously delivered PTD, including those resulting from Engineering Changes. [083-03-1222]

**085 Drawings**

- 085.1 Drawing Verification. The Contractor shall review, verify that drawings are compliant, obtain ABS review and address ABS comments, as applicable, before providing them to the USCG.
- 085.2 Drawing Number Assignment Report. The Contractor shall provide a Drawing Number Assignment Report. [085-03-1244]
- 085.3 As-Built Drawings. The Contractor shall update drawings to the As-Built condition. As-Built Drawings shall reflect the as-built, as-delivered configuration of the ship and shall be complete, without attached change paper and with current revision blocks and numbers. [085-03-2293]
- 085.4 Referenced Drawings. The Contractor shall provide drawings referenced within any drawing that have not been previously delivered under this contract.
- 085.5 Drawing Conventions. The Contractor shall utilize the following drawing conventions:
- 085.5.1 Identify the first revision of Construction Drawings as "FIRST SUBMITTAL". If the drawing is required to be re-submitted, it shall have the next sequential identifier shown and in the revision block the revisions made corresponding to the comments received from the USCG.
- 085.5.2 Remove reference to numbered revisions before the submission of the USCG approved final drawings to the USCG. The USCG approved final (as-built) drawings shall have a "-" in the revision area in the drawing number blocks throughout the drawings.
- 085.5.3 Label plate and signage shown on drawings shall incorporate the format and labeling requirements defined in the OPC System Specification.
- 085.5.4 Drawings shall include hull applicability.
- 085.5.5 Views from vendor drawings of equipment may be used on the drawing with reference to the vendor drawing for complete information.

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- 085.5.6 Material List. For arrangement and detail drawings, physical components within the drawing shall be listed on a single Material List.
- 085.5.6.1 Physical components include bulk materials such as adhesives, except that welding consumables need not be listed.
- 085.5.6.2 Materials Lists shall be standardized.
- 085.5.6.3 Materials Lists shall include the ESWBS-based HSC for CSA configuration items and the ESWBS-based HSC for ESWBS-based HSC for its next highest assembly.
- 085.5.6.4 Materials Lists shall include: Material Specifications, Hardware, and Quantities.
- 085.5.6.5 For each component, provide the salient characteristics needed to re-procure the item in a competitive solicitation.
- 085.5.6.6 Whenever available, include the original equipment manufacturer and their part number for the component.
- 085.5.6.7 Distributors' part numbers may be included in addition to the salient characteristics, but are not an acceptable substitute for those salient characteristics.
- 085.5.6.8 Whenever distributors' part numbers are used, the entry shall include the words "or equal" to differentiate it from original equipment manufacturer information.
- 085.5.6.9 National Stock Numbers shall be used for any components that have them.
- 085.5.6.10 The item numbers from the parts list or bill of material shall be shown in the field of the drawing with leaders to the various components in the included views.
- 085.6 Construction Drawings. 2 Dimensional (2D) drawings developed to demonstrate that the ship conforms to the requirements of the OPC System Specification and include diagrams depicting functional interconnections between components, arrangement drawings and associated lists.
- 085.6.1 Drawings shall completely specify unique processes, and when applicable: performance ratings; dimensions and tolerance data; critical assembly sequences; equipment characteristics; diagrams; mechanical and electrical connections; physical characteristics, including form, finish, and weight; details of material identification; inspection, test, and evaluation criteria; necessary calibration information, and other quality control data.
- 085.6.2 The Contractor shall note required certifications on the related drawings.
- 085.6.3 The drawings shall be self sufficient and fully describe construction of the OPC.

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- 085.6.4 Drawings shall show essential fabrication details, including the welding procedure (or the welding procedure number if the procedure has previously been submitted and approved) and welding sequences.
- 085.6.5 Construction drawings shall be developed by assembly, deck or area and applicable SWBS number. Assembly breaks shall be shown on the drawing in plan, elevation and section views for drawings not produced to the assembly level.
- 085.6.6 System Arrangements Drawings. Components including piping, electrical wiring and other components, except minor components such as cable ties, adhesives or other bulk materials on the ship, shall be depicted on an arrangement drawing in their true size, location and orientation. Purchased components may be depicted as simple shapes having the same outside dimensions of the object depicted. Interfaces created by the Contractor shall be depicted including fasteners, pipe joints and terminal strips.
- 085.6.6.1 Non-standard items not purchased shall have fabrication sketches provided.
- 085.7 3-Dimensional Technical Data Package. The Contractor shall provide the Production Level 3-Dimensional Technical Data Package (3D TDP that includes the following minimum functionality: [085-03-1215]
- 085.7.1 The 3D TDP shall reflect the current product baseline.
- 085.7.2 Drawings extracted shall be fully compatible with AutoCADTM 2009 without the use of any add on, or viewer programs.
- 085.7.3 Physical components shall be depicted or modeled in their true location, shape and orientation in one or more three dimensional CAD files.
- 085.7.4 The 3D TDP shall contain one or more linked 3D CAD files and associated electronic lists and shall be developed in accordance with MIL-STD-31000.
- 085.7.5 The 3D TDP shall be capable of demonstrating accessibility for operation, manipulation, removal or replacement tasks using an anthropomorphic model that can simulate body dimensions that are design-critical to the task(s) from a 5th percentile female through a 95th percentile male, as defined in DOD-HDBK-743, with and without personal protective clothing and equipment (PPE) and applicable task tools/peripherals.
- 085.7.5.1 The 3D TDP shall provide the capability to support virtual walkthroughs for HSI verification by 5th through 95th percentile men and women and to allow visualization of the actions they need to take to perform their tasks.
- 085.7.6 The 3D TDP shall not have any redundant models of parts, components, or geometry. There shall be only one model of any physical item in the 3D TDP.

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- 085.7.7 The 3D TDP may contain depictions of components in an in-process condition, such as flat parts prior to bending or forming, cast parts prior to machining, and similar parts in a form not ready to install on the ship, at the Contractor's option. This shall not be considered a redundant depiction.
- 085.7.7.1 Any depictions or models of parts in an in-process condition shall be readily distinguished from the as-installed depictions by layering conventions, distinctive part numbers, separable externally referenced files or similar techniques that allow such in-process parts to be readily removed from a display or other database.
- 085.7.7.2 In-process parts do not have a meaningful location prior to final installation and may be located at any location or orientation in the model.
- 085.7.7.3 In-process parts may also be omitted from the 3D TDP.
- 085.7.8 Parts may be depicted as a block, surface or solid showing the volume of space it occupies to a precision appropriate to the need for avoiding interferences with the installed component. Small items may be designated as a simple symbol in the Contractor's format. As an example, a fastener may be depicted as a block comprising a line with attached attributes describing it, but shall not be depicted as a solid with threads modeled.
- 085.7.9 The 3D TDP shall depict Space and Weight envelopes.
- 085.7.10 Any component, including structural components that are subsequently joined by welding or any other means, shall include as a separable attribute, the weight and the x, y, and z, coordinates of the center of gravity. This information shall be a linked, non-graphic entity capable of being extracted from the 3D TDP by automatic processes.
- 085.8 Machinery Arrangement Drawings.
- 085.8.1 Machinery arrangement drawings shall be developed for showing the major components, in detail, to justify the basic configurations and space allocations reflected in the design.
- 085.8.2 Plan views, elevations and section views shall be used so that major components are shown in at least two separate views.
- 085.8.3 Drawings shall indicate required access clearances for routine maintenance and repair but not for removal of the machinery.
- 085.8.4 The drawings shall show the locations of major components within each machinery space including, but not limited to tankage, ventilation, hull structure and closures, pumps, motors and major electrical equipment. The drawings shall identify each piece of equipment shown.

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- 085.8.5 The frames and bulkheads shall be clearly shown in machinery arrangement drawings.
- 085.9 Piping and HVAC System Diagrams. System diagrams shall depict the interconnections of the components in the system within the plan views of the ship structure. Components that provide functional effect on the system shall be depicted.
- 085.9.1 Piping and Mechanical Diagrams shall include components, such as valves and piping connections that can be disconnected in the course of normal servicing. Permanent joints such as threaded, welded or soldered pipe connections need not be depicted. Components and their interconnections shall be located as required for clarity in comprehending the functionality of the system and shall not be to scale in the diagram.
- 085.9.2 Components shall be depicted as symbols and diagrams shall include a symbol list including symbols used.
- 085.9.2.1 Symbols shall be in accordance with ASTM F1000-95 unless otherwise specified.
- 085.9.2.2 Hose and pipe shall be distinguished from each other.
- 085.9.2.3 Diagrams shall include tables with major component characteristics such as material types and specifications, flow rates, pressure settings, sizing information, etc. Where appropriate, flow quantities, pressures, directions and nominal pipe sizes shall be shown as text near or leader to the line depicted.
- 085.10 Electrical and Electronic Drawings.
- 085.10.1 Schematic diagrams shall depict, by means of graphic symbols, connections and functions of circuit arrangements. The schematic diagram shall trace the circuit and its functions without regard to the actual physical size, shape, or location of the component devices or parts.
- 085.10.2 Isometric System drawings shall show the system in isometric format and include information relative to vendor make and model number, cable types and sizes, material list, deck and bulkhead penetrations, location of hardware on the ship, referenced to the technical manuals, where applicable.
- 085.10.2.1 The drawings shall depict point to point wiring connections to trace power, communication and control signals. Individual wires shall be terminated at identified terminals within equipment, including terminal boxes. Power supply source and signal destination shall be indicated.
- 085.10.2.2 Wires requiring shielding and grounding shall be designated, and quantity of spare conductors shall be identified for each cable.

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- 085.10.3 Elementary Wiring diagrams shall show the system in diagrammatic format and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable.
- 085.10.3.1 The diagrams shall depict point to point wiring connections to trace power, communication and control signals. Individual wires shall be terminated at identified terminals within equipment, including terminal boxes. Power supply source and signal destination shall be indicated.
- 085.10.4 Electrical Power Distribution and Lighting Deck Plans shall show each major component in the system.
- 085.10.4.1 The drawings shall present deck plan views of each system including cables that interface with other systems. Cable designation and cable types shall be shown for each cable. The deck plans shall identify the compartment where each unit in the system is located.
- 085.11 Piping and HVAC Arrangement and Detail Drawings.
- 085.11.1 Piping and HVAC arrangement and detail drawings shall include plan, section, and elevation views.
- 085.11.2 The drawings shall show the piping and ducting runs and associated equipment in sufficient detail to allow the installation of the system solely by the use of this drawing.
- 085.11.3 Piping, ventilation ducts, machinery and electric equipment, including main wireways, can be shown to indicate possible interference issues.
- 085.12 Other Drawings.
- 085.12.1 The Contractor shall provide drawings of jigs and fixtures. [995-03-1099]
- 085.12.2 The Contractor shall provide the Hose Log. [501-03-2031]

**086 Technical Manuals and Other Data**

- 086.1 Technical Data Organizational Plan. The Contractor shall provide and implement a Technical Data Organizational Plan (TDOP). [086-03-1223]
- 086.2 Technical Data Index. The Contractor shall provide and implement a Technical Data Index (TDI) that lists ship system and equipment cross referenced with their respective content types required and their respective source information required. [086-03-1267]
- 086.3 Business Rules. The Contractor shall develop a proposed set of OPC Project Level Business Rules. [086-03-1240]

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- 086.3.1 Contractor-developed technical data shall be delivered in accordance with S1000D (<http://www.s1000d.org>) compliant Extensible Markup Language (XML) format, and the OPC Project Level Business Rules. The Contractor shall implement the business rules for technical data.
- 086.4 Technical Manual Source Data Quality Assurance Program. The Contractor shall develop and implement a Technical Manual Source Data Quality Assurance (TMSDQA) Program. [086-03-1027]
- 086.4.1 The Contractor's TMSDQA program organization shall have well defined responsibility, authority, the organizational freedom to identify and evaluate quality assurance problems and to recommend and initiate solutions.
- 086.5 Source Material.
- 086.5.1 For COTS configuration items, the Contractor shall provide OEM source material in accordance with MIL-DTL-24784/4C. [086-03-1273]
- 086.5.2 For COTS configuration items where the OEM does not provide source material that complies with MIL-DTL-24784/4C, the Contractor shall develop and provide the required supplemental data. [086-03-2329]
- 086.5.3 The Contractor shall provide source data products to develop the system and subsystem level technical data for contractor developed components, sub-systems, and systems. [086-03-1249]
- 086.5.4 For components the USCG has identified on the MEL that are subcomponents of another item on the MEL, no additional source material is required for the subcomponent if the source material for the parent component contains suitable detail regarding the subcomponent.
- 086.6 Technical Repair Standards. The Contractor shall develop data that are necessary to perform Contractor recommended planned maintenance actions at the Depot-Level (D-Level). Maintenance data shall be sufficient to perform Depot level overhauls of selected equipment. [086-03-2112]
- 086.7 Cutter Information Book. The Contractor shall provide the OPC Cutter Information Book (CIB). [086-03-1269]
- 086.8 Damage Control Technical Data. The Contractor shall provide the Damage Control Technical Data. [086-03-2113]
- 086.9 Technical Data Status Reports. The Contractor shall provide Technical Data Status Reports to report on the development of the required technical manuals and other data. The report shall provide the status of data development and validation, planned delivery schedule with status and outlook relative to the delivery schedule. [086-03-1272]

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**087 Facilities**

- 087.1 Facilities. The Contractor shall provide facilities as described in Table 1 below within 90 days after Option Exercise. Facilities provided shall comply with local building codes and the Americans with Disabilities Act (ADA).
- 087.2 Point of Contact. The Contractor shall provide single Point of Contact for facility services and equipment and initiate resolution to discrepancies within 24 hours of notification and provide an estimated duration to resolve the discrepancy.
- 087.3 Location. Facilities shall be within walking distance of the Contractor's offices and construction areas. USCG personnel shall have access to the facilities twenty-four hours per day, seven days per week. Contractor personnel shall not have access to these facilities without USCG approval.
- 087.3.1 The Contractor shall allow visitors designated by the Project Residence Office (PRO) access to the shipyard and allow the USCG to conduct occasional military ceremonies either adjacent to the PRO facilities or at a suitable location designated by the shipyard.
- 087.3.2 The Contractor shall provide heating, ventilation and air conditioning in spaces. The HVAC shall only be controllable by the USCG staff. Windows shall have operable window coverings. Lighting fixtures shall be suitable for use for the space as designated.
- 087.3.3 Electrical Power: The Contractor shall provide electrical power to USCG facilities 24 hours per day, 365 days per year. The Contractor shall provide minimum 48-hour notification to the PRO for shifts of power from installed building power to temporary power. The Contractor shall respond to power loss outside of the Contractor's control in accordance with the Contractor's existing Disaster Recovery Plan.
- 087.3.4 Drinking water: The Contractor shall provide potable water at facilities required under this contract.
- 087.4 Spaces.
- 087.4.1 The Contractor shall provide facilities, furnishings and equipment for USCG use as indicated in Table 1. The facilities shall be equivalent to those provided by the Contractor for its own use.
- 087.4.2 Spaces provided for PRO, Primary Crew Assembly Facilities (PCAF), and Pre-Commissioning Detachment (PreComDet) shall each be located, within its own building. PCAF and PreComDet spaces may be co-located in the same single building.

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- 087.4.3 The Contractor shall provide a diagram of proposed space layout indicating offices, partitions and required spaces to demonstrate compliance with these requirements. [087-03-1277]
- 087.5 Office Space.
- 087.5.1 The Contractor shall provide offices that have fixed walls, lockable doors and reasonable sound attenuation.
- 087.6 Partitioned Spaces.
- 087.6.1 The Contractor shall provide partitions on at least three sides of each work station and positioned to maximize privacy. Partitions shall be no less than 5 feet high and no more than 7 feet high. Each partitioned space shall have electrical power with LAN and telephone connectivity.
- 087.7 Conference Rooms.
- 087.7.1 The Contractor shall provide conference rooms that have fixed walls, lockable doors and reasonable sound attenuation.
- 087.8 Lockable Storage Areas.
- 087.8.1 These storage areas are not intended for hazardous material.
- 087.9 Restrooms.
- 087.9.1 The restrooms shall be co-located in the same building with the offices and other seating. Uni-sex restrooms may be provided with written USCG approval. Sinks shall have corresponding mirrors, hand towel and hand soap dispensers.
- 087.10 Shower and Changing Room Areas.
- 087.10.1 Showers shall provide hot and cold water. Changing areas shall provide a curtained area with bench and clothing hooks for each shower.
- 087.11 Parking.
- 087.11.1 Designated parking spaces. Parking spaces shall be specifically assigned to USCG personnel and indicated by signage. Designated spaces shall be within 150 feet walking distance from the corresponding facility.
- 087.11.2 Close Proximity parking space. A parking space in "close proximity" to the USCG occupied spaces is defined to mean within a 5 minute walking distance from the corresponding facility.
- 087.11.3 Remote parking space. A remote parking space is located in a secure parking area within a 10 minute walking distance from the corresponding facility.
- 087.11.4 Ship parking space. Parking shall be provided for the crew in close proximity to the ship from builder's trials through the departure of the OPC.
- 087.12 Contractor Provided Services.

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- 087.12.1 Janitorial Services. The Contractor shall provide the same janitorial services to keep spaces as provided to their own management.
- 087.12.2 Maintenance. The Contractor shall maintain provided facilities as necessary to ensure their continuous functionality.
- 087.12.3 Security. The Contractor shall provide security to protect the safety of occupants and USCG property. The Contractor shall provide support for tracking receipt, temporary storage, and delivery of USCG items. This support shall also consist of forklift and hand jack services.
- 087.13 Contractor Provided Equipment.
- 087.13.1 The Contractor shall provide and maintain telephone handsets and service for use by USCG personnel within the Contractor's telephone system. This service shall consist of direct dial local and long distance, and answering voicemail capabilities. For PRO, PCAF and PreComDet facilities, telephones shall have conference call and speakerphone capability.
- 087.13.2 LAN Connectivity. The Contractor shall provide Local Area Network (LAN) connectivity and wall mounted duplex RJ45 outlet jacks for LAN outlet locations as described in Table 1. The Contractor shall provide necessary additional space or equipment such as telecommunications cabinets to provide LAN connectivity. In addition, the Contractor shall provide air conditioned space at a mutually agreed upon demarcation location for USCG server equipment including 3 - 19 inch wide, 6 feet high server racks and a T1 demarcation cabinet to support USCG computers. The Contractor shall provide continuous, uninterrupted power for USCG servers at this demarcation point.
- 087.13.3 Cable TV Connectivity. The Contractor shall provide basic cable television service or equal as approved by the USCG and cable modem capability in locations and quantities described in Table 1.
- 087.13.4 Furnishings. Furnishings within an office space shall match in finish. Rolling chairs, side chairs, file cabinets and book cases shall be approved by the USCG. For PRO senior management (CO, XO, ACO) offices, office furniture shall be of matching wood construction, equivalent to the Contractor's senior management and approved by the USCG.
- 087.13.5 General seating desks shall be approved by the USCG.
- 087.13.6 Shelving shall be at least 12 inches deep. Where indicated in Table 1 as heavy duty, additional bracketing shall be used to accommodate heavy storage items.
- 087.14 Bicycle Equipment. The Contractor shall provide and maintain single speed bicycles and storage rack as approved by the USCG.

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- 087.15 Utility Vehicles. The Contractor shall provide utility vehicles intended for transportation within the gated bounds of the Contractor's facilities. Each vehicle shall have a minimum of 4 seats with an overhead covering to protect passengers from the weather. The Contractor shall provide fuel and electrical hook up and maintenance for these vehicles.

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## STATEMENT OF WORK FOR DETAIL DESIGN

TABLE 1 FACILITIES

Facility	Name/Description	Quantity	Size (minimum for each space)	Furnishings (each space)	Equipment (each space)
PRO Facility Space	CO, XO, and ACO Offices	3	225 sq ft	2- pedestal desks, 1- rolling chair, 4 matching stationary chairs, wastebasket, 4 drawer equivalent storage furnishings, 20 linear ft. of book shelving, and 6'x3' conference table.	1- Telephone, 2 - duplex LAN outlets
	Supervisory Personnel Offices	5	150 sq ft	1 - Pedestal desk, 1 - rolling chair, 2 - matching stationary chairs, wastebasket, 1 - 5 drawer upright file cabinet, 4- shelf bookcase, matching finish.	1- Telephone, 2 - duplex LAN outlets
	Partition Space	49	64 sq ft	1- Pedestal desk, 1 - rolling chair, wastebasket, 1 side chair, 1 - 5 drawer upright file cabinet	1- Telephone, 2 - duplex LAN outlets

## STATEMENT OF WORK FOR DETAIL DESIGN

Facility	Name/Description	Quantity	Size (minimum for each space)	Furnishings (each space)	Equipment (each space)
	Conference Room	1	600 sq ft minimum	90 sq feet of table work area, seating for 30 people, wastebasket, podium	1- Telephone, 2- LAN connectivity, 3' x 5' projection wall space, cable TV, Contractor provided system for video teleconference capability and ability to hook USCG computer to computer/video presentation machine with overhead projector.
	Lockable Storage	1	130 sq ft		
	Open Admin/Storage	1	300 sq feet	8- wastebaskets, 100 ft. of linear feet of printer, copier, fax, admin working space.	1 - copier (with stand); 2 - fax machines (with stand), 1 - LAN duplex outlet per item.
	Breakroom	1	200 sq ft.	2 - wastebaskets 10 ft of linear cabinets and countertops, 1 - sink with 36 inch countertop	1 - cable TV connection, 1 - Refrigerator, 1- microwave, 1 - coffee machine
	Restrooms	1	male	2 toilet stalls, 2 sinks and 2 urinals per 25 personnel at each Contractor provided facility, minimum 1 toilet, 1 sink, 1 urinal minimum per Contractor provided	

## STATEMENT OF WORK FOR DETAIL DESIGN

Facility	Name/Description	Quantity	Size (minimum for each space)	Furnishings (each space)	Equipment (each space)
				separate facility	
		1	female	2 toilet stalls and 2 sinks per 25 personnel at each Contractor provided facility, minimum 1 toilet, 1 sink minimum per Contractor provided separate facility	
	Shower and Changing Area	1	male	2 shower and changing stalls	1 - 3 foot countertop, mirror, electrical outlet, 4 hooks, 4 full length lockers
		1	female	2 shower and changing stalls	1 - 3 foot countertop, mirror, electrical outlet, 4 hooks, 4 full length lockers
	Utility vehicle	3			
Parking	Designated Spaces	7			
	Close Proximity Spaces	45			
	Bicycles	5			5 - bicycles
	Bicycle Storage Rack	1	Stores 5 bikes		
PCAF Facility Space	Office	8	100 sq ft	1 - pedestal desk, 1- rolling chair, 3 - matching side chairs,	1- telephone, 2 - LAN duplex outlets

## STATEMENT OF WORK FOR DETAIL DESIGN

Facility	Name/Description	Quantity	Size (minimum for each space)	Furnishings (each space)	Equipment (each space)
				wastebasket, 1 -vertical 5-drawer file cabinet, 1 bookcase	
	Partition Space	14	48 sq ft, minimum 6 ft length	1 - 60 inch desk top, 2 - 2 dwr file cabinets, 1- 48 inch desk return, 1- rolling chair, 1 - side chair, wastebasket	1- telephone, 1 - LAN duplex outlet per desk
	Conference Room	1	400 sq ft	Table with seating for 20 people, 20 rolling chairs, wastebasket	1- telephone, 2- LAN connectivity, cable tv, 3' x 5' projection wall space, Contractor provided system for video teleconference capability and ability to hook USCG computer to computer/video presentation machine with overhead projector.
	Lockable Storage	2	50 sq ft	20 linear feet shelving	
	Open Admin/Storage	1	100 sq feet	20 linear feet of shelving, 4 - side chairs, 4 - file cabinets, 4 - bookcases, wastebasket	1 - copier; 2 - fax machines, 1 - LAN duplex outlet
	Specialty Storage	1	50 sq ft	GSA approved classified material safe, cash storage safe	
	Specialty Storage (IT)	1	150 sq ft	1 - pedestal desk, 1 - rolling chair, 1 - 6 ft table, 1 -	1- telephone, 3 - duplex LAN outlets

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Facility	Name/Description	Quantity	Size (minimum for each space)	Furnishings (each space)	Equipment (each space)
				4 drawer file cabinet, 1 bookcase, 15 linear feet heavy duty shelving, waste basket	
	Reserved				
	Technical Publication Room	1	150 sq ft, minimum 10 ft length	100 linear feet of heavy duty shelving, 4-person work table, 4 - rolling chairs, wastebasket	1 - telephone, 1 - duplex LAN outlets
	Restrooms	1	male	1 toilet stall, 2 urinals, 3 sinks, wastebasket	
		1	female	2 toilet stalls, 2 sinks, wastebasket	
	Reserved				
	Lockable office	1	100 sq ft	1- desk, 2 - chairs, 1 - 4 drawer file cabinet, 1 - bookshelf, wastebasket	1 - telephone, 1 duplex LAN outlet
Parking	Designated Spaces	2			
	Close Proximity Spaces	8			
	Bicycles	5			5 - bicycles
	Bicycle Storage rack	1	Stores 5 bicycles		
PreComDet Facility Space	Office	6	100 sq ft	1 - pedestal desk, 1 - rolling chair, 3 - matching side chairs, 1- 5-drawer vertical file	1- telephone, 2 - LAN duplex outlets

## STATEMENT OF WORK FOR DETAIL DESIGN

Facility	Name/Description	Quantity	Size (minimum for each space)	Furnishings (each space)	Equipment (each space)
				cabinet, 1 bookcase., wastebasket	
	General seating space (to be provided as- needed during the 90 days prior to ship delivery)	1	4770 sq ft	95 - general seating desks, full length lockers, 95 - rolling chairs, 8 - book cases shelves, 8 - file cabinets, 8 - large capacity wastebaskets	50 - telephones, 50 - LAN duplex outlets
	Lockable Storage	1	50 sq ft	20 linear feet shelving	
	Open Admin/Storage	1	300 sq ft	20 linear feet of shelving, 4 - side chairs, 4 - file cabinets, 4 - bookcases, wastebasket	2 - copiers; 2 - fax machines
	Specialty Storage	1	50 sq ft		
	Break Room/Vending area	1	150 sq ft	6 foot table, 6 rolling chairs, wastebasket	1 cable TV connection, 1 sink with 36 inch countertop
	Restrooms	1	male	3 urinals, 2 toilet stalls, 5 sinks, wastebasket	
		1	female	3 toilet stalls, 3 sinks, wastebasket	
	Provide access to Shower/Changing area	1	male	3 shower and changing stalls, wastebasket	1 - 3 foot countertop, mirror, electrical outlet, 6 hooks, 4 full length lockers

## STATEMENT OF WORK FOR DETAIL DESIGN

Facility	Name/Description	Quantity	Size (minimum for each space)	Furnishings (each space)	Equipment (each space)
		1	female	3 shower and changing stalls, wastebasket	1 - 3 foot countertop, mirror, electrical outlet, 6 hooks, 4 full length lockers
	Utility vehicle	1			
Parking	Designated Spaces	7			
	Remote Parking Spaces	2	to accommodate 44 passenger bus		
	Ship Parking Spaces	2			

**088 Human Systems Integration (HSI)**

- 088.1 Human Systems Integration Program Plan. The Contractor shall update the Human Systems Integration Program Plan (HSIPP). [088-03-1281]
- 088.2 Issue and Decision Database. The Contractor shall update the HSI Issue and Decision Database as part of the HSI program, in accordance with the HSI Risk Analysis in ASTM F1337, to reflect the current state of the design. The Contractor shall provide a report. [088-03-2292]
- 088.2.1 The Contractor shall further analyze identified issues according to the provided instructions to assess their impact to human performance and mission success.
- 088.2.2 The Contractor shall also enter into the Web-Based Hazard Tracking System (HTS) identified issues that have System Safety implications.
- 088.2.3 The Contractor shall continue to update the HSI Issue and Decision Database to reflect any engineering changes or other design modifications to mitigate risks.
- 088.3 Human Factors Engineering.
- 088.3.1 The Contractor shall update the Human Engineering Program Plan (HEPP). The Contractor shall document changes to the Human Engineering Program in the HEPP. [088-03-1282]
- 088.3.2 The Contractor shall conduct the Phase II activities identified in the HEPP.

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- 088.4 3D TDP. The Contractor shall use the 3D TDP to demonstrate usability of the OPC during the design review process and use it to demonstrate proposed configuration or changes.
- 088.4.1 The Contractor shall coordinate this effort with the modeling and simulation activities and timelines herein.
- 088.4.2 The Contractor shall make applicable portions of mockups (3D TDP or physical) available prior to the submission of related data delivered in support of design reviews and shall be available for U.S. Coast Guard (USCG) use.
- 088.4.3 The Contractor shall demonstrate that the design supports human engineering requirements, mission requirements, and evaluate the arrangement and accessibility for operation of equipment mounted or stowed.
- 088.4.4 The Contractor shall evaluate the following areas with a human modeling tool to verify operator tasks can reliably be completed within constraints to meet mission requirements and documented in Models, Mockups and Simulation Reports:
- 088.4.4.1 Pilothouse
- 088.4.4.2 Operations Center
- 088.4.4.3 Main Machinery (maintenance activities)
- 088.4.4.4 Auxiliary Machinery Room (maintenance activities)
- 088.4.4.5 Small Boat Davits (operations including launch and recovery)
- 088.4.4.6 Material Handling Routes
- 088.4.4.7 Galley and Mess Deck
- 088.4.4.8 Sickbay (including ingress/egress medical evacuation routes)
- 088.4.4.9 Repair Lockers (including surrounding areas used for dressing and assembly)
- 088.4.4.10 Fantail (including towing, mooring, FAS)
- 088.4.4.11 Midship Refueling Station
- 088.4.4.12 Weapons System (including loading and firing)
- 088.4.4.13 Flight Deck (to include aviation operations)
- 088.4.4.14 Helicopter Control Station
- 088.5 Valve Criticality Analysis. The Contractor shall perform a Valve Criticality Analysis (VCA) in accordance with ASTM F1337 and the criteria of ASTM F1166.
- 088.5.1 The Contractor shall use the VCA to formalize the decision process for determining the location and accessibility of each valve and provide clear guidance to designers.
- 088.5.2 The Contractor shall ensure that operational and maintenance requirements are addressed when deciding on the location of a valve and documented in the VCA.

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- 088.5.3 The Contractor shall report the results of the VCA in the Human Engineering Design Approach Document - Operator.
- 088.6 Human Engineering Test Reports. The Contractor shall provide Human Engineering Test Reports (HETR). [088-03-1293]
- 088.6.1 The Contractor shall perform dedicated and integrated human performance verification testing defined in the Human Engineering Test Plan (HETP).
- 088.6.1.1 The Contractor shall report the results of performance verification testing in HETRs.
- 088.6.1.2 The Contractor shall include methodologies and results for the following Phase II activities identified in the HEPP and HETP:
- 088.6.1.2.1 Human Performance Testing
- 088.6.1.2.2 Usability Testing
- 088.6.1.2.3 Any additional activities identified in the Contractor's HEPP for Phase II.
- 088.7 Human Engineering Design Approach Document-Operator. The Contractor shall update the Human Engineering Design Approach Document-Operator (HEDAD-O). [088-03-1291]
- 088.7.1 The Contractor shall include any design changes made since the last submittal.
- 088.8 Human Engineering Design Approach Document-Maintainer. The Contractor shall update Human Engineering Design Approach Document-Maintainer (HEDAD-M). [088-03-1290]
- 088.8.1 The Contractor shall include any design changes made since the last submittal.
- 088.9 Manpower and Personnel.
- 088.9.1 The Contractor shall update the Manpower Mix Analysis. [088-03-1285]
- 088.9.1.1 USCG skill level requirements shall be identified in accordance with the Enlisted Performance Qualification Manuals, Competency Dictionary, and/or the Officer Specialty Management System.
- 088.9.1.2 Government civilian and/or contractor position skill levels shall be identified in accordance with the Standard Occupational Classification System, and/or the Federal Classification and Job Grading System.
- 088.9.1.3 Analyses included in this report shall be an auditable and repeatable industrial engineering manpower analysis.
- 088.9.1.4 In developing the Manpower Mix Analysis, the Contractor shall:
- 088.9.1.4.1 Include tasks defined in the GFI Critical Task Analysis Report.
- 088.9.1.4.2 Determine the minimum quantity and quality mix of military, government civilian, and contractor positions necessary to

## STATEMENT OF WORK FOR DETAIL DESIGN

- operate, maintain, and support the contractor's design for the total ship system.
- 088.9.1.4.3 Identify workload that is beyond the workload capacity of the maximum OPC operating crew allowed by the OPC system specification.
- 088.9.1.4.4 Identify any task not listed in the GFI Critical Task Analysis Report that is required to support or maintain the OPC system.
- 088.9.1.4.5 Identify directed manpower positions and identify the reference generating the requirement.
- 088.9.1.4.6 Describe the manning required during evolutions, and articulate the manning of simultaneous execution of those evolutions required by policy while at sea.
- 088.9.1.4.7 Identify the minimum necessary quantity, rank and rate, civilian job classification (where applicable), military, government civilian, or contractor ashore positions necessary to maintain and support.
- 088.9.1.4.8 Provide rationale for the manpower requirements by rank, rate, civilian job classification, and location as it relates to the maintenance, support, and training of the installed systems.
- 088.9.1.4.9 Identify by category, the required workload that is beyond the capacity and/or capability of the proposed operating crew while in port.
- 088.9.2 The Contractor shall perform Crew Labor Hour Calculations and provide reports. [088-03-1288]
- 088.9.2.1 The report shall be calculated in accordance with the COMDTINST 5312.11A and standard industrial engineering practices, and the following:
- 088.9.2.1.1 Use the make ready/put-away allowance and productivity allowance that was used in the Manpower Estimate Report for Maritime Security Ship Medium document, dated 18 March 2011.
- 088.9.2.2 The Contractor shall assign and distribute crew labor hours to the proposed OPC crew in the Manpower Mix Analysis Report by rank, rate, and organizational element as follows:
- 088.9.2.2.1 Aggregate OPC labor hours on a per week basis.
- 088.9.2.2.2 Adhere to the constraints identified in the Human Systems Integration Program plan (HSIPP)/Human Engineering Program Plan (HEPP).
- 088.9.2.3 The Contractor's Labor Hour Calculations shall include:
- 088.9.2.3.1 Tasks identified in the Critical Task Analysis Report,
- 088.9.2.3.2 Maintenance tasks, regardless of periodicity, to include corrective, preventive, and facilities maintenance (work

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- required to maintain the material condition of the OPC) both at sea and in-port.
- 088.9.2.3.3 Own unit support tasks, both at sea and in-port.
- 088.9.2.3.4 Crew evolutions, both at sea and in-port involving installed systems.
- 088.10 Performance Support and Training.
- 088.10.1 The Contractor shall provide qualified personnel to lead projects or teams that produce Performance Support and Training (PS&T) products. Acceptable qualifications are as follows:
- 088.10.1.1 Certified by the International Society for Performance Improvement as a Certified Performance Technologist (CPT); or,
- 088.10.1.2 A Master's degree in instructional design, instructional technology, education technology, and/or performance technology.
- 088.10.1.3 The Contractor shall provide satisfactory written documentation and demonstration of PS&T team lead competencies in the Training Development Plan.
- 088.10.2 The Contractor shall provide an Onboard and Embedded Training Market Research Report. [088-03-1306]
- 088.10.3 A PS&T kick-off meeting shall be held in conjunction with the Phase II Kick-off Meeting to align and discuss PS&T elements of the SOW and associated products. This meeting will serve as the Contractor's opportunity to provide their vision for achieving the requirements in the SOW and for the USCG to clarify any questions the Contractor may have regarding the various PS&T products.
- 088.10.3.1 The Contractor shall discuss their work breakdown structure of the PS&T products, technical expertise in producing PS&T products, qualification / certification of project manager(s) or team lead(s), anticipated resources required and/or subcontracts, plans for communicating with the Coast Guard regarding PS&T products, and master schedule for achieving PS&T products. The Contractor shall provide the Conference Meeting Agenda, Presentation Material, Actions, and Action Tracking. [042-03-1029]
- 088.10.4 The Contractor shall hold PS&T progress meetings in conjunction with the quarterly USCG-Contractor ILS meetings. The Contractor shall provide the Conference Meeting Agenda, Presentation Material, Actions, and Action Tracking. [042-03-1029]
- 088.10.4.1 Each meeting shall address completion status of each PS&T product developed in Detail Design or Construction, work completed the past quarter, planned activities for the next quarter, resources used last quarter (e.g., work hours), resources in current use (e.g., personnel, subcontractors),

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resources anticipated or needed for the next quarter, current risks and remediation strategies for PS&T products, action item status, and guidance / clarification required from the USCG.

- 088.10.5 The Contractor shall provide and implement a Training Development Plan. [088-03-1311]
- 088.10.6 Guidance on developing training materials is provided in the U.S. Coast Guard Training System Standard Operating Procedures.

**090 Quality Assurance**

- 090.1 Quality Assurance Plan. The Contractor shall update, implement and maintain the Quality Assurance Plan. [090-03-1319]

**092 Test Administration and Testing**

- 092.1 OPC Test Program. The Contractor shall schedule, coordinate, and execute the OPC Test Program.
- 092.2 Test dates and details. The Contractor shall notify the PRO in writing of final test dates and test details according the following:
- 092.2.1 2 business days prior to test execution if the test is to be performed at the Contractor's shipyard/facility or within 50 miles.
- 092.2.2 10 business days prior to the test execution if the test is to be performed 50 miles or further from the Contractor's facility.
- 092.2.3 60 days prior to the test execution if the test is to be performed outside the continental United States.
- 092.3 Test and Evaluation Program Plan. The Contractor shall provide a Test and Evaluation Program Plan (TEPP). [092-03-1321]
- 092.4 Machinery Control Software System Test Plan. The Contractor shall provide a Software System Test Plan for Machinery Controls. [092-03-2065]
- 092.5 C4ISR Software System Test Plan. The Contractor shall provide a Software System Test Plan for C4ISR. [092-03-2346]
- 092.6 Schedule. The Contractor shall provide a Schedule of Tests. [092-03-2340]
- 092.7 Test Procedures. The Contractor shall provide a Test Procedure for each test performed at the Contractor's facility, C4ISR TIF or PF, and MPCMS LBTF as required in the OPC System Specification with the exception of factory testing required by NVR. [092-03-2307]

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- 092.8 095 Test Procedures. The Contractor shall provide a Test Procedure for each of the tests in Section 095. [092-03-1336]
- 092.9 Break-in. Prior to equipment being tested, OEM break-in requirements shall be met.
- 092.10 Test report. The Contractor shall provide a test report for each test requiring a test procedure. [092-03-2224]
- 092.11 Re-test. The Contractor shall re-test any component or system impacted by rip-outs or modifications after a completed test.

**094 Trials**

- 094.1 Plans. The Contractor shall develop plans for the following trials:
- 094.1.1 Builder's Dock Trials (BDT) to demonstrate the readiness of ship systems for sea trials. BDT shall be conducted when the installation and system testing of equipment is complete.
- 094.1.2 Builder's Sea Trials (BST) to demonstrate proper system integration and operation. Tests and demonstrations that cannot be conducted dockside shall be conducted during BST.
- 094.1.3 Acceptance Trials (AT) to verify systems meet performance and other contractual requirements. Acceptance Trials shall be performed after successful completion of Builder's Sea Trials, and before the projected delivery date.
- 094.1.4 Sea Trials (ST) shall refer to both BST and AT.
- 094.2 Ship Trials Plan. The Contractor shall provide a Ship Trials Plan for each Trial. [094-03-1346]
- 094.3 Full load displacement and trim. The Contractor shall conduct ST at full load displacement and trim.
- 094.3.1 To compensate for missing loads during Trials the ballast tanks shall be filled to achieve a full load displacement and trim.
- 094.4 USCG Personnel. The Contractor shall arrange to have onboard the required USCG licensed personnel to safely operate the ship.
- 094.4.1 The Contractor shall provide dockside personnel and other services as necessary to dock and undock the ship.
- 094.5 Pre-Trial. Prior to the start of each Trial the Contractor shall perform the following:
- 094.5.1 Inspect the ship's mooring site to ensure that no conditions exist that could damage the ship's propeller or foul the water intakes.
- 094.5.2 Ensure that paint is dry.
- Pre-Trial. Prior to the start of ST the Contractor shall perform the following:

## STATEMENT OF WORK FOR DETAIL DESIGN

- 094.5.3 Remove temporary rigging, industrial equipment, and debris from the ship.
- 094.5.4 Successfully complete the Stability Check of the ship.
- 094.5.5 Outfit the ship with the necessary safety equipment.
- 094.6 USCG Personnel during trials. Provisions shall be made to carry a minimum of fifty (75 on the lead ship) USCG, or USCG designated, personnel for ST.
- 094.6.1 The Contractor shall furnish subsistence for USCG representatives while the ship is at sea. When a ship is out overnight, berthing accommodations shall be provided.
- 094.7 Rest Period. Personnel, including USCG representatives shall be provided with at least a continuous 6 hour rest period in each 24 hour period.
- 094.8 Pre-Fueling. Prior to the fueling of the ship the following requirements shall be met:
- 094.8.1 Alarm systems shall be operational.
- 094.8.2 Gauges and safety devices shall be checked for operation and final adjustments completed.
- 094.8.3 Damage control systems shall be completely installed, tested, and placed in operating condition.
- 094.8.4 Fuel transfer system shall be completely installed, tested, and placed in operating condition.
- 094.9 Trial equipment. The Contractor shall furnish, install and calibrate temporary trial instrumentation and equipment necessary for BDT, BST, and AT. After satisfactory completion of AT, the Contractor shall remove temporary Trial equipment from the ship.
- 094.10 Rerun. If during any test or trial, adjustments are made that affects the results of any previous tests, these affected tests shall be rerun.
- 094.11 Authorization. The Contractor shall obtain written authorization from Contracting Officer to proceed with AT.
- 094.12 Safety. The Contractor shall implement items of safety required or identified during the BST, prior to the beginning of AT.
- 094.13 Compartment close outs. The Contractor shall complete compartment close outs prior to the beginning of AT.
- 094.14 Ship Trial Report. The Contractor shall provide a Ship Trial Report for each Trial. [094-03-1345

**095 Test Requirements**

## STATEMENT OF WORK FOR DETAIL DESIGN

095.1 Supplemental test requirements. The following test requirements are supplemental to the test requirements defined within the OPC System Specification:

**095-070 General Requirements for Design and Construction**

- 095-070.1 Specific testing requirements included in GFI shall be incorporated into test procedures.
- 095-070.2 Crash Stop - During Sea Trials (ST) ship crash stop tests shall be in accordance with the following:
- 095-070.2.1 The ship shall reverse from a steady state of 100% installed power ahead to maximum installed power astern.
- 095-070.2.1.1 Throttles shall be set from full ahead to full astern in safe, yet rapid and smooth motion.
- 095-070.2.1.2 If Controllable Pitch Propellers (CPP) are installed, the test shall be performed twice: once with the main propeller hydraulic pumps and once with the standby hydraulic pumps.
- 095-070.2.2 The ship shall transition from a steady state of design full power astern to 100% installed power ahead.
- 095-070.2.2.1 Throttles shall be set from full ahead to design full astern in safe, yet rapid and smooth motion.
- 095-070.2.2.2 If CPP's are installed, the test shall be performed twice: once with the main propeller hydraulic pumps and once with the standby hydraulic pumps.
- 095-070.2.3 During crash stop tests the following data shall be recorded:
- 095-070.2.3.1 Time of test and base course.
- 095-070.2.3.2 Prime mover parameters immediately prior to Full Astern/Full Ahead signal and at frequent intervals during the maneuver.
- 095-070.2.3.3 Depth of water and sea condition.
- 095-070.2.3.4 Wind direction and velocity.
- 095-070.2.3.5 Ship's drafts fore and aft.
- 095-070.2.3.6 The reach and lateral distances and the ship's path for each run as shown in the Figure below;
- 095-070.2.3.7 Shaft torque and rpm.
- 095-070.2.3.8 Heading.
- 095-070.2.3.9 Rudder angle.
- 095-070.2.3.10 If CPP's are installed:
- 095-070.2.3.10.1 Time for propellers to stop prior to change in direction.
- 095-070.2.3.10.2 Time and distance to stop ship "Dead-in-water".
- 095-070.2.3.10.3 Time to reach required maximum shaft RPM after change of direction.

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095-070.2.3.11 If fixed pitch propellers are installed:

095-070.2.3.11.1 Time for propellers to stop prior to change in direction.

095-070.2.3.11.2 Time for shafts to start astern.

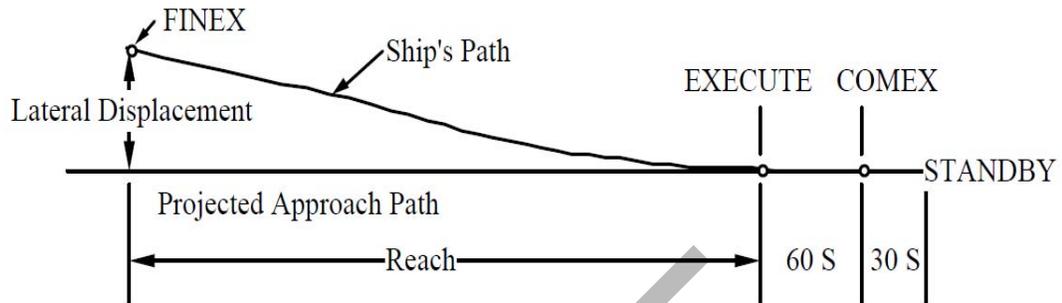


Figure 1: Crash Stop Diagram

095-070.3 Turning Circle - During ST the Turning Circle Test shall be in accordance with the following:

095-070.3.1 On the first ship only to both the port and starboard sides.

095-070.3.2 The rudder angle shall be the maximum design rudder angle.

095-070.3.3 The ship shall perform turning circles at a minimum of 540 degrees at 25%, 50%, 75%, and 100% of the ship's maximum ahead speed.

095-070.3.4 During the test the following data shall be recorded:

095-070.3.4.1 Time of test and base course.

095-070.3.4.2 Depth of water and sea condition.

095-070.3.4.3 Wind direction and velocity.

095-070.3.4.4 Ship's drafts fore and aft.

095-070.3.4.5 Tactical diameter.

095-070.3.4.6 Advance and transfer distances as shown in the Figure below

095-070.3.4.7 Heading.

095-070.3.4.8 Rudder angle.

095-070.3.4.9 Roll angle.

095-070.3.4.10 GPS position.

095-070.3.4.11 Ship's speed.

095-070.3.4.12 Shaft RPM.

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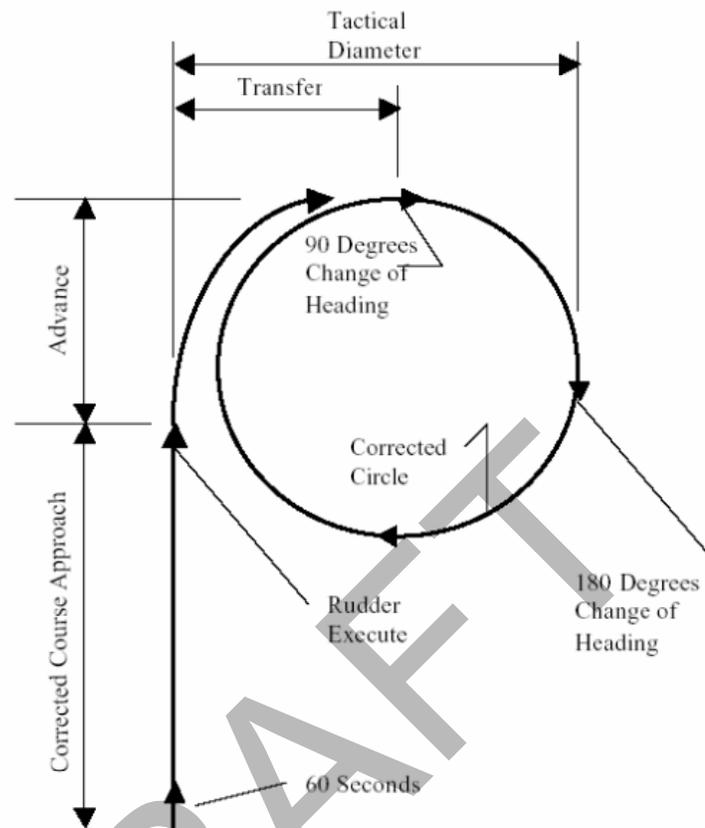


Figure 2: Turning Circle Diagram

095-070.4 Initial Turning Tests - During lead ship ST the Initial Turning Test shall be in accordance with the following:

095-070.4.1 At sustained speed at two separate rudder angles, one at 10 degrees and one at 20 degrees.

095-070.4.2 During the test the following data shall be recorded:

095-070.4.2.1 Time of test and base course.

095-070.4.2.2 Depth of water and sea condition...

095-070.4.2.3 Wind direction and velocity.

095-070.4.2.4 Ship's draft fore and aft.

095-070.4.2.5 The time history of heading and yaw.

095-070.4.2.6 Heading.

095-070.4.2.7 Rudder angle.

095-070.4.2.8 GPS position.

095-070.4.2.9 Ship's speed.

095-070.4.2.10 Shaft RPM.

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- 095-070.5 Zig-Zag Test - During ST the Zig-Zag Test shall be in accordance with the following:
- 095-070.5.1 With the ship proceeding ahead into the wind at the installed power, move the rudder at maximum rate and perform the following maneuvers:
- 095-070.5.1.1 Move the rudder from center to 10 degrees right, hold until ship's heading is 10 degrees to the right of the original course.
- 095-070.5.1.2 Move the rudder from 10 degrees right to 10 degrees left, hold until the ship's heading is 10 degrees to the left of the original course.
- 095-070.5.1.3 Move the rudder from 10 degrees left to 10 degrees right, hold until the ship's heading is 10 degrees to the right of the original course.
- 095-070.5.1.4 Move the rudder from 10 degrees to the right to 10 degrees to the left, hold until original heading is restored. Steady on original course.
- 095-070.5.1.5 Complete a second test following the same procedure but using a rudder angle of 20 degrees.
- 095-070.5.2 During the test the following data shall be recorded:
- 095-070.5.2.1 Time of test and base course.
- 095-070.5.2.2 Depth of water and sea condition.
- 095-070.5.2.3 Wind direction and velocity.
- 095-070.5.2.4 Ship's drafts fore and aft.
- 095-070.5.2.5 Time to check yaw.
- 095-070.5.2.6 Angle of overshoot.
- 095-070.5.2.7 Time of shift rudder, start and stop of actual rudder motion.
- 095-070.5.2.8 Time rudder is held at each position.
- 095-070.5.2.9 Rudder angle.
- 095-070.5.2.10 Roll angle.
- 095-070.5.2.11 GPS position.
- 095-070.5.2.12 Ship speed.
- 095-070.5.2.13 Shaft RPM.
- 095-070.6 Direct Spiral Test - During Lead Ship BST the Direct Spiral Test shall be in accordance with the following:
- 095-070.6.1 With the ship at the speed designated as most unfavorable to directional stability conduct the maneuvering as follows:
- 095-070.6.1.1 Move the rudder 20 degrees right and hold until the turning rate becomes steady.
- 095-070.6.1.2 Move the rudder to the following settings and hold at each setting until a steady turning rate in degrees is obtained: 20 degrees right, 15 degrees right, 10 degrees right, 5

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degrees right, 3 degrees right, 1 degree right, zero degrees, 1 degree left, 3 degrees left, 5 degrees left, 10 degrees left, 15 degrees left, 20 degrees left, 15 degrees left, 10 degrees left, 5 degrees left, 3 degrees left, 1 degree left, 0 degrees, 1 degree right, 3 degrees right, 5 degrees right, 10 degrees right, 15 degrees right, and 20 degrees right.

- 095-070.6.2 During the test the following data shall be recorded:
- 095-070.6.2.1 Time of test and base course.
  - 095-070.6.2.2 Depth of water and sea condition.
  - 095-070.6.2.3 Wind direction and velocity.
  - 095-070.6.2.4 Ship's drafts fore and aft.
  - 095-070.6.2.5 Heading.
  - 095-070.6.2.6 Rudder angle.
  - 095-070.6.2.7 Roll angle.
  - 095-070.6.2.8 Yaw rate.
  - 095-070.6.2.9 GPS position.
  - 095-070.6.2.10 Shaft RPM.
  - 095-070.6.2.11 Ship speed.
- 095-070.7 Low Speed Controllability Maneuvers - During Lead Ship ST this trial shall be in accordance with the following:
- 095-070.7.1 With the ship proceeding into the wind on a steady course at 6 knots ahead, conduct the following maneuvers:
    - 095-070.7.1.1 Move the rudder to the following settings and hold at each setting for 30 seconds: 10 degrees right, 10 degrees left, 0 degrees.
    - 095-070.7.1.2 Return to the base course and adjust speed to 6 knots with rudder at 0 degrees.
  - 095-070.7.2 Move the rudder to the following settings and hold at each setting for 30 seconds: 35 degrees right, 35 degrees left, 0 degrees.
  - 095-070.7.3 Return to base course and adjust to next speed.
  - 095-070.7.4 Repeat the maneuvers with speed decreased at 1 knot intervals until the speed at which the ship does not respond to the helm is determined.
  - 095-070.7.5 During the test the following data shall be recorded:
    - 095-070.7.5.1 Time of test and base course.
    - 095-070.7.5.2 Depth of water and sea condition.
    - 095-070.7.5.3 Wind direction and velocity.
    - 095-070.7.5.4 Ship's drafts fore and aft.
    - 095-070.7.5.5 Heading.
    - 095-070.7.5.6 Time of shift rudder, start and stop of actual rudder motion.

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- 095-070.7.5.7 Time rudder is held at each position.
- 095-070.7.5.8 Rudder angle.
- 095-070.7.5.9 GPS position.
- 095-070.7.5.10 Shaft RPM.
- 095-070.7.5.11 Ship speed.

**095-071 Access**

- 095-071.1 The Equipment Removal and Replacement Test shall be in accordance with the following:
  - 095-071.1.1 The USCG will select ten pieces of equipment from the Equipment Item Removal List (EIRL) that will be subject to removal and replacement testing.
  - 095-071.1.2 During the test the elapsed time required to remove and replace each selected item, including the time for access route preparation and restoration shall be recorded

**095-073 Noise and Vibration**

- 095-073.1 The Compartment Airborne Noise Test shall be in accordance with the OPC System Specification (NVR 6-4-4).
- 095-073.2 The Propulsion System Vibration Test shall be in accordance with ANSI S2.27.
- 095-073.3 The Shipboard Equipment Environmental Vibration Test shall be in accordance with ANSI S2.26 or MIL-STD-167-1 Type I.
- 095-073.4 The Shipboard Equipment Internally Excited Vibration Test shall be in accordance with ANSI S2.19 or MIL-STD-167-1 Type II.
- 095-073.5 The Installation Assessment of Rotating Machinery Vibration Test shall be in accordance with the following:
  - 095-073.5.1 The Installation Assessment of Rotating Machinery Vibration Test shall test rotating machinery for proper alignment and proper attachment to foundations.
  - 095-073.5.2 Vibration measurements performed on non-rotating structures, such as the bearing housing, machine casing, or machine base shall meet the criteria of ISO 10816.
  - 095-073.5.3 Vibration measurements performed on rotating components shall meet the criteria of ISO 7919.
  - 095-073.5.4 ISO 13373 shall be used as guidance for acquiring and evaluating vibration measurements.
  - 095-073.5.5 Testing shall be completed by an analyst certified in accordance with ISO 18436-2 Category IV or ASNT SNT-TC-1A Level III.

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- 095-073.6 The Whole-body Vibrations Test shall be in accordance with the OPC System Specification (NVR 6-3-4).
- 095-073.7 The Structural Vibration Test shall be in accordance with ISO 4867 and ISO 4868 and the following:
- 095-073.7.1 Vertical, athwartships and fore-and-aft vibration velocities under the main deck shall be measured on the centerline on a structural frame closest to the aft perpendicular.
- 095-073.7.2 Vertical, athwartships and fore-and-aft vibration accelerations of the mast shall be measured at the mounting locations for antennas.
- 095-073.7.3 The ship shall be loaded to design displacement and design waterline and data shall be taken in 10 rpm increments from 60 rpm to hull power when the ship is underway in an area with a minimum water depth of 10 times the full load draft and at a sea state of 2 or less.

**095-167 Hull Structure Closures**

- 095-167.1 Doors, hatches, manholes and scuttles tests shall be in accordance with the OPC System Specification (NVR 1-5-1, NVR 6-2-3).

**095-192 Compartment Tightness**

- 095-192.1 Compartment Tightness and Completion Tests shall be in accordance with the OPC System Specification (NVR 1-6-1)

**095-200 General Requirements for Machinery Plant**

- 095-200.1 During BDT a Dockside Propulsion System Operational Test shall be in accordance with the following:
- 095-200.1.1 Operate in the ahead direction for a minimum of 2 hours at as high a power level as the mooring condition allow.
- 095-200.1.2 Operate in the astern direction for a minimum of 2 hours at as high a power level as the mooring condition allow.
- 095-200.1.3 Operate to detect and correct installation defects.
- 095-200.1.4 Operate the Propulsion System for a sufficient amount of time to complete run-in of the gears and bearings as recommended by the OEM(s).
- 095-200.2 During BST the Underway Propulsion System Operational Test shall be in accordance with the following:

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- 095-200.2.1 This test shall be performed prior to any other Propulsion System test.
- 095-200.2.2 For each configuration of the Propulsion System operate at the minimum continuous power for 30 minutes.
- 095-200.2.3 For each configuration of the Propulsion System operate at 50% of the maximum continuous power for 30 minutes.
- 095-200.2.4 For each configuration of the Propulsion System operate at maximum continuous power for 30 minutes.
- 095-200.3 During ST the Propulsion System Speed Tests shall be in accordance with the following:
- 095-200.3.1 Design Full Power Ahead Test shall be in accordance with OPC System Specification (NVR 2-4-1/18.2).
- 095-200.3.2 Astern Power Test shall be in accordance with OPC System Specification (NVR 2-4-1/18.3).
- 095-200.3.3 Operate for 4 hours at 3 knots with two shafts continuously engaged.
- 095-200.3.4 For each Propulsion System configuration determine the minimum continuous ship speed. (BST only)
- 095-200.3.5 Operate for 1 hour at the minimum continuous speed for each Propulsion System configuration. (BST only)
- 095-200.3.6 For each Propulsion System configuration determine the maximum continuous ship speed. (BST only)
- 095-200.3.7 Operate for 1 hour at the maximum continuous speed for each Propulsion System configuration. (BST only)
- 095-200.3.8 Demonstrate that the ship can be operated continuously throughout the ship's speed range.
- 095-200.3.9 Operate at sustained speed trial power for 4 hours. (BST only)
- 095-200.3.10 Operate at 14 knots for 2 hours. (BST only)
- 095-200.3.11 Operate continuously at speeds between 3 knots and 8 knots with a minimum of two shafts continuously engaged. (BST only)
- 095-200.3.12 During tests the following data shall be measured and recorded at the frequency indicated:
- 095-200.3.12.1 Ship Speed (Continuously)
- 095-200.3.12.2 Throttle position (Each run)
- 095-200.3.12.3 Diesel engine rack position (Each run)
- 095-200.3.12.4 Fuel consumption rate of each engine (Continuously)
- 095-200.3.12.5 Engine speed (Continuously)
- 095-200.3.12.6 Temperature and pressure of propulsion equipment and related fluids (Continuously)
- 095-200.3.12.7 Shaft torque (Continuously)
- 095-200.3.12.8 Propeller shaft speed (Continuously)

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- 095-200.3.12.9 Rudder angle (Continuously)
- 095-200.3.12.10 CPP oil pressure
- 095-200.3.12.11 CPP pitch (Continuously)
- 095-200.3.12.12 Weather air temperature and barometric pressure (Each run)
- 095-200.3.12.13 Relative wind speed and direction (Each run)
- 095-200.3.12.14 Wave height and direction (Each run)
- 095-200.3.12.15 Sea water temperature (Each run)
- 095-200.3.12.16 Water depth (Each run)
- 095-200.3.12.17 Ship service power (Each run)
- 095-200.3.13 If data from a test indicates unsteady conditions or inconsistencies, the test shall be repeated until satisfactory data have been obtained.
- 095-200.4 The Propulsion Redundancy Test shall be in accordance with the OPC System Specification (NVR 2-6-1/11) and the following:
  - 095-200.4.1 Demonstrate that, upon a single failure, the propulsion and steering systems provide the performance required by the OPC System Specification (NVR 2-6-1/7.1).
  - 095-200.4.2 Demonstrate that, upon the loss of one machinery space, the intact propulsion machine(s) provide the performance required by the OPC System Specification (NVR 2-6-1/7.1).
  - 095-200.4.3 Demonstrate that the rudder design allows the vessel to turn in either direction with one propulsion machine or one steering system inoperable.
  - 095-200.4.4 Demonstrate that, in the event of steering system failure, means are provided to secure rudders in the amidships position.
  - 095-200.4.5 Demonstrate that, at least two independent auxiliary services systems are provided and arranged such that a single failure will not result in propulsion performance inferior to that required by the OPC System Specification (NVR 2-6-1/7.1).
  - 095-200.4.6 Demonstrate that, a single failure in the vital auxiliary machinery (e.g. pumps, heaters, etc.) excluding failure of fixed piping, shall not result in reduction of the full propulsion capability.
  - 095-200.4.7 If electric propulsion is provided:
    - 095-200.4.7.1 Demonstrate that electrical power generation and distribution systems are arranged such that following a single failure in the systems, the electrical power supply provides the performance required by the OPC System Specification (NVR 2-5-1/7.1).
    - 095-200.4.7.2 Demonstrate that the circuits supplying equipment essential to the operation of the propulsion and steering system are divided such that a loss of one section will not result in

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performance inferior to that required by the OPC System Specification (NVR 2-5-1/7.1).

- 095-200.4.7.3 Demonstrate that a fully redundant power management system is provided so that each section of the switchboard can function independently

**095-202 Machinery Plant Control and Monitoring**

- 095-202.1 Prior to conducting the LBTF testing the Machinery Plant Control and Monitoring factory acceptance test shall be in accordance with the following:
- 095-202.1.1 Operate for 48 hours prior to starting the test
- 095-202.1.2 Demonstrate the following:
- 095-202.1.2.1 Network redundancy
- 095-202.1.2.2 Network error detection
- 095-202.1.2.3 Network failure detection
- 095-202.1.2.4 Network operation at 5% load
- 095-202.1.2.5 Network operation at 25% load
- 095-202.1.2.6 Network operation at 75% load
- 095-202.1.2.7 Network monitoring
- 095-202.1.2.8 Network interfaces
- 095-202.1.2.9 System growth margins
- 095-202.1.2.10 Human Machine Interface (HMI) Graphical User Interface (GUI) operation as follows:
- 095-202.1.2.10.1 GUI of propulsion system display and information
- 095-202.1.2.10.2 GUI of electrical plant display and information
- 095-202.1.2.10.3 GUI of fire and flooding detection display and information
- 095-202.1.2.10.4 GUI of liquid level tanks for water, fuel oil, waste water, and solid waste
- 095-202.1.2.10.5 GUI of liquid transfer systems
- 095-202.1.2.10.6 GUI of alarm handling
- 095-202.1.2.10.7 GUI of alarm pages
- 095-202.1.2.10.8 GUI of auxiliary systems
- 095-202.1.2.10.9 GUI of commands to start/run/stop, open/close for each controlled system
- 095-202.1.2.10.10 GUI of user security
- 095-202.1.2.11 Communication between RTUs, PLCs, and HMI computers
- 095-202.1.2.12 PLC redundancy
- 095-202.1.2.13 PLC failure detection
- 095-202.1.2.14 Module failure detection

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- 095-202.1.2.15 RTU failure detection
- 095-202.1.2.16 Data logging of alerts and alarms
- 095-202.1.2.17 Data logging trending functions
- 095-202.1.2.18 Data logging data export functions and abilities
- 095-202.1.2.19 After the last test is complete the system shall run for an additional 24 hours without failure.
- 095-202.2 The Propulsion control system factory acceptance test shall be in accordance with the OPC System Specification (NVR 2-2-1/4.2, NVR 3-5-3/9.2, NVR 4-1-7/5.1.1 and 4-1-7/5.2).
- 095-202.3 Prior to installing the control system equipment on the ship, the LBTF testing shall be completed in accordance with the following:
  - 095-202.3.1 Demonstrate the functionality of each sensor
  - 095-202.3.2 Demonstrate the functionality of the system to portray and represent alarm conditions
  - 095-202.3.3 Demonstrate that a single engineering watch-stander
  - 095-202.3.4 demonstrate that the system response times for networking, HMI display, commands, and alarm notification at each control station are in accordance with the OPC specification
  - 095-202.3.5 Demonstrate the functionality and operation of the Engine Order Telegraph
  - 095-202.3.6 Validate the machinery control systems respond to FMEA and FMECA failures
  - 095-202.3.7 Demonstrate that the stimulator/simulator (STIM/SIM) model accurately represents the following ship's systems:
    - 095-202.3.7.1 Propulsion and propulsion auxiliary machinery systems
    - 095-202.3.7.2 Propulsion shaft, clutch, and pitch systems
    - 095-202.3.7.3 Liquid level measurement and transfer systems
    - 095-202.3.7.4 Switchboards, generators, load management, and electrical machinery systems
    - 095-202.3.7.5 Fire and flooding detection systems
    - 095-202.3.7.6 Damage control and monitoring systems
    - 095-202.3.7.7 Auxiliary machinery systems
    - 095-202.3.7.8 IPS systems if installed
    - 095-202.3.7.9 Bow thruster
    - 095-202.3.7.10 Air conditioning systems
    - 095-202.3.7.11 Cooling water systems
    - 095-202.3.7.12 Steering control systems
    - 095-202.3.7.13 Equipment failure for the following:
      - 095-202.3.7.13.1 Each Propulsion engine
      - 095-202.3.7.13.2 Propulsion engine over speed trip

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- 095-202.3.7.13.3 Each Propulsion shaft, clutch, pitch
- 095-202.3.7.13.4 Electric Plant switchboard components
- 095-202.3.7.13.5 Each Diesel Engine
- 095-202.3.7.13.6 Each Propulsion generator when installed
- 095-202.3.7.13.7 Each Generator set
- 095-202.3.7.13.8 Each bus circuit breaker
- 095-202.3.7.13.9 Bow thruster
- 095-202.3.7.13.10 Network interfaces to fire detection system
- 095-202.3.7.13.11 Network interfaces to auxiliary machinery systems
- 095-202.3.7.13.12 Network interfaces between systems
- 095-202.3.7.13.13 Each steering system component
- 095-202.3.8 Demonstrate the functionality of the STIM/SIM operator station to modify the STIM/SIM software model
- 095-202.3.9 Demonstrate the functionality of the STIM/SIM operator station to change propulsion operational conditions
- 095-202.3.10 Demonstrate the functionality of the STIM/SIM operator station to initiate propulsion alarm conditions
- 095-202.3.11 demonstrate the STIM/SIM model is aligned the propulsion system dynamic analysis
- 095-202.3.12 Demonstrate the controls from each LBTF propulsion station accurately interacts with the STIM/SIM model and provides the corresponding indications at LBTF instrumentation, HMI monitors, MPCMS monitors, and MPCMS data logging computers
- 095-202.3.13 Demonstrate the controls from each switchboard accurately interacts with the STIM/SIM model and provides the corresponding indications at LBTF instrumentation, HMI monitors, MPCMS monitors, and MPCMS data logging computers
- 095-202.3.14 Demonstrate the controls from each MPMCS workstation to ensure that it accurately interacts with the STIM/SIM model to provide control of auxiliary equipment, auxiliary machinery, remote control of electrical switchboards and propulsion controls
- 095-202.3.15 When provided demonstrate the controls and interaction between integrated electric plant, propulsion controls, electric propulsion drive, MPCMS and the STIM/SIM model
- 095-202.3.16 Demonstrate Machinery Control System Network redundancy
- 095-202.3.17 Demonstrate Machinery Control System Network error detection
- 095-202.3.18 Demonstrate Machinery Control System Network failure detection
- 095-202.3.19 Demonstrate Machinery Control System Network monitoring
- 095-202.3.20 Demonstrate Machinery Control System Network interfaces
- 095-202.3.21 Validate Machinery Control System growth margins as available

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- 095-202.3.22 Demonstrate Machinery Control System network load under various conditions demonstrate the trending of analog data points from the electric, propulsion, and auxiliary plant
- 095-202.3.23 Demonstrate data export to supported media in .csv format
- 095-202.3.24 Demonstrate the recording of each alarm
- 095-202.3.25 Demonstrate the recording of machinery status changes
- 095-202.3.26 Demonstrate the ability to change alarm set points
- 095-202.3.27 Demonstrate user interface at each local and remote operator station
- 095-202.3.28 Demonstrate system physical, network, and user security and security levels
- 095-202.3.29 Demonstrate and validate Machinery Control System Human Machine Interface (HMI) Graphical User Interface (GUI) operation and layout as follows:
  - 095-202.3.29.1 GUI of propulsion system display and information at the MPMCS and the PCS
  - 095-202.3.29.2 GUI of electrical plant display and information at the MPMCS and the EPCS
  - 095-202.3.29.3 GUI of fire and flooding detection display and information for the MPCMS
  - 095-202.3.29.4 GUI of liquid level tanks for water, fuel oil, lube oil, ballast, waste water, and solid waste for the MPMCS
  - 095-202.3.29.5 GUI of liquid transfer systems for the MPCMS
  - 095-202.3.29.6 GUI of bow thruster system
  - 095-202.3.29.7 GUI of steering system functionality and monitoring and controls
  - 095-202.3.29.8 GUI of alarm handling for the MPMCS, EPCS, and the PCS
  - 095-202.3.29.9 GUI of alarm pages for the MPMCS, EPCS, and the PCS
  - 095-202.3.29.10 GUI of auxiliary systems for the MPMCS, and when available as installed as part of the EPCS and the PCS
  - 095-202.3.29.11 GUI of commands to start/run/stop, open/close for each controlled system for the MPMCS, EPCS, and the PCS
  - 095-202.3.29.12 GUI of network system monitoring
  - 095-202.3.29.13 GUI of security functions.
- 095-202.3.30 After BST the LBTF Validation Test shall verify the updated STIM/SIM model reflects actual machinery performance observed and recorded.
- 095-202.3.31 After AT the LBTF Validation Test shall verify the updated STIM/SIM model reflects actual machinery performance observed and recorded.
- 095-202.4 Prior to starting propulsion machinery for the first time the following shall be accomplished:

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- 095-202.4.1 Validate connections to sensors and field devices
- 095-202.4.2 Demonstrate the functionality of each sensor and field devices
- 095-202.4.3 Demonstrate the functionality of the system to portray and represent alarm conditions
- 095-202.4.4 Demonstrate the functionality of local control panels.
- 095-202.5 Prior to starting diesel engines for the first time the following shall be accomplished:
  - 095-202.5.1 Validate connections to sensors and field devices;
  - 095-202.5.2 Demonstrate the functionality of each sensor and field devices;
  - 095-202.5.3 Demonstrate the functionality of the system to portray and represent alarm conditions;
  - 095-202.5.4 Demonstrate the functionality of local control panels.
- 095-202.6 Prior to providing power to the switchboards or exercising the generators for the first time the following shall be accomplished:
  - 095-202.6.1 Validate connections to sensors and field devices
  - 095-202.6.2 Demonstrate the functionality of each sensor and field devices
  - 095-202.6.3 Demonstrate the functionality of the system to portray and represent alarm conditions
  - 095-202.6.4 Demonstrate the functionality of switchboard controls.
- 095-202.7 Prior to filling tanks for the first time the following shall be accomplished:
  - 095-202.7.1 Validate connections to sensors and field devices
  - 095-202.7.2 Demonstrate the functionality of each sensor and field devices
  - 095-202.7.3 Demonstrate TLI sensor functionality and level display is correct over the entire range of action
  - 095-202.7.4 Demonstrate motor controlled valves are calibrated and function from remote locations.
- 095-202.8 During BDT, ST, and AT the machinery control system data logging system shall record alarm events and monitored parameters.
- 095-202.9 During BDT the machinery control systems data logging functions shall be in accordance with the following:
  - 095-202.9.1 Demonstrate the trending of analog data points from the electric, propulsion, and auxiliary plant
  - 095-202.9.2 Demonstrate data export to supported media in .csv format
  - 095-202.9.3 Demonstrate the recording of each alarm
  - 095-202.9.4 Demonstrate the recording of machinery status changes
  - 095-202.9.5 Demonstrate the record each change to alarm set points
  - 095-202.9.6 Demonstrate machinery plant log format.

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- 095-202.10 During BDT the machinery control systems remote control tests shall be in accordance OPC System Specification (NVR 4-1-7/5.1).
- 095-202.11 During BDT the machinery control systems local control test shall be in accordance with the OPC System Specification (NVR 4-1-7/5.2).
- 095-202.12 During BDT the machinery control systems operation tests shall be in accordance with the following:
- 095-202.12.1 Demonstrate the alarm, display, and control functionality of the instrumentation for the parameters listed in table 1, table 2, table 3B, table 6A, table 6B, and table 8 of NVR 4-2-2.
- 095-202.12.2 Demonstrate the Operations of automatic controlled machinery.
- 095-202.12.3 Demonstrate the transfer of standby of auxiliary machinery.
- 095-202.12.4 Demonstrate the remote control of auxiliary machinery
- 095-202.12.5 Demonstrate the fire detection system
- 095-202.12.6 Demonstrate the flooding detection system
- 095-202.12.7 Demonstrate system and network responsiveness and response times
- 095-202.12.8 Demonstrate the Tank Level Indication alarms and display
- 095-202.12.9 Demonstrate TLI valve control and liquid transfer ability.
- 095-202.13 During BST the Machinery control systems operational tests shall be in accordance OPC System Specification (NVR 4-1-7/5.3.1).
- 095-202.14 During BST the Machinery control systems Remote control tests shall be in accordance OPC System Specification (NVR 4-1-7/5.1), and the following:
- 095-202.14.1 Demonstrate that the control of machinery functions correctly for loads and engine maneuvers without any manual intervention in the propulsion machinery space.
- 095-202.14.2 Demonstrate and record the propulsion plant performance for each handle position starting at full astern and proceeding to full ahead; the ship shall maintain course and speed for 2 minutes at each handle position.
- 095-202.15 During BST the Machinery control systems local control test shall be in accordance OPC System Specification (NVR 4-1-7/5.2).
- 095-202.16 During BST the Machinery control system redundancy test shall be in accordance with the OPC System Specification (NVR 4-1-7/5.3.2).
- 095-202.17 During BST and AT the machinery control systems data logging functions shall be in accordance with the following:
- 095-202.17.1 Demonstrate machinery plant log format

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- 095-202.17.2 Demonstrate the trending of analog data points from the electric, propulsion, and auxiliary plant
- 095-202.17.3 Demonstrate that the system has recorded each alarm observed
- 095-202.17.4 Demonstrate the recording of machinery status changes.
- 095-202.18 During AT the Machinery control systems operational test shall be in accordance with the following:
  - 095-202.18.1 After the propulsion machinery has been running for at least 2 hours and the ship is operating in deep water (the greater of at least 5 times draft or 2 ship lengths), the machinery shall be operated over its full range of power to demonstrate the functionality of each control system. The following tests shall be included:
    - 095-202.18.1.1 Operations of automatic controlled machinery
    - 095-202.18.1.2 Transfer of standby auxiliary machinery
    - 095-202.18.1.3 Remote control of auxiliary machinery
    - 095-202.18.1.4 Remote control of the electric plant
    - 095-202.18.1.5 Fire detection system
    - 095-202.18.1.6 Flooding detection system

**095-233 Propulsion Diesel Engines**

- 095-233.1 The Propulsion Diesel Engine First Article Test and Inspection shall be in accordance with the OPC System Specification (NVR 2-2-1/7.6).
- 095-233.2 The Propulsion Diesel Engine Production Unit Test and Inspection shall be in accordance with the OPC System Specification (NVR 2-2-1/7.6).

**095-241 Propulsion Reduction Gears**

- 095-241.1 The Reduction Gear First Article Inspection and Test shall be in accordance with the OPC System Specification (NVR 2-4-2/6).
- 095-241.2 The Reduction Gear Production Unit Quality Conformance Test shall be in accordance with the OPC System Specification (NVR 2-4-2/6).
- 095-241.3 During BDT the Reduction Gear Operational Test shall be conducted as follows:
  - 095-241.3.1 The Reduction Gears shall be marked with Dykem prior to the start of BDT tests.
  - 095-241.3.2 Clutch-declutch tests to operate in propulsion system configurations.
  - 095-241.3.3 Brake test if applicable.

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- 095-241.3.4 During these tests the inlet oil temperature and oil pressure, bearing temperature, and drain temperature of each journal and thrust bearing shall be monitored and recorded every 15 minutes.
- 095-241.3.5 Document tooth contact patterns with photographs and diagrams.
- 095-241.3.6 Where tooth contact patterns indicate unacceptable conditions such as insufficient contact area, contact below the base line, or excessive lead mismatch, adjustments shall be made to correct the deficiencies.

**095-243 Propulsion Shafting**

- 095-243.1 The Propulsion Shafting System Measured Bearing Reactions Test shall be in accordance with the OPC System Specification (NVR 2-4-1/2.2.1).
- 095-243.2 The Propulsion Shafting Material Test shall be in accordance with the OPC System Specification (NVR 2-4-1/2.2.3).
- 095-243.3 The Propulsion Shafting System Measured Runout Readings Test shall be in accordance with the OPC System Specification (NVR 2-4-1/2.2.2).
- 095-243.4 During BST, the Locked Shaft Test shall be in accordance with the following:
- 095-243.4.1 Performed on both port and starboard shafts.
- 095-243.4.2 With one shaft in the locked configuration, operate the vessel for a minimum of 15 minutes and determine the maximum continuous ship speed.
- 095-243.5 During BST, the Trail Shaft Test shall be in accordance with the following:
- 095-243.5.1 Performed on both port and starboard shafts.
- 095-243.5.2 Operate in trail shaft mode for 15 minutes to determine the maximum ship speed and if installed, the pitches of both the driven and trailing CPP.
- 095-243.5.3 Continuously monitor the lube oil pressure of the reduction gear to demonstrate proper operation.

**095-244 Propulsion Shaft Bearings and Seals**

- 095-244.1 During BST, the Thrust Bearing Clearance Inspection shall be in accordance with the following:
- 095-244.1.1 Measure clearance with the ship at 100% installed power ahead.
- 095-244.1.2 Measure clearance with the ship at maximum power astern.

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- 095-244.1.3 The clearances shall be recorded on the thrust bearing nameplate.
- 095-244.2 During BST, the Propulsion Shaft Seal Leakage Test shall be in accordance with the OPC System Specification (NVR 2-4-5/3.4.3) and the following:
- 095-244.2.1 The static leakage rate of the mechanical sealing elements shall be measured for each propulsion shaft for one hour.
- 095-244.2.2 The dynamic leakage rate of the mechanical sealing elements shall be measured for each propulsion shaft for one hour.
- 095-244.3 Failure of any mechanical or inflatable seals to meet leakage requirements shall constitute failure of these tests.

**095-245 Propellers**

- 095-245.1 The Propeller Inspection shall be in accordance with the OPC System Specification (NVR 2-4-3/8).
- 095-245.2 The Propeller Blade Gage Inspection shall be in accordance with the OPC System Specification (NVR 2-4-3/8).
- 095-245.3 For Controllable Pitch Propellers, the CPP hydrostatic test shall be in accordance with the following:
- 095-245.3.1 Castings, forgings (except propulsion shafting sections), extruded metal, and hoses which contain fluids or form a fluid barrier shall be hydrostatically tested after final machining at 150 percent of their maximum operating pressures for 30 minutes without a pressure drop.
- 095-245.3.2 Components which form the water-oil barrier in the hub, including the hub casting, shall be tested at 150 percent of the maximum hub pressure for 30 minutes without a pressure drop.
- 095-245.4 The Propeller Single-Plane Balancing Test shall be in accordance DOD-P-24562.
- 095-245.5 For CPP's, the Propeller Two-Plane Balancing Test shall be in accordance DOD-P-24562.
- 095-245.6 For CPP's, tests during Shipboard installation shall be in accordance with DOD-P-24562.
- 095-245.7 For CPP's, Post-installation testing shall be in accordance with DOD-P-24562.
- 095-245.8 For CPP's, during ST, the CPP Operational Test shall be in accordance with the following:
- 095-245.8.1 Demonstrate emergency provisions for manual control of pitch at or near the pitch-actuating control valve and an emergency pitch actuating system.

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- 095-245.8.2 Verify the time to reverse propeller pitch from design ahead to full astern while operating at maximum ahead speed.
- 095-245.8.3 Verify the time to reverse propeller pitch from full astern to design pitch ahead while operating at maximum astern speed.

**095-304 Electric Cable**

- 095-304.1 Cable voltage drop shall be measured to demonstrate that it meets the requirements of the OPC System Specification.
  - 095-304.1.1 Circuits showing voltage drop greater than 75% of the allowable voltage drop according to the voltage drop calculations shall be measured.

**095-310 Ship Service and Emergency Generator Sets**

- 095-310.1 First Article Testing for the Diesel Generator Set shall be in accordance with OPC System Specification (PPD-310-001).
- 095-310.2 First Article Testing for the Generator shall be in accordance with OPC System Specification (PPD-310-002).
- 095-310.3 First Article Testing for the Voltage Regulator-Exciter shall be in accordance with OPC System Specification (PPD-310-003).
- 095-310.4 First Article Testing for the Speed and Load Sensing Governor shall be in accordance with OPC System Specification (PPD-310-004).
- 095-310.5 Quality Conformance Testing for each Diesel Generator Set shall be in accordance with OPC System Specification (PPD-310-001).
- 095-310.6 Quality Conformance Testing for each Generator shall be in accordance with OPC System Specification (PPD-310-002).
- 095-310.7 Quality Conformance Testing for each Voltage Regulator-Exciter shall be in accordance with OPC System Specification (PPD-310-003).
- 095-310.8 Quality Conformance Testing for each Speed and Load Sensing Governor shall be in accordance with OPC System Specification (PPD-310-004).
- 095-310.9 Testing of SSDGs and their associated control systems to demonstrate that the features meet OPC System Specification requirements shall include the following:
  - 095-310.9.1 Tests of SSDGs and their associated control systems shall verify the performance of the following functions as applicable:
    - 095-310.9.1.1 Primary and alternate controls.

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- 095-310.9.1.2 Alarms.
- 095-310.9.1.3 Power sources.
- 095-310.9.1.4 Transfer override arrangements.
- 095-310.9.1.5 Interlocks.
- 095-310.9.1.6 Safety controls.
- 095-310.9.1.7 Automatic power management system.
- 095-310.9.1.8 Protective relaying systems.
- 095-310.9.1.9 Generator automatic and manual safety trip controls.
- 095-310.9.1.10 Transfer of capability to and operation of redundant systems upon failure of the primary system.
- 095-310.9.1.11 Operation of data networks and control and monitoring interfaces.
- 095-310.9.2 Prior to operation, tests to demonstrate that SSDG insulation-resistance meets the requirements of the OPC System Specification shall be in accordance with the following:
  - 095-310.9.2.1 Circuits and parts of regulators and rectifiers which have a voltage rating less than the test voltage shall be disconnected before the test voltage is applied.
  - 095-310.9.2.2 Separate measurements shall be made on the armature and field windings. Windings shall be thoroughly discharged before applying test voltage.
  - 095-310.9.2.3 Circuits or groups of circuits of equal voltage above ground shall be connected together. Circuits or groups of circuits of different voltages above ground shall be tested separately.
  - 095-310.9.2.3.1 Insulation-resistance shall be measured with an insulation-resistance indicating ohmmeter; for those circuits that would be damaged by a 500-V insulation tester, a low voltage ohmmeter shall be used.
  - 095-310.9.2.4 The test voltage shall be applied for at least 60 seconds.
  - 095-310.9.2.5 The temperature of the component shall be noted and insulation-resistance measurements shall be corrected to 25 degrees C.
    - 095-310.9.2.5.1 Corrections shall be based on insulation-resistance doubling for each 15 degrees C decrease in temperature.
    - 095-310.9.2.5.2 Insulation resistances, corrected to 25 degrees C, shall be not less than the values specified in Sect. 300 of the NSTM.
    - 095-310.9.2.5.3 Test results shall be recorded.
  - 095-310.9.2.6 The maximum and minimum air gap readings for each pole of the generators shall be recorded for salient pole machines.

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- 095-310.9.2.7 If provided, the generator field flashing circuits shall be checked for proper operation.
- 095-310.9.2.7.1 These circuits shall be checked in manual voltage control and in automatic voltage control.
- 095-310.9.3 Tests to demonstrate proper operation of the starting system of each SSDG shall be in accordance with the following:
- 095-310.9.3.1 Each SSDG shall be started six times, consisting of cranking the assembled generator set until the engine starts, then stopping the engine and repeating the procedure as soon as the set comes to rest.
- 095-310.9.4 Testing of each SSDG's no load capability shall be as follows:
- 095-310.9.4.1 With the unit operating at no load, at rated speed, and rated voltage, the following shall be checked for proper operation:
- 095-310.9.4.1.1 Range of manual voltage control - record maximum and minimum
- 095-310.9.4.1.2 Manual-automatic transfer switch
- 095-310.9.4.1.3 Range of auto voltage adjustment - record maximum and minimum
- 095-310.9.4.1.4 Range of speed changer - record minimum, maximum, and time to go from minimum to maximum
- 095-310.9.5 Testing of each generator set's full load capability shall be as follows:
- 095-310.9.5.1 Each SSDG shall be operated at full load for 45 minutes to bring it up to or near its operating temperature.
- 095-310.9.5.1.1 During this period, the general operation of the SSDG shall be observed and any necessary adjustments shall be made.
- 095-310.9.6 Testing of each SSDG's capability at full load at rated power factor shall be as follows:
- 095-310.9.6.1 The range of voltage adjustment shall be checked and the maximum and minimum values recorded.
- 095-310.9.6.2 Each SSDG shall be tested during three separate test runs to demonstrate the pressure at which the low oil pressure trip operates.
- 095-310.9.6.3 Each SSDG shall be tested during three separate test runs to demonstrate the speed at which the overspeed trip operates.
- 095-310.9.6.4 Each SSDG shall be tested during three separate test runs to demonstrate that the manual trip operates satisfactorily.
- 095-310.9.6.5 At no load, the SSDG shall be adjusted to rated voltage and frequency.
- 095-310.9.7 Testing of each SSDG to demonstrate its capability to handle an increasing load shall be as follows:

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- 095-310.9.7.1 After the set has been brought up to its operating temperature, it shall be operated at no load and approximately 20, 40, 60, 80, and 100 percent of the kW rating of the set (in that order) for periods of at least 10 minutes each.
- 095-310.9.7.1.1 Voltage regulation waveforms showing magnitude and frequency during step loads shall be reported for load tests.
- 095-310.9.7.2 For generator set that uses droop for dividing load between generator sets, the voltage and speed droop, as applicable, shall be within 3 percent at full load for machines and shall correspond to the curves obtained during the factory tests.
- 095-310.9.7.3 No adjustments shall be made during the test.
- 095-310.9.7.4 The voltage and frequency during the loading tests shall remain within system requirements.
- 095-310.9.7.5 The Heat run load (4 hour) test shall be performed after the Increasing Load Test and prior to the Overload test.
- 095-310.9.8 Heat run load testing (4 hour) of each generator set shall be as follows:
- 095-310.9.8.1 Data for the diesel engine functions listed below shall be taken as follows at 15 minute intervals throughout the Heat Run Load test:
- 095-310.9.8.1.1 Exhaust pressure.
- 095-310.9.8.1.2 Lube oil pressure, in and out of engine.
- 095-310.9.8.1.3 Lube oil strainer pressure, in and out.
- 095-310.9.8.1.4 Crankcase pressure.
- 095-310.9.8.1.5 Seawater pump discharge pressure.
- 095-310.9.8.1.6 Fresh water pump discharge pressure.
- 095-310.9.8.1.7 Scavenger air pressure (if applicable).
- 095-310.9.8.1.8 Starting air pressure.
- 095-310.9.8.1.9 Water heat exchanger temperatures.
- 095-310.9.8.1.10 Seawater, in and out.
- 095-310.9.8.1.11 Fresh water, in and out.
- 095-310.9.8.1.12 Lube oil cooler oil temperature, in and out.
- 095-310.9.8.1.13 Lube oil cooler water temperature, in and out.
- 095-310.9.8.1.14 Engine fresh water temperature, in and out of engine.
- 095-310.9.8.1.15 Lube oil temperature, in and out of engine.
- 095-310.9.8.1.16 Cylinder exhaust temperature.
- 095-310.9.8.1.17 Air intake temperature.
- 095-310.9.8.2 Data for the generator functions listed below shall be taken at 15 minute intervals throughout the Heat Run Load test:

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- 095-310.9.8.2.1 Generator air cooler water pressure drop.
- 095-310.9.8.2.2 Generator air cooler water temperature, in and out.
- 095-310.9.8.2.3 Bearing lube oil pressure.
- 095-310.9.8.2.4 Bearing temperatures.
- 095-310.9.8.2.5 Current (one line for 3 phase ac).
- 095-310.9.8.2.6 Frequency, or r/min.
- 095-310.9.8.2.7 Power.
- 095-310.9.8.2.8 Power factor.
- 095-310.9.8.2.9 Stator temperatures.
- 095-310.9.8.2.10 Voltage (one phase for 3 phase ac.)
- 095-310.9.9 Demonstration of each generator's capability to handle overload shall be as follows:
  - 095-310.9.9.1 Immediately after completion of the 4 hour test the generator shall be tested for 2 hours at the machine's specified overload rating (110%).
  - 095-310.9.9.2 The voltage and frequency for the overload test shall be within system requirements.
  - 095-310.9.9.3 For generators that use droop for dividing load between generators, the voltage and speed droop, as applicable, shall be within 4 percent and shall correspond to the curves obtained during the factory tests.
  - 095-310.9.9.4 Data for the diesel engine functions listed below shall be taken at 15 minute intervals throughout the Overload test:
    - 095-310.9.9.4.1 Exhaust pressure.
    - 095-310.9.9.4.2 Lube oil pressure, in and out of engine.
    - 095-310.9.9.4.3 Lube oil strainer pressure, in and out.
    - 095-310.9.9.4.4 Crankcase pressure.
    - 095-310.9.9.4.5 Seawater pump discharge pressure.
    - 095-310.9.9.4.6 Fresh water pump discharge pressure.
    - 095-310.9.9.4.7 Scavenger air pressure (if applicable).
    - 095-310.9.9.4.8 Starting air pressure.
    - 095-310.9.9.4.9 Water heat exchanger temperatures.
    - 095-310.9.9.4.10 Seawater, in and out.
    - 095-310.9.9.4.11 Fresh water, in and out.
    - 095-310.9.9.4.12 Lube oil cooler oil temperature, in and out.
    - 095-310.9.9.4.13 Lube oil cooler water temperature, in and out.
    - 095-310.9.9.4.14 Engine fresh water temperature, in and out of engine.
    - 095-310.9.9.4.15 Lube oil temperature, in and out of engine.
    - 095-310.9.9.4.16 Cylinder exhaust temperature.
    - 095-310.9.9.4.17 Air intake temperature.

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- 095-310.9.9.5 Data for the generator functions listed below shall be taken at 15 minute intervals throughout the Overload test:
- 095-310.9.9.5.1 Generator air cooler water pressure drop.
  - 095-310.9.9.5.2 Generator air cooler water temperature, in and out.
  - 095-310.9.9.5.3 Bearing lube oil pressure.
  - 095-310.9.9.5.4 Bearing temperatures.
  - 095-310.9.9.5.5 Current (one line for 3 phase ac).
  - 095-310.9.9.5.6 Frequency, or r/min.
  - 095-310.9.9.5.7 Power.
  - 095-310.9.9.5.8 Power factor.
  - 095-310.9.9.5.9 Stator temperatures.
  - 095-310.9.9.5.10 Voltage (one phase for 3 phase ac).
- 095-310.9.10 Testing of each SSDG's capability to handle Decreasing Load shall be as follows:
- 095-310.9.10.1 The Decreasing Load test shall be performed immediately after the Overload test.
  - 095-310.9.10.2 The set shall be operated at the same loads as on the Increasing load test but in reverse order.
  - 095-310.9.10.3 No adjustments shall be made during the test
  - 095-310.9.10.4 Data shall be recorded as on increasing load steps.
  - 095-310.9.10.5 For Increasing and Decreasing Load tests audible noise, mechanical balance, and lubrication shall be observed and recorded at each of the specified load points.
- 095-310.9.11 Immediately after completing the Decreasing Load test, testing of SSDG insulation-resistance, to verify that it meets OPC System requirements, shall be in accordance with the insulation-test method described above.
- 095-310.9.12 Testing of SSDG's parallel operation capabilities shall be as follows:
- 095-310.9.12.1 Ship service generator sets, in every combination of two units each, shall be operated in parallel.
  - 095-310.9.12.2 Where more than one type of control for voltage, and thereby reactive load, (VAr) division is provided, such as reactive droop compensation and reactive differential compensation, the parallel operation tests shall be conducted under each type.
  - 095-310.9.12.3 This test shall also be performed in isochronous mode.
  - 095-310.9.12.4 Where more than two SSDGs can be paralleled, the parallel operation test shall be repeated with each combination of SSDGs including SSDGs in parallel.
- 095-310.9.13 Testing of SSDG ability to share load between parallel generator sets shall be as follows:

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- 095-310.9.13.1 Load the paralleled generators with each generator operating at rated voltage and frequency to 20 percent of their combined kW rating.
- 095-310.9.13.2 The governors shall be adjusted for equal percentage division of kW load, at approximately 20 percent of the combined kW ratings of the paralleled generators.
- 095-310.9.13.2.1 No further adjustment of the governor, voltage regulator, and rheostat shall be made for the duration of this test.
- 095-310.9.13.3 Vary the load from 20 percent of the combined kW rating of the parallel generators to 100 percent in approximately five steps and back to 20 percent load in the same manner.
- 095-310.9.13.3.1 The speed, voltage, current, and kW load of each generator at each load point shall be recorded.
- 095-310.9.13.4 Where more than one type of control for speed and load (kW) division is provided, such as droop and differential (isochronous), the above tests shall be conducted under each type.
- 095-310.9.13.5 Where more than one type of control for voltage, and thereby reactive load, (kVAR) division is provided, such as reactive droop compensation and reactive differential compensation, the above tests shall be conducted under each type.
- 095-310.9.13.6 The voltage and speed droop, as applicable, is to correspond to the curves obtained during the factory tests.
- 095-310.9.13.7 The voltage and speed droops of any one machine shall be within 10 percent of the voltage and speed droops of any other machine.
- 095-310.9.13.8 Proportional load sharing to within 5% shall be demonstrated to show compliance with the requirements of OPC System Specification (NVR 3-3-2/7.1.4).
- 095-310.9.14 Testing of SSDG's capability to transfer power from the ship to shore shall be as follows:
- 095-310.9.14.1 One of the generators shall be paralleled with shore power and the load transferred from the generator to shore power and back without interruption of power.
- 095-310.9.14.1.1 This test shall be repeated three times for each generator capable of being paralleled with shore power.
- 095-310.9.15 Testing of SSDG's capability to export power to shore shall be as follows:
- 095-310.9.15.1 Generators shall be paralleled with shore power and the load exported from the generator to shore power utilizing the EPCS without interruption of power.
- 095-310.9.15.1.1 This test shall be repeated three times for each generator capable of being paralleled with shore power for the purpose of export to shoreside facilities.

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- 095-310.9.16 Testing of each SSDG's Transient Load Response shall be as follows:
- 095-310.9.16.1 The regulator-exciter shall be in the automatic mode for this test.
  - 095-310.9.16.2 The reactive current compensation circuit shall be inoperative or set to zero.
  - 095-310.9.16.3 The governor shall be in the isochronous mode.
  - 095-310.9.16.4 The generator set shall be operated at 100 percent of rated load, at rated power factor, voltage, and speed, until temperatures have stabilized.
    - 095-310.9.16.4.1 All load shall then be removed from the generator set.
  - 095-310.9.16.5 The regulator-exciter and governor shall be adjusted to obtain rated values of terminal voltage and speed.
  - 095-310.9.16.6 No further adjustments shall be made.
  - 095-310.9.16.7 The instrument readings shall be taken at this time.
  - 095-310.9.16.8 A 50 percent rated kW load shall be applied in one step.
    - 095-310.9.16.8.1 After voltage and speed have stabilized, complete instrument readings shall be recorded.
  - 095-310.9.16.9 The load shall then be reduced to no load in one step.
    - 095-310.9.16.9.1 After voltage and speed have stabilized, instrument readings shall be taken.
  - 095-310.9.16.10 This sequence shall be repeated two additional times.
  - 095-310.9.16.11 The test shall be repeated using loads of 35, 20, and 10 percent of rated kW load.
  - 095-310.9.16.12 The test shall be repeated for each load (50, 35, 20, and 10 percent of rated kW load) with the governor in the droop mode and the speed regulation changer set at 3.3 percent.
  - 095-310.9.16.13 The minimum information for each set of readings taken during the test shall be the three-phase RMS voltages and line currents, frequency, kW output, and frequency deviation.
  - 095-310.9.16.14 A recording instrument of suitable accuracy and response shall be used to provide a permanent trace of speed versus time during the tests.

**095-320 General Requirements for Electrical Power Distribution Systems**

- 095-320.1 The shore tie electrical cables tests shall be in accordance with the following:
- 095-320.1.1 The shore tie electric cables shall be removed from their stowage reels and faked on the deck.

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- 095-320.1.2 The shore tie electric cables shall be rigged to the pier on both the port and starboard side of the ship.
- 095-320.1.2.1 It is not required to connect the cables to an electrical service.
- 095-320.1.2.2 The stores cranes and mooring capstans may be used to rig and unrig the shore tie electrical cables.
- 095-320.1.3 The shore tie electric cables shall be re-stowed on their stowage reels after being unrigged from the pier.
- 095-320.1.4 The number of personnel utilized to rig and unrig the cables and the time required for each event shall be recorded.

**095-324 Switchboards and Panels for Electric Power Lighting**

- 095-324.1 First Article Testing for the Switchboard shall be in accordance with OPC System Specification (PPD-324-001).
- 095-324.2 Quality Conformance Testing for each Switchboard shall be in accordance with OPC System Specification (PPD-324-001).
- 095-324.3 Testing of each Switchboard shall be in accordance with the following:
  - 095-324.3.1 Demonstrate that the Electric Plant Control Panel (EPCP) components function as described in PPD-324-001.
  - 095-324.3.2 Demonstrate that the EPCC functions as described in PPD-324-001.
  - 095-324.3.3 Demonstrate that circuit breakers and bus tie breakers can be opened and closed manually.
    - 095-324.3.3.1 If the circuit breakers are electrically operated, demonstrate that circuit breakers and bus tie breakers can be opened and closed manually and electrically.
- 095-324.4 The Electric Plant Control System (EPCS) tests shall be in accordance with the following:
  - 095-324.4.1 Demonstrate that each SSDG is capable of being automatically started from each switchboard.
  - 095-324.4.2 Demonstrate for each switchboard that the local SSDG is capable of being started from the local switchboard.
  - 095-324.4.3 Demonstrate that each switchboard is capable of starting each remote SSDG.
  - 095-324.4.4 Demonstrate that each switchboard is capable of performing load shedding functions.
  - 095-324.4.5 Demonstrate that each switchboard is capable of performing even load sharing functions.
  - 095-324.4.6 Demonstrate that each switchboard equipped with shore power circuit breakers is capable of receiving power from the shore.

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095-324.4.7 Demonstrate that each switchboard so equipped is capable of exporting power to shore.

**095-400 C4I Integration****095-402 Secure Electronic Processing Information Systems****095-404 Signal Transmission Lines****095-405 Antenna****095-407 Electromagnetic Environmental Effects (E3), Grounding and Bonding****095-410 Command and Control Systems**

095-410.1 C2 System testing shall be tested in accordance with the following:

095-410.1.1 The C2 system shall be tested in accordance with the OPC System Specification (NVR 4-1-15/9).

095-410.1.2 The Contractor shall obtain authorization from the Coast Guard for the use of each simulator, stimulator or simulation used to conduct C2 system Production Facility (PF), Equipment Light-Off (ELO) and trial tests.

095-410.1.3 At the Test and Integration Facility (TIF), the following shall be conducted:

095-410.1.3.1 C2 software development and integration tests.

095-410.1.3.2 C2 hardware development and integration tests.

095-410.1.4 Prior to shipboard installation, the following shall be conducted:

095-410.1.4.1 C2 System Acceptance Testing;

095-410.1.4.2 C2 System Endurance Testing;

095-410.1.4.3 C2 System Stress Testing.

095-410.1.4.4 Demonstrate the SCIF C2 SA LSD can be fully controlled by the user.

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- 095-410.1.4.5 Demonstrate that user actions causing a work station reboot, reset or logout does not affect the persistency of the SCIF C2 SA LSD.
- 095-410.1.4.6 Demonstrate that the OPCEN C2 SA LSDs can be fully controlled by the user.
- 095-410.1.4.7 Demonstrate that user actions causing a work station reboot, reset or logout does not affect the persistency of the OPCEN C2 SA LSDs.
- 095-410.1.4.8 Demonstrate that MLSTC work stations comply with OPC System Specification.
- 095-410.1.4.9 Demonstrate that users have the ability to fully utilize computers and systems interfaced to each MLSTC work stations.
- 095-410.1.4.10 Demonstrate that MLSTC watch stations comply with OPC System Specification.
- 095-410.1.4.11 Demonstrate the ability to utilize computers and systems interfaced to each MLSTC watch station.
- 095-410.1.5 Prior to Builders Dock Trials, the following shall be conducted:
- 095-410.1.5.1 C2 System Acceptance Testing;
- 095-410.1.5.2 C2 System Endurance Testing.
- 095-410.1.6 During sea trials the following shall be conducted:
- 095-410.1.6.1 C2 System Acceptance Testing;
- 095-410.1.6.2 C2 System Endurance Testing.
- 095-410.1.6.3 Demonstrate the SCIF C2 SA LSD can be fully controlled by the user.
- 095-410.1.6.4 Demonstrate that user actions causing a work station reboot, reset or logout does not affect the persistency of the SCIF C2 SA LSD.
- 095-410.1.6.5 Demonstrate the SCIF C2 SA LSD can be read from any location within the operational workspace within the SCIF.
- 095-410.1.6.6 Demonstrate that the OPCEN C2 SA LSDs can be fully controlled by the user.
- 095-410.1.6.7 Demonstrate that user actions causing a work station reboot, reset or logout does not affect the persistency of the OPCEN C2 SA LSDs.
- 095-410.1.6.8 Demonstrate that at least one OPCEN C2 SA LSD can be easily read from any location within the operational workspace within the OPCEN.
- 095-410.1.6.9 Demonstrate that MLSTC work stations comply with OPC System Specification.
- 095-410.1.6.10 Demonstrate the ability to fully utilize computers and systems interfaced to each MLSTC work station.

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- 095-410.1.6.11 Demonstrate that MLSTC watch stations comply with OPC System Specification.
- 095-410.1.6.12 Demonstrate the ability to fully utilize computers and systems interfaced to each MLSTC watch station.

**095-415 Computing Network System**

- 095-415.1 The Computing Network System Fiber Optic Cabling Topology test shall be in accordance with the OPC System Specification (NVR 4-1-13/5).
- 095-415.2 Prior to shipboard installation, the following shall be demonstrated:
  - 095-415.2.1 That classified data can be "type 1" encrypted and passed to the unclassified network.
  - 095-415.2.2 That unclassified data can be "type 3" encrypted and passed external to the ship.
  - 095-415.2.3 That the unclassified storage device is capable of storing required unclassified data.
  - 095-415.2.4 That the unclassified storage device provides the user the ability to archive selected data or the entire unclassified storage device.
  - 095-415.2.5 That the classified storage device is capable of storing the required classified data.
  - 095-415.2.6 That the classified storage device provides users the ability to archive user selected data or the entire unclassified storage device.
  - 095-415.2.7 That the software and firmware patching and updating can be performed from the CNS for unclassified LAN computers and systems capable of receiving these remote services.
  - 095-415.2.8 That software and firmware patching and updating can be performed from the CNS for classified LAN computers and systems capable of receiving these remote services.
- 095-415.3 Prior to Builder's Dock Trials, demonstrate the following:
  - 095-415.3.1 That there is no cross connects between unclassified and classified network drops.
  - 095-415.3.2 End to end connectivity between each drop and the network switch.
  - 095-415.3.3 That the printers are securely installed in their defined spaces.
  - 095-415.3.4 That users have the ability to utilize each printer.
  - 095-415.3.5 That classified data can be "type 1" encrypted and passed to the unclassified network.

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- 095-415.3.6 That unclassified data can be "type 3" encrypted and passed external to the ship.
- 095-415.3.7 That the unclassified storage device is capable of storing required unclassified data.
- 095-415.3.8 That the unclassified storage device provides the user the ability to archive selected data or the entire unclassified storage device.
- 095-415.3.9 That the classified storage device is capable of storing required classified data.
- 095-415.3.10 That the classified storage device provides users the ability to archive user selected data or the entire unclassified storage device.
- 095-415.3.11 That the software and firmware patching and updating can be performed from the CNS for unclassified LAN computers and systems capable of receiving these remote services.
- 095-415.3.12 That software and firmware patching and updating can be performed from the CNS for classified LAN computers and systems, capable of receiving these remote services.
- 095-415.4 During Sea Trials, demonstrate the following:
- 095-415.4.1 That classified data can be "type 1" encrypted and passed to the unclassified network.
- 095-415.4.2 That unclassified data can be "type 3" encrypted and passed external to the ship.
- 095-415.4.3 That the unclassified storage device is capable of storing required unclassified data.
- 095-415.4.4 That the unclassified storage device provides the user the ability to archive selected data or the entire unclassified storage device.
- 095-415.4.5 That the classified storage device is capable of storing required classified data.
- 095-415.4.6 That the classified storage device provides users the ability to archive user selected data or the entire unclassified storage device.
- 095-415.4.7 That the software and firmware patching and updating can be performed from the CNS for unclassified LAN computers and systems capable of receiving these remote services.
- 095-415.4.8 That software and firmware patching and updating can be performed from the CNS for classified LAN computers and systems capable of receiving these remote services.

**095-420 Navigation Systems**

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**095-421 Non-Electrical / Electronic Navigation Aids****095-422 Navigation Lights, Signal Lights, Searchlights and Lights for Night Flight Operations****095-428 Integrated Bridge Systems****095-431 Short Tie Communication System**

095-431.1 The Shore Tie Communication System Test shall be in accordance with the following:

- 095-431.1.1 Prior to Builder's Sea Trials demonstrate from both the Starboard and Port Short Tie Connections the following:
  - 095-431.1.1.1 The connection to a shore location from four VOIP Phones.
  - 095-431.1.1.2 The connection to a shore location from four CEUT's.
  - 095-431.1.1.3 Display on four TV's High Definition Television (HDTV) reception from the shore.
  - 095-431.1.1.4 Send data from the Computer Network System to a shore location.
  - 095-431.1.1.5 Receive data from a shore location to the Computer Network System.
  - 095-431.1.1.6 Receive a phone call from the shore at four VOIP phones.
  - 095-431.1.1.7 Receive a phone call from the shore at four CEUT's.

**095-432 Telephone Systems**

095-432.1 The Telephone system test shall be in accordance with the OPC System Specification (NVR 4-1-3 Table 1) and the following:

- 095-432.1.1 Prior to shipboard installation, demonstrate the following:
  - 095-432.1.1.1 The ability to assign a communication circuit, via the CEUT, to assignable speakers.
  - 095-432.1.1.2 Users have the ability to utilize each CEUT function.
- 095-432.1.2 Prior to Builder's Dock Trials, demonstrate the following:
  - 095-432.1.2.1 Secure Type I encrypted phone call from Secure Telephone Equipment (STE) to a shore location with the same capability.
  - 095-432.1.2.2 Receiving a secure Type I encrypted phone call from a shore location with a STE to a STE located on the ship.
  - 095-432.1.2.3 Receiving a facsimile from a shore location.
  - 095-432.1.2.4 Transmitting a facsimile from the ship to a shore location.

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- 095-432.1.2.5 The ability to assign a communication circuit, via the CEUT, to assignable speakers.
- 095-432.1.2.6 Users have the ability to utilize each CEUT function.
- 095-432.1.2.7 Users have the ability to utilize each wireless handheld transceiver function.
- 095-432.1.3 During Sea Trials, demonstrate the following:
  - 095-432.1.3.1 The ability to assign a communication circuit, via the CEUT, to assignable speakers.
  - 095-432.1.3.2 Users have the ability to utilize each CEUT function.
  - 095-432.1.3.3 Users have the ability to utilize each wireless handheld transceiver function.

**095-433 Amplified Voice Communication Systems**

- 095-433.1 Announcing System loudspeakers tests shall demonstrate that they meet OPC System Specification requirements including the following:
  - 095-433.1.1 Proper operation including interconnection;
  - 095-433.1.2 Sound level;
  - 095-433.1.3 Intelligibility.
- 095-433.2 Each Announcing system circuit test shall demonstrate that the circuit transmits over the loudspeakers in accordance with OPC System Specification requirements.
- 095-433.2.1 Each Announcing System circuit test shall demonstrate that it is accessible through the Integrated Voice Network.
- 095-433.3 Announcing Systems tests shall demonstrate that they meet the following requirements:
  - 095-433.3.1 General alarms can be transmitted from the Pilot House through the 1MC.
  - 095-433.3.2 Chemical, Collision, and General alarms can be transmitted from the port and starboard quarterdeck positions through the 1MC.
  - 095-433.3.3 Flight Crash alarms can be transmitted from the Pilot House and Helicopter Control Station through the 5MC.

**095-434 Surveillance, Entertainment and Training System**

- 095-434.1 During Sea Trials demonstrate continuous reception of the Department of Defense (DoD) Armed Forces Network Direct to Sailor worldwide television satellite service while the ship is executing it's maximum turn rate.

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**095-436 Electrical Alarm, Safety and Warning Systems.**

- 095-436.1 Tests of each installed alarm system shall demonstrate that it functions in accordance with OPC System Specification requirements.
- 095-436.2 Tests of aalarm systems shall demonstrate proper functioning by operationally inducing the faults or conditions they are designed to alarm.
- 095-436.2.1 If equipment would be damaged or personnel safety would be jeopardized, induced faults or conditions shall be simulated to demonstrate that the alarm systems meet OPC System Specification requirements.

**095-437 Indicating Order and Metering Systems**

- 095-437.1 Tests of Indicating, Order and Metering Systems shall demonstrate that they meet the requirements of the OPC System Specification requirements.
- 095-437.2 Inspections of systems that interface with Indicating, Order and Metering Systems shall demonstrate that the interface signals are provided to these systems in accordance with OPC System Specification requirements.

**095-439 Video Systems**

- 095-439.1 The Video System Operation Test shall be in accordance with the OPC System Specification (NVR 4-4-4/12) and the following:
- 095-439.1.1 Prior to Builder's Dock Trials, demonstrate the following:
- 095-439.1.1.1 The view of each fixed camera.
- 095-439.1.1.2 The view of each pan/tilt/zoom (PTZ) camera at the maximum physical limits of each camera and camera lens.
- 095-439.1.1.3 The combination of fixed and PTZ cameras offer unobstructed views while moored.
- 095-439.1.1.4 That every installed fixed and PTZ cameras may be viewed simultaneously on each video system unclassified display.
- 095-439.1.1.5 That the user may select any subset of the installed fixed and PTZ cameras to be displayed on every video system unclassified display. The test shall include selecting one camera, every camera, and randomly selected subsets of cameras.
- 095-439.1.2 During Sea Trials, demonstrate the following:
- 095-439.1.2.1 The view of each fixed camera.

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- 095-439.1.2.2 The view of each pan/tilt/zoom (PTZ) camera at the maximum physical limits of each camera and camera lens.
- 095-439.1.2.3 The combination of fixed and PTZ cameras offer unobstructed views while underway: conducting flight operations, boat operations, weapons firing, and simulated migrant detention operations.
- 095-439.1.2.4 That the combination of fixed and PTZ cameras offer unobstructed views while anchored.

**095-440 Exterior Communication Systems**

- 095-440.1 The Exterior Communications Test shall be in accordance with the following:
  - 095-440.1.1 Demonstrate the Communications Management System (CMS) Human Machine Interface (HMI) at the Test and Integration Facility.
  - 095-440.1.2 Prior to shipboard installation, demonstrate the following:
    - 095-440.1.2.1 Simultaneous over the air operation of the exterior communications channels.
    - 095-440.1.2.2 Military UHF SATCOM 25 KHz dedicated voice communications from a CEUT with a distant station on the five channels.
    - 095-440.1.2.3 Military UHF SATCOM 5 KHz dedicated voice communications from a CEUT with a distant station on the five channels.
    - 095-440.1.2.4 Military UHF SATCOM 25 KHz Demand Assigned Multiple Access (DAMA) voice communications from a CEUT with a distant station on the five channels.
    - 095-440.1.2.5 Military UHF SATCOM Integrated Waveform (IW) voice communications from a CEUT with a distant station on the five channels.
    - 095-440.1.2.6 Message Processing System interface to the five Military UHF SATCOM channels with a distant station.
      - 095-440.1.2.6.1 The test shall be conducted using Operator to Operator (OTO) messaging.
  - 095-440.1.3 Prior to Builder's Dock Trials, demonstrate the following:
    - 095-440.1.3.1 Simultaneous over the air operation of the exterior communications channels.
    - 095-440.1.3.2 Military UHF SATCOM 25 KHz dedicated voice communications from a CEUT with a distant station on the five channels.
    - 095-440.1.3.3 Military UHF SATCOM 5 KHz dedicated voice communications from a CEUT with a distant station on the five channels.
    - 095-440.1.3.4 Military UHF SATCOM 25 KHz Demand Assigned Multiple Access (DAMA) voice communications from a CEUT with a distant station on the five channels.

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- 095-440.1.3.5 Military UHF SATCOM Integrated Waveform (IW) voice communications from a CEUT with a distant station on the five channels.
- 095-440.1.3.6 Message Processing System interface to the five Military UHF SATCOM channels with a distant station.
- 095-440.1.3.6.1 The test shall be conducted using Operator to Operator (OTO) messaging.
- 095-440.1.4 During Sea Trials, demonstrate the following:
- 095-440.1.4.1 Simultaneous over the air operation of the exterior communications channels.
- 095-440.1.4.2 Military UHF SATCOM 25 KHz dedicated voice communications from a CEUT with a distant station on the five channels.
- 095-440.1.4.3 Military UHF SATCOM 5 KHz dedicated voice communications from a CEUT with a distant station on the five channels.
- 095-440.1.4.4 Military UHF SATCOM 25 KHz Demand Assigned Multiple Access (DAMA) voice communications from a CEUT with a distant station on the five channels.
- 095-440.1.4.5 Military UHF SATCOM Integrated Waveform (IW) voice communications from a CEUT with a distant station on the five channels.
- 095-440.1.4.6 HF Military Tactical four channel broadband voice communications with a distant station at a minimum of 200 nautical miles.
- 095-440.1.4.7 HF Military Tactical narrowband voice communications with a distant station at a minimum of 200 nautical miles.
- 095-440.1.4.8 Military UHF SATCOM antenna system 360 degree continuous coverage while the ship is in motion.
- 095-440.1.4.8.1 The test shall be conducted using continuous SATCOM communications.
- 095-440.1.4.9 Message Processing System interface to the five Military UHF SATCOM channels with a distant station.
- 095-440.1.4.9.1 The test shall be conducted using Operator to Operator (OTO) messaging.

**095-441 Message Processing System Fleet SIPRNET Messaging (FSM).****095-443 Visual and Audible Systems**

- 095-443.1 Testing of Ship's whistle and whistle controls shall demonstrate that operating modes and sequences function in accordance with OPC System Specification requirements.

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- 095-443.1.1 After the ship's whistle has been secured for four hours, testing shall demonstrate that the first blast of the ship's whistle is as sharp and as distinct and of equal intensity as subsequent blasts.
- 095-443.1.2 A sound level meter shall be used to test the ship's whistle to demonstrate that it meets the audibility requirements of the OPC System Specification.
- 095-443.2 Testing of the ship's bells and gong shall demonstrate that they operate alone and in conjunction with other signal devices.

**095-451 Surface Search Radars****095-452 Multi-Mode Radar (MMR)**

- 095-452.1 The Multi-Mode Radar Test shall be in accordance with the following:
- 095-452.1.1 Prior to Builder's Dock Trials, conduct the following:
- 095-452.1.1.1 Multi-Mode Radar Operational Verification Test.
- 095-452.1.1.2 Multi-Mode Radar Interface Verification Test.
- 095-452.1.2 During Sea Trials, conduct the following:
- 095-452.1.2.1 Multi-Mode Radar System Demonstration Test.

**095-455 Identification Systems**

- 095-455.1 The IFF Test shall be in accordance with the following:
- 095-455.1.1 Prior to Builder's Dock Trials, demonstrate the following:
- 095-455.1.1.1 IFF Transponder Operational Verification Test.
- 095-455.1.1.2 IFF Transponder Interface Verification Test.
- 095-455.1.1.3 IFF Interrogator Operational Verification Test.
- 095-455.1.1.4 IFF Interrogator Interface Verification Test.
- 095-455.1.2 During Sea Trials demonstrate the following:
- 095-455.1.2.1 IFF System Demonstration Test.

**095-457 Electro-optical / Infrared (EO/IR) Sensor System.**

- 095-457.1 The Electro-Optical and Infrared (EO/IR) Surveillance System Test shall in accordance with the following:
- 095-457.1.1 Prior to Builder's Dock Trials, conduct the following:

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- 095-457.1.1.1 EO/IR surveillance system Operational Verification Test.
- 095-457.1.1.2 EO/IR Interface Verification Test.
- 095-457.1.2 During Sea Trials, conduct the EO/IR System Test.

**095-472 Countermeasure and Decoy System**

- 095-472.1 The ECM system test shall be in accordance with the following:
  - 095-472.1.1 Prior to Builder's Dock Trials, conduct the following:
    - 095-472.1.1.1 Passive Electronic Support Measures System (ESM), Selective Emitter Database (SEI) and Electronic Warfare Trainer (EWT) Operational Verification Test.
    - 095-472.1.1.2 ESM, SEI and EWT Interface Verification Test.
    - 095-472.1.1.3 Radio Direction Finder (RDF) Operational Verification Test.
    - 095-472.1.1.4 RDF Interface Verification Test.
  - 095-472.1.2 During Sea Trials, conduct the following:
    - 095-472.1.2.1 ESM, SEI and EWT Test.
    - 095-472.1.2.2 RDF Test.

**095-485 Voice Recorder System**

- 095-485.1 The Voice Recorder System Test shall be in accordance with the following:
  - 095-485.1.1 Prior to shipboard installation, conduct the following:
    - 095-485.1.1.1 Voice Recorder System Operational Verification Test.
    - 095-485.1.1.2 Record external voice communications circuits simultaneously.
  - 095-485.1.2 Prior to Builder's Dock Trials, conduct the following:
    - 095-485.1.2.1 Voice Recorder System Operational Verification Test.
    - 095-485.1.2.2 Record every external voice communications circuits simultaneously.
  - 095-485.1.3 During Sea Trials, conduct the following:
    - 095-485.1.3.1 Voice Recorder System Operational Verification Test.
    - 095-485.1.3.2 Record every external voice communications circuits simultaneously.

**095-492 Tactical Air Navigation System (TACAN)**

- 095-492.1 The TACAN Test shall be in accordance with the following:
  - 095-492.1.1 Prior to Builder's Dock Trials, conduct the following:

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- 095-492.1.1.1 TACAN Operational Verification Test.
- 095-492.1.1.2 TACAN Interface Verification Test.
- 095-492.1.2 During Sea Trials, conduct the TACAN System Test.

**095-494 Meteorological Systems**

- 095-494.1 Prior to BDT, the Meteorological Systems Operational Test shall be in accordance with the following:
  - 095-494.1.1 Verify that the correct system configuration files for the Wind Processing unit and the High End Displays have been installed.
  - 095-494.1.2 Verify the following outputs of the system using calibrated instrumentation:
    - 095-494.1.2.1 Wind speed;
    - 095-494.1.2.2 Wind direction;
    - 095-494.1.2.3 Air Temperature;
    - 095-494.1.2.4 Humidity;
    - 095-494.1.2.5 Barometric pressure.
  - 095-494.1.3 During BDT and BST, the Meteorological Systems Intra-system Test shall demonstrate communication between the meteorological system and the navigation data distribution system for each input and output.

**095-502 Auxiliary Diesel Engines**

- 095-502.1 The Auxiliary Diesel Engine First Article Test and Inspection shall be in accordance with the OPC System Specification (NVR 2-2-1/7.6).
- 095-502.2 The Auxiliary Diesel Engine Production Unit Test and Inspection shall be in accordance with the OPC System Specification (NVR 2-2-1/7.6).

**095-512 Heating, Ventilation, and Air Conditioning**

- 095-512.1 The Heating, Ventilation, and Air Conditioning (HVAC) System Testing shall be in accordance with the OPC System Specification (NVR 5-3-3/10.1) and the following:
  - 095-512.1.1 Testing shall be completed prior to installing insulation on flanged joints and termination points.
  - 095-512.1.2 Grease interceptor hoods and associated systems shall be tested to verify they meet system requirements.

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**095-514 Air Conditioning Plants**

- 095-514.1 The Air Conditioning Unit Shipboard Operational Test shall be in accordance with the OPC System Specification (NVR 5-3-5/5.2).
- 095-514.2 The Air Conditioning Unit Shipboard Performance Test shall be in accordance with the OPC System Specification (NVR 5-3-5/5.3).

**095-529 Drainage and Ballast Systems**

- 095-529.1 Hydrostatic testing of the Ballast Water Management System (BWMS) shall be in accordance with OPC System Specification (NVR 5-1-1B/6.3) and the following:
- 095-529.1.1 Pressure and leak tests - After installation of the unit and associated piping, the system shall be hydrostatically tested with clean fresh water. Conditions such as leakage, excessive deflection, and permanent deformation shall constitute failure of these tests.
- 095-529.2 Operational testing of the BWMS shall be in accordance with OPC System Specification (NVR 5-1-1B/6.4) and the following:
- 095-529.2.1 Each unit shall be set-up and adjusted in accordance with the respective manufacturer's instructions.
- 095-529.2.2 Each unit shall be operated for at least 1 working hour during ballasting and 1 working hour during de-ballasting to demonstrate that mechanical and electrical parts and controls function accurately, efficiently, and safely. Non-conformance with any requirements of OPC System Specification (NVR 5-1-1B/6.4) shall constitute failure of the test.
- 095-529.3 Capacity testing of the BWMS shall be in accordance with the following:
- 095-529.3.1 After installation, at least two capacity tests shall be conducted. The first test shall be made prior to Builder's Trials and the second test shall be made during Builder's Sea Trials.
- 095-529.3.2 Failure of the unit to make rated capacity shall constitute failure of these tests.
- 095-529.3.3 Test duration shall be 2 hours with test segments of at least one hour each.
- 095-529.3.3.1 The first test segment shall process water from the ship's ballast system suction and discharge to the ballast tanks.
- 095-529.3.3.2 The second test segment shall process water taken from the ship's ballast tanks and discharge overboard.

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**095-531 Desalination Plants, Fresh and Potable Water Systems**

- 095-531.1 The Desalination Plant testing shall be in accordance with the OPC System Specification (NVR 5-2-6/5.1) and the following:
- 095-531.1.1 The salinity indicating system shall be tested to ensure that diversion valves and alarms are activated.
  - 095-531.1.2 Each desalination plant shall be capacity tested for 24 hours.
    - 095-531.1.2.1 Feedwater shall be supplied by the installed feed pump system.
    - 095-531.1.2.2 Test conditions shall ensure that the feedwater is natural sea water.
    - 095-531.1.2.3 Potable water quality shall meet the requirements of the OPC System Specification.
      - 095-531.1.2.3.1 Salinity content shall be verified by laboratory analysis.
      - 095-531.1.2.4 Failure of the unit to make the required capacity shall constitute failure of these tests.
  - 095-531.1.3 Parallel desalination unit operating tests - After the individual capacity tests are completed for each distilling unit, both units shall be operated simultaneously.
    - 095-531.1.3.1 Test conditions shall be the same as required for the individual capacity tests except that the test duration shall be 8 hours.
    - 095-531.1.3.2 It shall be demonstrated that the piping and equipment downstream of the plant are of sufficient size and capacity to handle continuous parallel operation of the desalination units.
    - 095-531.1.3.3 Conditions such as overflow of air gaps, and excessive pressure drop, shall constitute failure of this test.
    - 095-531.1.3.4 Failure of each unit to make rated capacity shall constitute failure of this test.

**095-551 Compressed Air Systems**

- 095-551.1 The Compressed Air System Testing shall be in accordance with the OPC System Specification (NVR 5-2-10/22) and the following:
- 095-551.1.1 After completion of the hydrostatic test, a leakage test shall be performed by charging the system with air (the ship's air compressor may be used for charging) to a pressure equal to the nominal operating pressure of the system.

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- 095-551.1.1.1 The compressed air shall be allowed to stand in the system to equalize the temperature. The pressure drop shall not exceed 5 percent, after correcting for temperature changes, for a 6-hour period.
- 095-551.1.2 After installation, the service air compressors shall undergo an air system functional test:
- 095-551.1.2.1 The system shall be tested to simultaneously provide the Mission Air, Ship Service Air, and Control Air demands for four hours.
- 095-551.1.2.2 The pressure and air delivery rates shall meet the demands of equipment served.
- 095-551.1.3 After installation, each start air compressor shall undergo a functional test:
- 095-551.1.3.1 Each starting air compressor shall be lined up to the air receivers at atmospheric pressure.
- 095-551.1.3.2 The pressure inside the receivers at the beginning of the test shall be atmospheric pressure.
- 095-551.1.3.3 The time required to charge the complete set of receiver(s), in the space with the largest total start air capacity, to engine starting pressure shall meet system requirements.

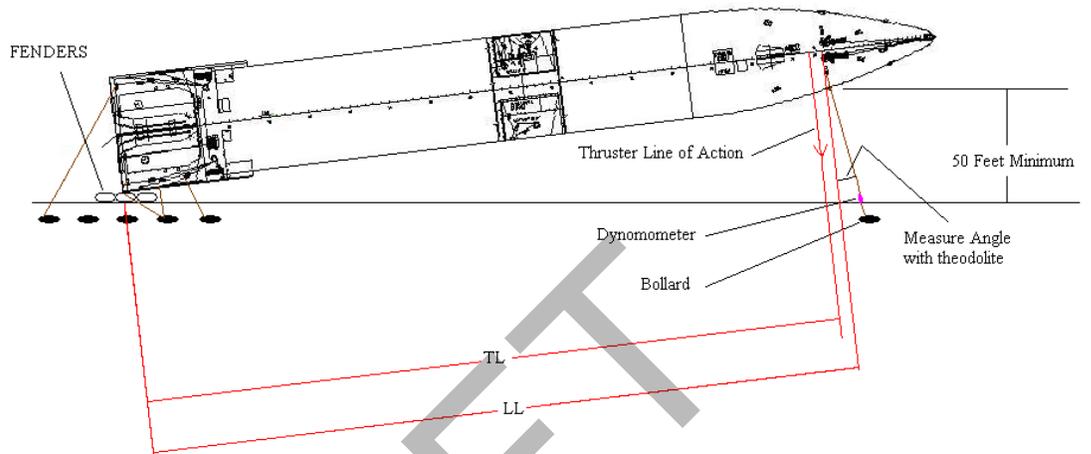
**095-568 Thruster Systems**

- 095-568.1 Tests shall demonstrate the capability to operate the thruster from each control panel on the ship.
- 095-568.2 During BDT, the Thruster Performance Test shall be in accordance with the following:
- 095-568.2.1 Demonstrate proper operation of the ship's thrusters in each thruster direction.
- 095-568.2.2 Power tests shall be performed to both the port and starboard sides to verify rated thrust loading of the thrusters.
- 095-568.2.2.1 With the ship along side of the dock, attach a line with a dynamometer along the respective thruster line of action as shown in the figures below.
- 095-568.2.2.2 Water depth shall be checked to ensure a minimum clearance below the ship of ten feet.
- 095-568.2.2.3 The ship shall be well away from the docks and seawalls which could cause a static head of sea water to build up on either side of the hull.
- 095-568.2.2.4 The line of action of the ship's thruster shall be adjusted to accurately measure the thrust along the instrumentation as shown in the figures below.

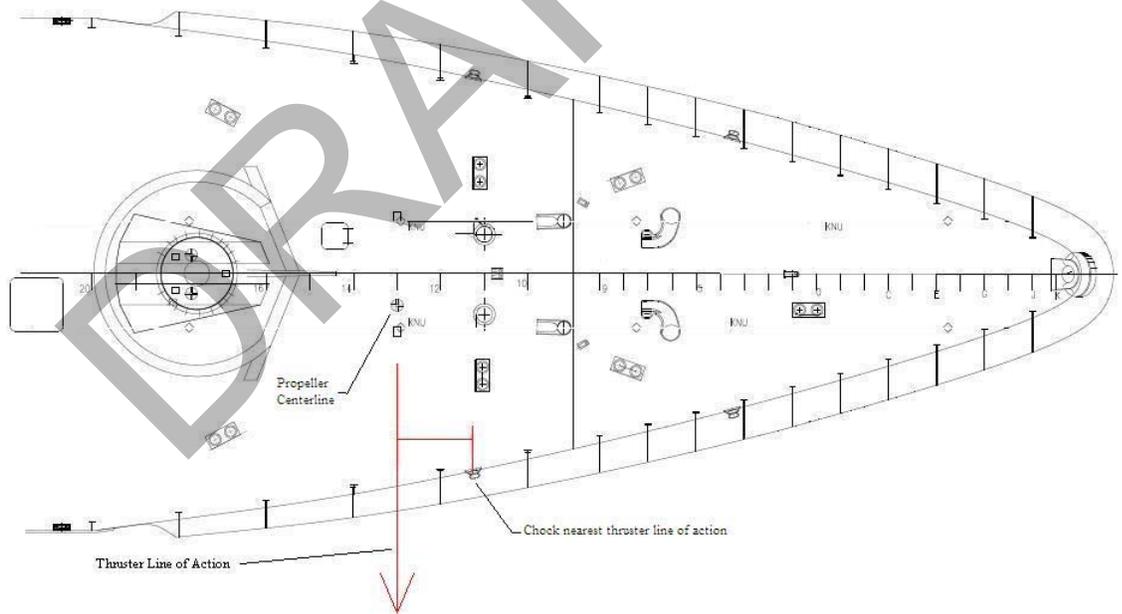
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095-568.2.2.5 The thruster shall produce the rated thrust for a duration of five minutes.

095-568.2.3 Demonstrate the capability to operate the thruster from each control panel on the ship.

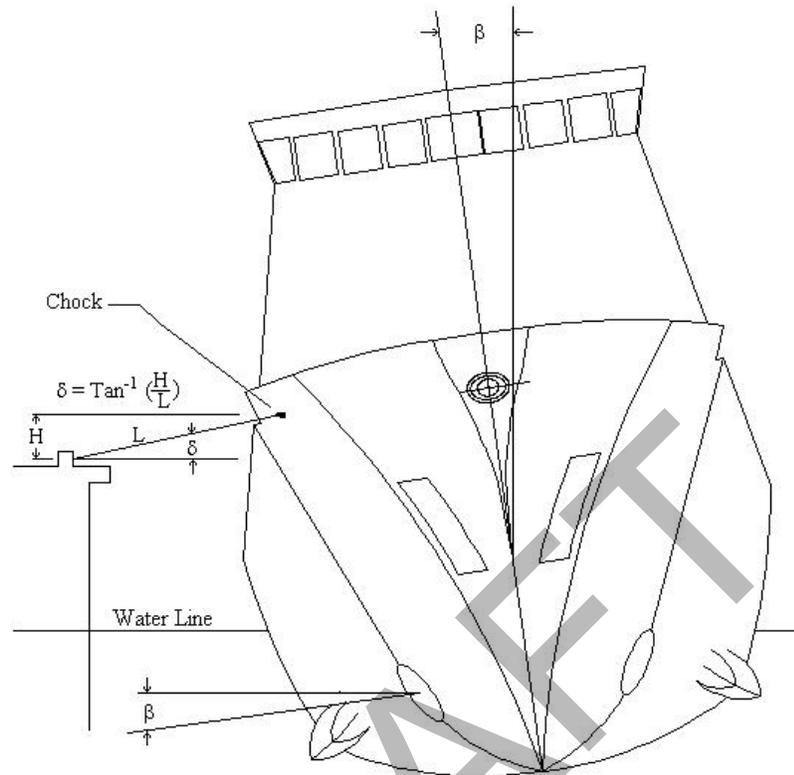


Thruster Dock Trial diagram



Thruster test configuration

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Thruster Dock Test Configuration

**095-572 Stores Handling Systems**

- 095-572.1 Stores Elevator systems tests shall be in accordance with the OPC System Specification (NVR 5-5-6/6) and ASME A17.1, part 7-codified as a material lift:
- 095-572.1.1 The elevator shall be inspected by an ASME QEI-1 certified (licensed) Quality Elevator Inspector (QEI).
  - 095-572.1.2 A Stores Elevator QEI Inspection Report shall identify those components and systems that do not conform to the specifications/standards.
  - 095-572.1.3 A plan to correct non-conforming components or systems shall be provided.
  - 095-572.1.4 The results shall be recorded in the Registry of Lifting Appliances.
- 095-572.2 The elevator tests shall be in accordance with the OPC System Specification (NVR 5-5-6/6) and the following:

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- 095-572.2.1 The elevator shall meet the dispatch requirements of the OPC System Specification.
- 095-572.2.2 A test weight of 4000 lbs shall be secured to a 48 inch by 48 inch pallet. The pallet shall be moved, using a pallet jack, from the flight deck to the lowest extent of the elevator, moved off the elevator to the entrance to the stowage location(s), moved back on to the elevator and returned to the flight deck.
- 095-572.2.3 Demonstrate that there are no physical interferences restricting movement of the pallet between the flight deck and the storerooms.
- 095-572.2.4 Elevator safety nets shall be closed and doors closed during car (platform) movements.
- 095-572.2.5 The load shall be secured to the elevator platform using two gripping chains or two web straps while in the elevator.
- 095-572.3 The stores handling tests to demonstrate ship capabilities shall be in accordance with the following:
- 095-572.3.1 The capability to transfer 12 pallets, each loaded with 5,000 pounds, from the pier, at the maximum outreach (not less than 20 feet beyond maximum ship beam), to the center of the flight deck.
- 095-572.3.2 The capability to transfer 5000 pound pallets between the flight deck and the temporary stowage areas in the hangar.
- 095-572.3.3 The capability to transfer stores along the paths indicated on Stores Path Diagram. Samples boxes, ranging from 2 feet cubed to 4 feet cubed, shall be utilized as appropriate during the demonstration.
- 095-572.3.4 Non-compliance with the requirements of, or variations from, the Stores Path Diagram shall be identified and provided in a Stores Handling Demonstration Report.
- 095-572.3.5 The times and personnel required for each of the above demonstrations shall be documented in the Stores Handling Demonstration Report.

**095-573 Cargo Handling Systems**

- 095-573.1 The stick boom tests shall be in accordance with the following:
- 095-573.1.1 The stick boom system(s) shall be static load tested to 200 percent of the Working Load Limit.
- 095-573.1.1.1 The load shall be externally applied and held for 10 minutes.
- 095-573.1.2 The hoist winch brake and rigging shall be static load tested to 150 percent of the Working Load Limit.
- 095-573.1.2.1 The load shall be applied and held for 10 minutes.

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- 095-573.1.3 The stick boom shall hoist the rated working load at rated speed and the speed shall be recorded.
- 095-573.1.4 A test load equivalent to 125 percent of Working Load Limit shall be lifted and slewed over the entire range of motion of the stick boom at not less than 1/4 rated speed.
- 095-573.1.5 A report of results of the test shall be provided and the results shall be recorded in the Registry of Lifting Appliances

**095-581 Anchor Stowage and Handling**

- 095-581.1 The dockside anchor handling tests shall be in accordance with the OPC System Specification (NVR 5-5-1/5.2).
- 095-581.2 The at-sea anchor handling tests shall be in accordance with the OPC System Specification (NVR 5-5-1/5.3).

**095-582 Mooring and Towage Systems**

- 095-582.1 The shipboard mooring systems tests and inspections shall be in accordance with the OPC System Specification (NVR 5-5-2/6) and following:
- 095-582.1.1 The mooring system shall be rigged for Mooring Service Type 1 conditions using 6 lines. The arrangement shall be consistent with the mooring diagram.
- 095-582.1.2 The mooring system shall be rigged for Mooring Service Type IIA conditions. The arrangement shall be consistent with the mooring diagram.
- 095-582.1.3 The mooring system shall be rigged for Mooring Service Type IIB conditions. The arrangement shall be consistent with the mooring diagram.
- 095-582.1.4 The mooring system shall be rigged for Mooring Service Type III conditions. The arrangement shall be consistent with the mooring diagram.
- 095-582.1.5 The mooring hawser powered reel stowage systems shall be demonstrated.
- 095-582.2 The shipboard towing systems tests and inspections shall be in accordance with the OPC System Specification (NVR 5-5-2/6) and the following:
- 095-582.2.1 The ship shall be rigged for being towed. The arrangement shall be consistent with the towing diagram.
- 095-582.2.2 The ship shall be rigged for conducting a USN fixed length tow against the towing eye. The arrangement shall be consistent with the towing diagram.

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- 095-582.2.3 The ship shall be rigged for conducting a Coast Guard adjustable length tow against the tow bitt. The arrangement shall be consistent with the towing diagram.
- 095-582.2.4 The towing hawser powered reel stowage system shall be demonstrated.

**095-583 Boats Stowage and Handling**

- 095-583.1 The liferafts systems tests shall be in accordance with the following:
- 095-583.1.1 It shall be verified that the liferafts provided at ship delivery have been certified in accordance with the OPC System Specification.
- 095-583.1.2 A liferaft release devices shall be tested during Builder's Dock Trials (BDT) by using a liferaft container of the same weight as one with a liferaft inside (an actual liferaft shall not be used) by the force generated by a 5th percentile female. The canister shall operate smoothly and shall fall clear of the hull.
- 095-583.1.3 The deployable boarding ladders tests shall be demonstrated by deploying the ladders so personnel can use them to debark the ship.
- 095-583.2 The rescue swimmer systems test shall be in accordance with the following:
- 095-583.2.1 Demonstrate that the davit or boom be deployed from stowage location by two persons in two minutes or less, without tools to either the port or starboard side of the ship.
- 095-583.2.2 Demonstrate that the electric winch can be removed from stowage location, transported, secured, and made fully operational by two persons in two minutes or less, without tools to either the port or starboard side of the ship.
- 095-583.2.3 Demonstrate that the complete swimmer recovery system can be deployed and fully functional in three minutes or less on either the port or starboard side of the ship.
- 095-583.2.4 Demonstrate that the davit or boom provides 24 inches of clearance on both the port and starboard side of the hull.
- 095-583.2.5 Demonstrate that the Working Load Limit (WLL) of the davit or boom has a capacity of at least 300 lbs. The boom shall be statically loaded to 200% of WLL in at least one installation position; the remaining positions shall be statically loaded or validated by Non Destructive Testing (NDT). The electric winch shall be operationally tested to 125% of WLL and the winch brake shall be static load tested to 150% of WLL.

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- 095-583.2.6 Demonstrate that the davit or boom provides vertical clearance for a 95th percentile male in a rescue sling when the davit/boom is swung inboard without two-blocking or striking bulwark or handrails on either the port or starboard side of the ship.
- 095-583.2.7 The swimmer recovery system shall be deployed to verify that sufficient operational room is provided to recover personnel from the water to onboard the ship on either the port or starboard side of the ship.
- 095-583.2.8 The swimmer recovery system shall be demonstrated during Builder's Dock Trials (BDT).
- 095-583.3 The boat handling systems test shall be in accordance with the OPC System Specification (NVR 5-5-4/6) and the following:
- 095-583.3.1 Demonstrate that each boat can be transferred between stowage and the at-the-rail transfer position, and returned at least 4 times. These tests shall be done in half-cycles, extending to do launch and retrievals below.
- 095-583.3.2 Demonstrate that the each boat can be launched from the transfer position and retrieved from the water at least two times with the ship dead in the water. The bow boom with painter shall be fully extended, and the davit shall fully extend.
- 095-583.3.3 Demonstrate that the each boat can be launched from the transfer position and retrieved from the water at least two times with the ship dead in the water. The bow boom with painter shall be partially extended, and the boat shall be launched and retrieved with the boat held close to the hull.
- 095-583.3.4 Demonstrate that the each boat can be launched from the transfer position and retrieved from the water at least three times with the ship underway making 4 to 6 knots. The bow boom with painter shall be fully extended, and the davit shall fully extend.
- 095-583.3.5 Demonstrate that the each boat can be launched from the transfer position and retrieved from the water at least three times with the ship underway making 4 to 6 knots. The bow boom with painter shall be partially extended, and the boat shall be launched and retrieved with the boat held close to the hull.

**095-588 Aircraft Stowage, Handling, Launching and Landing Facilities**

- 095-588.1 The flight and hangar deck tie-down fittings tests shall be in accordance with the test notes of drawing NAVSHIPS No. 803-1916300 and the following:

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- 095-588.1.1 Relief in accordance with test note T-6A (1) shall not be granted.
- 095-588.2 The helicopter high point bulkhead securing fittings tests shall be in accordance with the following:
- 095-588.2.1 The high point securing fitting shall be tested at 90 degrees to the hangar bulkhead for a period of one minute using the loads and load vectors specified on drawings, NAVAIRWARCENACDIVLKE Drawing 621220 for H-60B/J/R/T aircraft and NAVAIRWARCENACDIVLKE Drawing 627861 for use with MH-60S aircraft.
- 095-588.2.2 The high point securing fitting installation welds shall be tested with magnetic particle or liquid penetrate before and after application of the test loads.
- 095-588.3 The hangar overhead handling system tests shall be in accordance with the OPC System Specification (NVR 5-5-3/7) and the following:
- 095-588.3.1 All of the portable hoists shall be taken from their stowage locations, rigged and operated from the overhead padeyes, and returned to their stowage locations.
- 095-588.3.2 Each portable hoist, when rigged, shall be remotely operated without interfering with operation of the other rigged portable hoists.
- 095-588.3.3 Each portable hoist shall safely lift a 4000 pound load at speeds from 0 to 15 feet per minute through its full vertical range.
- 095-588.3.4 For each overhead padeyes with the hoist installed, the hoist hook shall have at least 15 feet of clearance above the hangar deck in the full up position.
- 095-588.3.5 Each padeye shall be static load tested to 200 percent of the working load (4000 pounds) for a period of ten minutes. There shall be no deformation or damage to the padeye or supporting structure. Visible deformation or cracking shall be cause for failure.
- 095-588.3.6 Multiple portable hoists shall be used to move a 2500 pound load as follows:
- 095-588.3.6.1 From a location at the near the port side bulkhead at forward end of the hangar to a location near the starboard side bulkhead at the aft end of the hangar.
- 095-588.3.6.2 From a location at the near the starboard side bulkhead at forward end of the hangar to a location near the port side bulkhead at the aft end of the hangar.
- 095-588.3.6.3 From any stowage locations within the hangar to the hangar deck.
- 095-588.4 The hangar door tests shall be in accordance with the following:

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- 095-588.4.1 Demonstrate complete opening and closing of the hangar door, in the powered mode, as required by the OPC System Specification, without binding.
- 095-588.4.2 The hangar door shall be manually opened and closed by a 5th percentile female in no specified time period.
- 095-588.4.3 The hangar door shall be secured (locked) in the full open position and shall not be able to be closed until manually released.
- 095-588.4.4 Demonstrate the hangar door is light tight in the fully closed position.
- 095-588.4.5 The hangar door leak test shall be in accordance with the OPC System Specification. It shall be dogged (secured) in the closed position and when closed and dogged, the door shall be sealed such that burning liquids on the flight deck or other liquids spilled on the flight deck cannot enter the hangar area.
- 095-588.4.6 Demonstrate that when the hangar door is undogged and swing bolts disengaged, the swing bolts are flush with the deck.
- 095-588.4.7 Demonstrate that drain trough can be accessed for cleaning.
- 095-588.4.8 Verify that the hangar door opening meets the clearance requirements for the specified aircraft.
- 095-588.5 The deck drains, troughs, and seals in the landing area dump test shall be in accordance with NAVSEA Design Practices and Criteria Manual for Helicopter Deck Containment and Drainage," S9070-AC-DDT-010.
- 095-588.6 The Visual Landing Aid (VLA) Lighting Systems (i.e., Stabilized Glide Slope Indicator System, Visual Landing Aids Lighting System, and Flight Deck Status and Signaling, HFIR Lights, obstruction lighting, Flight Deck Flood Lights, and Wave-Off Light System) tests shall be conducted as follows:
- 095-588.6.1 A Visual Landing Aids (VLA) Light Intensity and Operational Test shall be conducted in accordance with the ship class lighting plan.
- 095-588.6.2 Stabilized Glide Slope Indicator (SGSI) tests shall be conducted in accordance with the installation requirements.
- 095-588.7 The Helicopter Refueling System test shall be in accordance with OPC System Specification (NVR 5-2-8/8.3) and the following:
- 095-588.7.1 The Helicopter In-Flight Refueling (HIFR) system (i.e., hoses, fittings, couplings, etc.) shall be rigged from the JP-5 Hose Room to the indicated HIFR spot on the flight deck and ready for passing to a helicopter flying alongside the ship.
- 095-588.8 The Flight Deck and Hangar Firefighting Systems tests shall be in accordance with OPC System Specification (NVR 5-4-3/9).

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- 095-588.9 The Aircraft Freshwater Washdown System tests shall demonstrate that discharge rate and pressures are in accordance with OPC System Specification (NVR 5-2-6/3.3.8).
- 095-588.10 The Aircraft Engine water tests shall demonstrate that minimum water quality requirements are in accordance with OPC System Specification.
- 095-588.11 The Talon Grid test shall be in accordance with the following procedures:
- 095-588.11.1 A straight edge shall be laid across the grid from edge to edge and the clearance at the grid center shall be measured and recorded.
- 095-588.11.2 A direct upward pull from the approximate center isthums of the grid of 13,700 pounds shall be applied for 2 minutes. After releasing the test load, the grid and resin foundation shall visually examined for evidence of structural failure. The procedure described in 095-588.11.1 shall be repeated. The grid shall be inspected for surface cracks by the dye penetrant method at the radius of 12 inches for the attachment point of the pull. Six hold down bolts shall be randomly removed and inspected by dye penetrant inspection for failure and replace or renew as necessary, The resin foundation shall be visibly inspected.
- 095-588.11.3 There shall be no deformation or damage to the grid or supporting structure. Visible deformation or cracking shall be cause for failure.
- 095-588.12 The MORIAH Wind System test shall be in accordance with the test procedures in NAVAIR Report No. NAWCADLKE-CRD-48J300-0017.
- 095-588.13 Flight deck safety nets and frames shall tests shall be in accordance with OPC System Specification (NVR 6-2-3/4.2) and the requirements of ASC6120034.
- 095-588.14 Stowage systems for the aviation stores shall demonstrate that there are 450 square feet of stowage area and sufficient stowage aids to secure the stores.

**095-589 Cranes and Hoists**

- 095-589.1 The stores crane tests shall be in accordance with the OPC System Specification (NVR 5-5-3/6.3) and the following:
- 095-589.1.1 A test load equivalent to 125 percent of Working Load Limit shall be lifted, luffed, and slewed over the entire range of motion of the crane (to the extent permitted by test load obstructions) at not less than 1/4 rated speed.

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- 095-589.1.2 The rated speeds of lift, Luff, and slew functions shall be confirmed with a load equivalent to the Working Load Limit.
- 095-589.1.3 Crane winch static brake tests shall be conducted at 150 percent of the Working Load Limit.
- 095-589.1.3.1 The load shall be externally applied, held for 10 minutes, and then released by the brake under load in a controlled manner, brakes set and load stopped, and load removed.
- 095-589.1.3.2 Luff and slew positions shall be maintained by the crane during this test.
- 095-589.1.4 A static test of the installed crane structure at maximum outreach shall be conducted at not less than 200% of Working Load Limit.
- 095-589.1.4.1 The test load shall be applied and removed by external crane; the load need not be applied to the wire rope or winch brake.
- 095-589.1.4.2 The crane, foundation, and surrounding deck structure shall not deform or crack.
- 095-589.1.5 The remote release feature of each crane winch shall be demonstrated under the Working Load Limit.
- 095-589.1.6 Each crane shall be stowed to demonstrate that it stows at least 2 inches below the obstruction clearance requirements established by the NAVAIR Air Capable Ship Aviation Facilities Bulletin No. 1.
- 095-589.1.7 If the cranes are also used as davits, the specific davit tests shall be supplementary to the above tests.
- 095-589.1.8 A report with the results of the tests shall be provided and the results recorded in the Registry of Lifting Appliances.
- 095-589.2 The Trolley Hoist and Rail System (if provided) test shall be in accordance with the following:
- 095-589.2.1 Monorails and monorail foundation brackets shall be tested to 200% of the working load limit or rated load of the system by application of static loads against the rail at each foundation bracket, and at the center of the longest span. The load shall be held for 10 minutes, and welds inspected.
- 095-589.2.2 A trolley hoist unit shall be installed on each trolley rail system and operated over the entire range of the system. Each trolley hoist unit shall be installed on a trolley rail system tested at least once. While installed, each trolley hoist and its lifting brake shall be load tested to 150% of its Working Load Limit.
- 095-589.2.3 Each interlock shall be operated to show that they function as specified.
- 095-589.2.4 Portable track sections shall be installed.
- 095-589.2.5 Switches and turntables shall be demonstrated.

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- 095-589.2.6 Where a trolley hoist unit is shared between several trolley rail systems, the transfer of the hoist shall be demonstrated.
- 095-589.2.7 The trolley rail systems shall be used in the demonstration of equipment access routes, as applicable.
- 095-589.2.8 A report with the results of the tests shall be provided and the test results recorded in the Registry of Lifting Appliances.
- 095-589.3 The trolley hoist boom systems test shall be in accordance with the following:
- 095-589.3.1 Demonstrate that each system (both port and starboard) can deploy and retrieve its accommodation ladders and other equipment as designed for handling by the trolley hoist boom systems.
- 095-589.3.2 Demonstrate that each system can handle the load of the accommodation ladders and other equipment throughout their operating ranges.
- 095-589.3.3 Demonstrate that the powered trolley can travel the full length of the beam.
- 095-589.3.4 Demonstrate that each trolley hook when stowed meets ergonomic requirements
- 095-589.3.5 Demonstrate that each system slews in accordance with the OPC System Specification.
- 095-589.3.6 Demonstrate that each system can be stowed.
- 095-589.3.7 The test results shall also be recorded in the Registry of Lifting Appliances.
- 095-589.4 Lifting Eye Foundations.
- 095-589.4.1 Testing of lifting eyes shall be by applying a static load of 200% of Working Load Limit for 10 minutes and then inspecting the welds.

**095-593 Environmental Pollution Control Systems**

- 095-593.1 The Sewage System Tests shall be in accordance with the following:
- 095-593.1.1 Pressure and leak tests - The sewage system shall be hydrostatically tested in accordance with OPC System Specification (NVR 5-1-1B/6.3) and the following:
- 095-593.1.1.1 The sewage holding tank shall be hydrostatically tested to a pressure equivalent to 2 feet above the full load waterline of the ship or to the highest point of the tank vent piping, whichever is greater. The vacuum flush system piping shall be tested to 50 psi with the water closets and interface devices blanked off.

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- 095-593.1.2 Conditions such as leakage, excessive deflection, and permanent deformation shall constitute failure of these tests.
- 095-593.2 Sewage System operational tests shall be in accordance with OPC System Specification (NVR 5-1-1B/6.4) and the following:
- 095-593.2.1 The sewage holding tank pump discharge shall be tested for compliance with the requirements for deck discharge connection pressure. This test shall be accomplished by the use of pressure gauges at the sewage pump discharge immediately downstream of the pump and at the shore connection valve with the shore connection valve closed (shut-off head).
- 095-593.2.2 Specified operation of level controls and alarms shall be demonstrated.
- 095-593.2.3 Maintenance of system vacuum shall be tested by flushing selected vacuum toilets, at a rate of 166 flushes per hour, for at least 15 minutes. The drop in vacuum in the black water main shall be recorded.
- 095-593.2.4 Failure of any level controls and alarms or failure of the unit to accommodate the design rate capacity in accordance with OPC System Specification (NVR 5-7-7) shall constitute failure of these tests.
- 095-593.3 Hydrostatic testing of the oil pollution control system including the oily water separator shall be in accordance with OPC System Specification (NVR 5-1-1B/6.3) and the following:
- 095-593.3.1 Pressure and leak tests - After installation of the unit and associated piping, the system shall be hydrostatically tested with clean fresh water. Conditions such as leakage, excessive deflection, and permanent deformation shall constitute failure of these tests.
- 095-593.4 Operational tests of the oil pollution control system including the oily water separator shall be in accordance with NAVSEA Design Supplement Section 1202 Liquid Waste Management- Bilge Water and Oily Wastewater, OPC System Specification (NVR 5-1-1B/6.4), and the following:
- 095-593.4.1 Each unit with pumps, controls, and alarms shall be set-up and adjusted in accordance with the respective manufacturer's instructions.
- 095-593.4.2 Each unit shall be operated for at least 8 consecutive working hours to demonstrate that mechanical and electrical parts and controls function accurately, efficiently, and safely. Non-conformance with any requirements of OPC System Specification shall constitute failure of the test.
- 095-593.5 Capacity tests of the oil pollution control system including the oily water separator shall be as follows:

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- 095-593.5.1 After installation, at least two capacity tests shall be made. The first test shall be made prior to, and the second, during, Builder's Sea Trials.
- 095-593.5.2 Failure of the unit to make rated capacity shall constitute failure of these tests.
- 095-593.5.3 Test conditions shall be as follows:
- 095-593.5.3.1 Test duration shall be 2 hours with test segments of at least one hour each.
- 095-593.5.3.2 Test fluid shall be greater than 5,000 ppm of fuel and greater than 5,000 ppm of lube oil in fresh water.
- 095-593.5.4 The capacity shall be based on the total volume of influent (oily water) processed by the unit. Any water, such as from an auxiliary supply, for discharging accumulated oil shall not be included to achieve the rated capacity of the unit.
- 095-593.5.5 The water discharge (effluent) from the unit shall not exceed 15 ppm of oil/fuel mixture.
- 095-593.6 The hydrostatic testing of Incinerator system shall be in accordance with OPC System Specification (NVR 5-1-1B/6.3) and the following:
- 095-593.6.1 Pressure and leak tests - After installation of the unit and associated piping, the system shall be hydrostatically tested with clean fresh water. Conditions such as leakage, excessive deflection, and permanent deformation shall constitute failure of these tests.
- 095-593.7 Operational testing of the Incinerator system shall be in accordance with OPC System Specification NVR (5-1-1B/6.4) and the following:
- 095-593.7.1 Each unit with pumps, controls, and alarms shall be set-up and adjusted in accordance with the respective manufacturer's instructions.
- 095-593.7.2 Each unit shall be operated for at least 8 consecutive working hours to demonstrate that mechanical and electrical parts and controls function accurately, efficiently, and safely.
- 095-593.7.3 Non-conformance with any requirements of OPC System Specification shall constitute failure of the test.

**095-603 Draft Marks**

- 095-603.1 Prior to launching of the ship, the Draft Marks Verification Test shall be in accordance with the following:
- 095-603.1.1 Measurements shall be made with a transit or instrument of equivalent accuracy to demonstrate that the error in the

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location of the draft marks is no greater than that required in the OPC System Specification.

**095-622 Ladders, Handrails, Floor Plates, Staging, Gratings, and Service Platforms**

- 095-622.1 The accommodation ladder tests shall be in accordance with the following:
- 095-622.1.1 Accommodation ladders, both port and starboard, shall be rigged in the accommodation ladder (Boat Landing Platform) configuration at the maximum angle as specified in the OPC System Specification.
  - 095-622.1.2 The accommodation ladders, both port and starboard, shall be rigged in the brow configuration.
    - 095-622.1.2.1 Each accommodation ladder shall be demonstrated that it can be positioned on a pier or other surface through its full operating range.
  - 095-622.1.3 Each accommodation ladder, in both configurations, shall be unrigged and stowed.
- 095-622.2 The portable brow tests shall be in accordance with the following:
- 095-622.2.1 The portable brow shall be rigged at designated locations.
  - 095-622.2.2 The number of personnel utilized and the time to rig the brow at each location shall be reported.

**095-651 Food Service**

- 095-651.1 The commissary spaces equipment test shall be in accordance with the following:
- 095-651.1.1 All commissary equipment shall be operated through two complete sequences of each mode of operation to determine that the equipment performs in accordance with its associated technical manual.
  - 095-651.1.2 All safety devices and interlocks shall be tested.
  - 095-651.1.3 Electrically heated equipment shall be operated for 10 minutes at each control setting or through five sequences of the thermostatic control with the control reset between sequences to cover the full range of the thermostat.

**095-665 Workshops, Laboratories and Tool Issue Rooms**

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- 095-665.1 The Industrial plant equipment (IPE) Test shall be in accordance with the following:
- 095-665.1.1 Industrial plant equipment (IPE) shall be tested and inspected to ensure that it has been properly installed on the ship and performs in accordance with its associated technical manual.
    - 095-665.1.1.1 Insulation resistance and electrical checks shall be performed in accordance with ANSI/National Fire Protection Association (NFPA) requirements on electrical IPE, accessories, tools and tool equipment and associated power cables.
    - 095-665.1.1.2 Before and after sea trials, motor-driven IPE shall be tested for alignment and operation.
      - 095-665.1.1.2.1 The alignment tests shall be adequate to document the adverse effects encountered by the equipment or its foundations due to vibration.
    - 095-665.1.1.3 Personnel and machine safety shields, devices, systems and controls required for the safe operation of the equipment shall be tested during sea trials.
  - 095-665.2 The Hoists and Handling Gear Test shall be in accordance with the following:
    - 095-665.2.1 Shop hoists and handling gear shall show satisfactory service by operating equipment and simulating lifts by handling loads and testing the effectiveness of brake or locking mechanisms.
  - 095-665.3 The Machine Tools Test shall be in accordance with the following:
    - 095-665.3.1 Testing of machine tools shall include an operational test and an alignment test, and shall be conducted during and after Builder's Sea Trials.

**095-702 Armament Installations**

- 095-702.1 The Consolidated Operability Tests (COT) shall include both medium caliber weapons and small arms munitions and weapons and demonstrate the following:
- 095-702.1.1 The capability to transfer munitions along the paths indicated on weapons handling flow path diagram. Sample loads that simulate the weight and size of the 57 mm rounds and the small arms containers shall be utilized as appropriate during the demonstration.
  - 095-702.1.2 With additional support, that munitions can be safety loaded, handled, stowed, and unloaded in accordance with Weapons System Safety Plan and OP-4 requirements.

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**096 Mass Properties**

- 096.1 Estimated weights and centers of gravity. The Contractor shall manage and report the OPC overall estimated weights and estimated centers of gravity (W&CG).
- 096.2 Weight Control Program Plan. The Contractor shall update and implement the Weight Control Program Plan. [096-03-1351]
- 096.3 Weight estimates. The Contractor shall develop and provide the following weight estimates and reports that include Longitudinal Weight Distribution, Government Furnished Material (GFM) Weight Summary, Contract Modification Summary:
- 096.3.1 Allocated Baseline Weight Estimate (ABWE). [096-03-1347]
- 096.3.2 Quarterly Weight Reports. [096-03-1357]
- 096.3.3 Provide a Weight Moment of Inertia Report. [096-03-1353]
- 096.3.4 Final Weight Report. [096-03-1356]
- 096.3.5 Accepted Ship Report. [096-03-1354]

**097 Inclining Experiment**

- 097.1 Stability Check Procedures. The Contractor shall provide Stability Check Procedures. [097-03-1358]
- 097.2 Inclining Experiment Procedures. The Contractor shall provide Inclining Experiment Procedures. [097-03-1360]
- 097.2.1 The inclining experiment shall include measurements to determine the "as-inclined" natural roll period. This shall be determined by sallying the ship.
- 097.2.2 The Inclining Experiment shall be conducted in accordance with ASTM F1321 except that trim shall not be by the bow nor more than 1/150 of the LBP by the stern, and the number of pressed tanks shall be kept to a minimum.
- 097.3 Stability Check Test Data and Report. The Contractor shall provide a Stability Check Test Data and Report. [097-03-1359]
- 097.4 Inclining Experiment Report. The Contractor shall provide an Inclining Experiment Report. [097-03-1361]

**098 Mockups, Modeling, and Simulation**

- 098.1 Modeling and Simulation Plan. The Contractor shall update the Modeling and Simulation Plan. [098-03-2103]
- 098.2 USCG resources. The Contractor shall request USCG resources to support testing using models and mockups. [042-03-2339]

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- 098.3 Models, Mockups and Simulation Reports. The Contractor shall provide Models, Mockups and Simulation Reports. [098-03-2102]
- 098.4 Mockups.
- 098.4.1 Pilothouse. The Contractor shall use the pilothouse physical mockup that includes the Bridge Wings, to demonstrate egress by the crew, range of visibility from seated and standing positions, and to evaluate the arrangement and accessibility for operation and maintenance of equipment mounted or stowed in the pilothouse.
- 098.4.1.1 Windows, seats, consoles, indicators and displays, controls, and equipment matching the configuration of the ship shall be provided.
- 098.4.1.2 The mockup shall be maintained until 365 days after the keel laying and then disposed of unless otherwise directed by the KO.
- 098.4.2 Operations Center. The Contractor shall use the physical Operations Center mockup to demonstrate egress by the crew, range of visibility from seated and standing positions, and to evaluate the arrangement and accessibility for operation and maintenance of equipment mounted or stowed in the Operations Center.
- 098.4.2.1 Seats, consoles, indicators and displays, controls, and equipment matching the configuration of the ship shall be provided.
- 098.4.2.2 The mockup shall be maintained until 365 days after the keel laying and then disposed of unless otherwise directed by the KO.
- 098.5 Models and Simulations.
- 098.5.1 The Contractor shall develop a 3-D kinematic model of the anchoring system and surrounding structure including a simulation of the anchoring system operation. [581-03-1879]
- 098.5.1.1 The 3D simulation of the anchoring handling evolution shall have sufficient detail to show that the anchors and their handling stowage system will work smoothly and that there are no interferences or binding when raising or lowering the anchors.
- 098.5.1.2 Fabrication of the anchor windlass or bolsters shall not occur prior to USCG concurrence with the simulation results.
- 098.5.1.3 The model shall demonstrate that:
- 098.5.1.3.1 The anchoring system meets the requirements of the OPC System Specification.
- 098.5.1.3.2 The anchors self-orient correctly when being drawn up.
- 098.5.1.3.3 The anchors shall fall and be retrieved clear of the hull and appendages.
- 098.5.1.3.4 The anchors shall seat properly in the anchor pockets or against the bolsters when fully housed.
- 098.5.1.3.5 The anchor shackles and swivels pass through the hawse pipes, and anchor shanks will seat properly in the hawse pipes.

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- 098.5.1.3.6 Sufficient anchor chain links are provided in the anchor swivel (partial) shots to secure the anchors in the pockets, and disconnect the chains above the anchor swivels.
- 098.5.1.3.7 The chains, anchor windlasses, pipes, and chain lockers will function properly.

**100 Hull Structure**

- 100.1 Design and analyze. The Contractor shall update the design and analyze the hull and superstructure, mast, major foundations and appendages to satisfy the requirements of the OPC System Specification.
- 100.2 Construction drawings. The Contractor shall provide production ready detail design construction drawings. [100-03-1392]
- 100.3 Design Load Criteria Summary. The Contractor shall provide updates of the Design Load Criteria Summary. [100-03-1348].
- 100.4 Updates. The Contractor shall update the following:
- 100.4.1 Strength Studies, Calculations and Analyses. [100-01-1380]
  - 100.4.2 Longitudinal Strength Report and Drawing. [100-03-1389]
  - 100.4.3 Structural Opening Reinforcement Report. [100-03-1377]
  - 100.4.4 Hull Girder and Fatigue Analysis Report. [100-03-1379]
  - 100.4.5 Structural Design Report. [100-03-1387]
  - 100.4.6 Structural Foundations Report. [180-03-1401]
  - 100.4.7 Shaft Strut Design and Analysis. [161-03-1397]
  - 100.4.8 Mast Structural Analysis. [170-03-2104]
  - 100.4.9 Finite Element Analysis Report and Model. [100-03-1386]
- 100.5 System Level Structural Drawings. The Contractor shall update System Level Structural Drawings for design development. These shall depict the structural design that is demonstrated by the calculations to meet the design requirements and shall be approved by ABS.
- 100.5.1 Mid-Ship Section Drawing. [100-03-1376]
  - 100.5.2 Standard Structural Details. [100-03-1395]
  - 100.5.3 Scantling Drawings. [100-03-1382]
  - 100.5.4 Foundations Drawing. [180-03-2076]
- 100.6 Docking Plan and Drawing. The Contractor shall develop and provide an OPC Docking Plan including an OPC Class Guidance Docking Plan and an Individual Standardized Docking Drawing for each OPC to suit the individual offsets, appendages, openings, and other details of the particular ship and shall provide the information to safely dock and undock the OPC. The Contractor shall perform calculations for the development of the OPC Docking Plan and Drawing in accordance with NSTM S9086-7G-STM-010/CH-997R3. The Contractor shall include the

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Docking Plan and Drawing in the Drawing Number Assignment Report. [100-03-1396].

- 100.7 Weapon Foundation Design Calculations. The Contractor shall provide Weapon Foundation Design Calculations. [184-03-1407]
- 100.8 Weapon Foundation Design and Structural Arrangement Drawings. The Contractor shall provide Weapon Foundation Design and Structural Arrangement Drawings. [184-03-1406]
- 100.9 Ship Master Reference Plane Drawings. The Contractor shall provide Ship Master Reference Plane Drawings for the reference planes listed in the Combat System Alignment plan. [184-03-2295]
- 100.10 Schedule of Door, Manholes, and Hatches. The Contractor shall provide a Schedule of Door, Manholes, and Hatches. [167-03-1980]
- 100.11 Compartment Testing Diagram. The Contractor shall provide a Compartment Testing Diagram. [192-03-1973]
- 100.12 Schedule of Watertight Tests and Inspections. The Contractor shall provide a Schedule of Watertight Tests and Inspections. [192-03-2297]

**184 Combat System Alignment**

- 184.1 Combat System Alignment Plan. The Contractor shall update the Combat System Alignment Plan. [184-03-2330]
- 184.2 Ship Master Reference Planes. The Contractor shall provide compiled drawing of the each of the defined Ship Master Reference Planes listed in the Combat System Alignment plan. (184-03-2295)

**200 Propulsion System**

- 200.1 Endurance Fuel Requirements. The Contractor shall update the Calculation of Surface Ship Endurance Fuel Requirements. [200-03-1412]
- 200.2 Propulsion Redundancy. The Contractor shall update the Propulsion Redundancy Computations and Analysis Report. [200-03-1408]
- 200.3 Dynamic Analysis Report. The Contractor shall update the Propulsion System Dynamic Analysis Report. [200-03-1433]
  - 200.3.1 The Contractor shall verify the control system has no instability issues or operational bands where vital propulsion services are inadequate to maintain continued control and operation.
  - 200.3.2 The Contractor shall validate the dynamic analysis open water steady state and open water transient event output data by measuring and recording ship and propulsion plant response during Builder's Sea Trials, and then comparing the measured responses to the responses predicted by the dynamic analysis.

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- 200.3.3 The Contractor shall use the ship's permanently-installed instrumentation and Contractor-furnished temporary instrumentation together with Contractor-furnished strip chart recorders to measure and record parameters.
- 200.3.4 The Contractor shall adjust the mathematical models and re-run the open water dynamic analyses until the computer program results agree with the sea trial measurements to within plus or minus five percent.

**202 Machinery Control System**

- 202.1 Software Configuration Management Plan. The Contractor shall provide the Machinery Controls Software Configuration Management Plan. [202-03-1561]
- 202.2 Interface Requirements Specification. The Contractor shall update the Interface Requirements Specification (IRS). [202-03-1420]
- 202.3 Development Integrated Master Plan. The Contractor shall update and implement the Machinery Controls Development Integrated Master Plan (IMP). [202-03-2048]
- 202.4 Interface Design Description. The Contractor shall update the Interface Design Description (IDD) and Diagram. [202-03-2061]
- 202.5 Development Environment Report. The Contractor shall update the Machinery Control Development Environment Report. [202-03-2218]
- 202.6 Functional and Schematic Block Diagrams. The Contractor shall update the Functional Block Diagrams (FBDs) and Schematic Block Diagrams (SBDs) for Machinery Control systems. [202-03-2054]
- 202.7 Signal List. The Contractor shall update the Signal List for MPCMS, PCS, EPCS, and stand alone local controlled machinery [202-03-1421]
- 202.8 Graphic User Interface Style Guide. The Contractor shall update the Machinery Controls Graphic User Interface (GUI) Style Guide. [202-03-2050]
- 202.9 Integration Design Report. The Contractor shall update the Machinery Control System Integration Design Report. [202-03-1427]
- 202.10 Data and Calculations. The Contractor shall provide Data and Calculations to document MPCMS, PCS, and EPCS functionality for ship responses, maneuvering, simulations, system response times, scan times, safety, security, failure detection and system reconfiguration, system startup/shutdown times, system load analysis, and network transmission times. [202-03-2049]
- 202.11 Documentation. The Contractor shall provide the following documentation: [202-03-2057]

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- 202.11.1 The Contractor shall provide a list of Computer Software Configuration Items (CSCIs) for MPCMS, PCS, EPCS and any stand alone control systems
- 202.11.2 The Contractor shall provide Software Version Descriptions (SVD) describing plans for ensuring operability between each control system (MPCMS, PCS, EPCS and any stand alone control system) when there is a version change in one or more of the respective control systems.
- 202.11.3 The Contractor shall provide Software Programmer's Guides for MPCMS, PCS, EPCS, and any stand alone control system. [202-03-2056]
- 202.11.4 The Contractor shall provide Systems Operational Manuals for MPCMS, PCS, EPCS, and any stand alone control systems. [202-03-2217]
- 202.11.5 The Contractor shall provide Software Users Manuals for MPCMS, PCS, EPCS, and any stand alone control systems that address each Computer Software Configuration Item (CSCI). [202-03-2058]
- 202.11.6 The Contractor shall provide Firmware Support Manuals for MPCMS, PCS, EPCS, and any stand alone control system that address each Computer Software Configuration Item (CSCI). [202-03-2060]
- 202.11.7 The Contractor shall provide detailed Installation, Wiring and Fabrication Drawings for MPCMS, PCS, and EPCS equipment and subsystem interfaces. [202-03-2063]
- 202.11.8 The Contractor shall provide source code for Computer Software Configuration Items (CSCI) for MPCMS, PCS, and EPCS in a format that can be compiled. [202-03-1576]
- 202.11.8.1 Licenses and tools for modifying, recreating and compiling the source code and any applicable files used to operate the software shall be provided to the Coast Guard by an electronic media agreed to by the Coast Guard. The Contractor shall demonstrate that the deliverables above can be installed, modified, compiled and removed by the USCG to/from the Contractor's LBTF as well as the LBTF to be delivered to the USCG after first Ship delivery.
- 202.12 Security evaluation. The Contractor shall perform a security evaluation of the MPCMS, PCS, EPCS, and any stand alone control systems' detailed design. The evaluation method shall be chosen to identify areas of insufficient security as well as to provide a method by which MPCMS, PCS and EPCS designers may evaluate and subsequently improve the overall security of the control systems. The security evaluation and any consequent changes to MPCMS, PCS, EPCS, or stand alone control systems' designs shall be documented.

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- 202.13 Configuration Audit Reports. The Contractor shall provide Configuration Audit Reports [202-03-2072] for MPCMS, PCS EPCS, and any stand alone control system for discrepancies between:
- 202.13.1 Requirements and software,
  - 202.13.2 Requirements and hardware,
  - 202.13.3 Software developed by the contractor,
  - 202.13.4 Software installed on ships and
  - 202.13.5 Software delivered to the Coast Guard.
- 202.14 Land Based Test Facility. The Contractor shall provide a Machinery Control System Land Based Test Facility (LBTF) to support integration, testing, verification, and validation of the MPCMS, EPCS, and PCS design, analysis, hardware, software, and networking prior to installation aboard the ship.
- 202.14.1 The LBTF shall provide the following:
    - 202.14.1.1 Verifying and validating software operation and functionality;
    - 202.14.1.2 Verifying MPCMS operation, and internal and external interfaces;
    - 202.14.1.3 Verifying PCS operation, and internal and external interfaces;
    - 202.14.1.4 Verifying EPCS operation, and internal and external interfaces;
    - 202.14.1.5 Verifying system HMI display layout and content;
    - 202.14.1.6 Verifying the propulsion dynamic analysis control results;
    - 202.14.1.7 Verifying the electric plant control system report results;
    - 202.14.1.8 Conducting FAT and system integration level tests utilizing the subsystems controller interfaces;
    - 202.14.1.9 Conducting software integration;
    - 202.14.1.10 Conducting networking tests, system integration tests, and system response time measurements;
    - 202.14.1.11 Conducting pre-installation testing of the operating system and upgrades;
    - 202.14.1.12 Testing and validation information assurance security;
    - 202.14.1.13 Testing and validating system data-logging functions;
    - 202.14.1.14 Testing and validating system built-in test equipment functions;
    - 202.14.1.15 Testing software and/or hardware changes;
    - 202.14.1.16 Testing corrective actions to fix software and/or hardware defects;
    - 202.14.1.17 Duplicating, troubleshooting, fixing & testing problems that occur during shipboard integration testing and trials and,
    - 202.14.1.18 Validating and developing machinery control system shipboard test plans and procedures.

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- 202.14.2 The Contractor shall maintain and operate the LBTF throughout delivery of hull one, until such time when they will be directed to transfer the system to the Government to lifecycle sustainment.
- 202.14.3 The Contractor shall provide and maintain and required ancillary test equipment such as: multi-meters, multifunction process calibrators, laptop computers, diagnostic software, network analyzers, and other equipment as required.
- 202.14.4 The Government reserves the right to access the equipment and software at every facility in which it is operating to conduct Government inspections.
- 202.14.5 The Contractor shall provide a Machinery Control System Land Based Test Facility Development Plan that includes: [202-03-1275]
- 202.14.5.1 The Contractor's plan and schedule to design, build, and outfit the LBTF.
- 202.14.5.2 The Contractor's plan and schedule to integrate, test, and Commission the LBTF.
- 202.14.5.3 The Contractor's plans to staff, operate, and maintain the LBTF.
- 202.14.5.4 The Contractor's plan describing the storage and maintenance of: configuration management documentation, test plan documentation, system software, and stimulator and simulator software and equipment for the LBTF and the ship.
- 202.14.6 Machinery Controls Land Based Test Facility Environment; the Contractor shall provide the following machinery controls at the LBTF to duplicate the shipboard configuration, integration, communication, inputs, and outputs.
- 202.14.6.1 A high fidelity Engineering Control Center console complete with installed equipment including: throttles, gauges, lamps, switches programmable logic controllers, industrial computers, power supplies, network components, terminal boards, and cables and wiring, and HMI displays.
- 202.14.6.2 The bridge helm workstation, propulsion control panel, and MPCMS display complete with throttles, gauges, lamps, switches programmable logic controllers, industrial computers, power supplies, network components, terminal boards, and cables and wiring, and HMI displays
- 202.14.6.3 A high fidelity set of switchboards as part of the electrical plant control system complete with panel mounted switches, gauges, lamps, HMI displays, and interior components including EPCS computers, network components, cables, wiring, terminal boards.

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- 202.14.6.4 A high fidelity propulsion control system complete with local control panels for one propulsion shaft, which includes the propulsion control system computers, HMI displays, controllers, and network components.
- 202.14.6.5 A high fidelity machinery plant control and monitoring system complete with industrial computers, HMI displays, printers for each location, programmable logic controllers, remote terminal units, network components, switches lamps, gauges, cables, data logging computers and displays.
- 202.14.6.6 Simulation and stimulation computers, controllers, and programmable logic controllers, data loggers, their associated wiring, cables, network components, and the end devices required to model the ship's propulsion, electrical, and auxiliary systems, machines, and equipments.
- 202.14.6.7 Machinery control system hardware signals, including multiplexed signals, shall be interfaced to a simulator/stimulator, which shall accurately represent the behavior of ship systems in real time.
- 202.14.7 The Contractor shall provide a MPCMS, propulsion and electric plant simulation and simulation system at the LBTF.
- 202.14.7.1 The simulation shall represent simultaneously the full behavior of the combined MPCMS, auxiliary systems, propulsion plant, and electric plant as installed on the ship.
- 202.14.7.2 The propulsion plant simulation shall include the mathematical model simulations of the propulsion diesel engines, loiter motors, propulsion drive train including CPP, shafts, propellers, diesel generator sets and the combined electric plant to the load center level.
- 202.14.7.3 The simulation shall be capable of demonstrating the ability of the MPCMS to control and operate the plant in each propulsion and electric plant mode of operation and configurations including transitions between modes and configurations.
- 202.14.7.4 The simulation shall be complete such that the functionality of the machinery control system is demonstrated throughout the operator stations.
- 202.14.7.5 The results of the dynamic response analysis shall be incorporated in the simulator/stimulator to represent the behavior of the ship systems and hydrodynamic loads in real time.
- 202.14.7.6 The results of electric plant computer model simulations used for the design of the electric plant shall be incorporated in the simulator/stimulator to accurately demonstrate electric plant control and power management.

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- 202.14.7.7 A simulator operator station shall be provided to allow a single user the ability to run and interact with the engineering plant simulation, which includes setting fault conditions, changing performance variables, starting and stopping simulated machinery, monitoring, capturing, and recording the effects from the other systems, consoles, equipment, and devices. The system shall also provide a set of scenarios to simulate changes in the machinery plant, such as; emergency stop of propulsion engines, failure of propulsion engines, switchboard functions and malfunctions, network failures, interface failures, sensor failures, and auxiliary system functions and malfunctions, and to perform the failures and events identified in the FMEA and FMECA reports.
- 202.14.7.8 A means shall be provided to set (force) the value from the simulator/stimulator to each MPCMS input, and to display the value of each MPCMS output.
- 202.14.7.9 The system shall trigger alarm conditions to the machinery control systems upon request.
- 202.14.7.10 The simulator/stimulator system shall interface to I/O modules to functionally replicate the shipboard configuration except that installation details such as cable lengths, terminal board connections, etc. need not be identical.
- 202.14.7.11 Network messages between the MPCMS and external systems shall be simulated or shall be interfaced to the actual equipment.
- 202.14.7.12 The Contractor shall store and provide every model version of the stimulator/simulator and the machinery controls software including the baseline model, the BST model and the AT model
- 202.14.7.13 The Contractor shall update the simulator/stimulator model and the machinery controls software after Builders Sea Trials to reflect actual machinery performance observed and recorded.
- 202.14.7.14 The Contractor shall update the simulator/stimulator model and machinery controls software after Acceptance Trials to reflect actual machinery performance observed and recorded.
- 202.14.7.15 The Contractor shall update the LBTF hardware to reflect the final shipboard configuration.

**233 Propulsion Diesel Engines**

- 233.1 Drawings. The Contractor shall provide the Propulsion Diesel Engine Drawings and Particulars as described in OPC System Specification. [233-03-2020]

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233.2 Certification of Power Limiting Controls. The Contractor shall provide the Certification of Power Limiting Controls for Propulsion Diesel Engine. [233-03-2019]

233.2.1 The Contractor shall demonstrate that engine meets the performance requirements for power limiting controls in accordance with PPD 200-001.

233.2.1.1 In lieu of the Certification of Power Limiting Controls for Propulsion Diesel Engine, the Contractor may provide a letter stating that the Propulsion Diesel Engines will not meet the performance requirements for power limiting control.

## 241 Propulsion Reduction Gears

241.1 Drawings. The Contractor shall provide the Reduction Gear Drawings and Particulars as described in OPC System Specification. [241-03-1434]

## 242 Clutches and Flexible Couplings

242.1 Design Data and Calculations. The Contractor shall provide the Propulsion Clutches and Flexible Couplings Design Data and Calculations. [242-03-1436]

242.1.1 The Contractor shall analyze the propulsion clutches and the propulsion flexible couplings.

242.1.2 If propulsion clutches approved under ABS SVR are provided, the analysis for the clutches shall be in accordance with SVR 4-3-2. If propulsion clutches not approved under ABS SVR are provided, the analysis for the clutches shall be in accordance with MIL-C-18087.

242.1.3 If propulsion flexible couplings approved under ABS SVR are provided, the analysis of the flexible couplings shall be in accordance with SVR 4-3-2. If propulsion flexible couplings not approved under ABS SVR are provided, the analysis of the flexible couplings shall be in accordance with ISO 4863.

242.1.4 The Contractor shall provide performance diagram for fluid couplings.

242.2 Drawings. The Contractor shall provide the Propulsion Clutches and Flexible Couplings Drawings. [242-03-2233]

## 243 Propulsion Shafting

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- 243.1 Main Propulsion Shafting Arrangement and Details Drawing. The Contractor shall update the Main Propulsion Shafting Arrangement and Details Drawing. [243-03-1437]
- 243.2 Stern Tube Shaft Seals, Bulkhead Seals, and Shaft Locking Device Drawings. The Contractor shall provide the Stern Tube Shaft Seals, Bulkhead Seals, and Shaft Locking Device Drawings as described in OPC System Specification (NVR 2-4-5/2.2 and NVR 2-4-5/12.2). [243-03-2088]
- 243.3 Stern Tube Shaft Seals, Bulkhead Seals, and Shaft Locking Device Analysis. The Contractor shall provide the Stern Tube Shaft Seals, Bulkhead Seals, and Shaft Locking Device Analysis. [243-03-2089]
- 243.4 Propulsion Shafting Alignment Analysis and Propulsion Shafting Stress Analysis. The Contractor shall update the Propulsion Shafting Alignment Analysis and Propulsion Shafting Stress Analysis. [243-03-2232]

**244 Propulsion Shaft Bearings and Seals**

- 244.1 Drawings. The Contractor shall update the Line Shaft Bearing Drawings, Stern Tube and Strut Bearing Drawings, and Thrust Bearing Drawings. [244-03-2091]
- 244.2 Calculations. The Contractor shall update the Line Shaft Bearing Location and Radial Loads Calculations, Stern Tube and Strut Bearing Location and Radial Loads Calculations, and Thrust Bearing Location and Thrust and Radial Loads Calculations. [244-03-2092]

**245 Propellers**

- 245.1 Technical Development Program Plan. The Contractor shall provide the Propeller Technical Development Program Plan. [245-03-1449]
- 245.2 Design Requirements Report. The Contractor shall provide the Propeller Design Requirements Report as described in the OPC System Specification (NVR 2-4-3/4.1). [245-03-2093]
- 245.3 Design and Analysis Report. The Contractor shall provide the Propeller Design and Analysis Report as described in the OPC System Specification (NVR 2-4-3/4.4 and 2-4-3/4.7). [245-03-1450]
- 245.4 Propeller and Gage Manufacture Drawing. The Contractor shall provide the Propeller and Gage Manufacture Drawing. [245-03-1454]

**256 Propulsion Machinery Seawater Cooling**

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- 256.1 Diagrams. The Contractor shall update Machinery Seawater Cooling System Diagrams. [501-03-2029]
- 256.2 Calculations. The Contractor shall update Machinery Seawater Cooling System Calculations. [501-03-2034]
- 256.3 Drawings. The Contractor shall provide Machinery Seawater Cooling System arrangement and detail drawings. [501-03-2030]

**259 Combustion Air Exhaust System**

- 259.1 Analysis Report. The Contractor shall update the Combustion Air Intake and Exhaust Analysis Report. [259-03-1465]

**264 Lube Oil Fill, Transfer and Purification**

- 264.1 Diagrams. The Contractor shall update Lube Oil Systems diagrams. [501-03-2029]
- 264.2 Calculations. The Contractor shall update Lube Oil Systems calculations. [501-03-2034]
- 264.3 Drawings. The Contractor shall provide Lube Oil Systems arrangement and detail drawings. [501-03-2030]

**300 Electric Plant**

- 300.1 Booklet of Standard Wiring Practice. The Contractor shall provide the Booklet of Standard Wiring Practice. [300-03-1487]
- 300.2 Design Report. The Contractor shall update the Electric Plant Design Report. [300-03-1472]
- 300.3 One Line Diagram. The Contractor shall update the Electrical One Line Diagram. [300-03-1473]
- 300.4 Electric Plant Load Analysis. The Contractor shall update the Electric Plant Load Analysis (EPLA). [300-03-1474]
- 300.5 Control System Report. The Contractor shall update the Electric Plant Control System (EPCS) Report. [300-03-1476]
- 300.6 Diagrams. The Contractor shall update the System Control, Power Block, and Schematic Diagrams. [300-03-1484]
- 300.7 Basic Impulse Level Report. The Contractor shall provide an Basic Impulse Level Report [300-03-1480]
- 300.8 Grounding Details Report. The Contractor shall provide a Grounding Details Report. [300-03-1481]

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- 300.9 Survivability Analysis. The Contractor shall update an Electrical System Survivability Analysis. [300-03-1485]
- 300.10 Arrangements of Electrical Equipment. The Contractor shall provide Arrangements of Electrical Equipment. [300-03-1486]
- 300.11 Motor Control Centers Drawings. The Contractor shall provide Motor Control Centers Drawings. [300-03-1489]
- 300.12 Nameplate/Identification Plate Drawings. The Contractor shall provide Nameplate/Identification Plate Drawings. [300-03-1490]
- 300.13 Short Circuit Study. The Contractor shall provide a Short Circuit Study. [300-03-1478]
- 300.14 Steady-State Voltage-Dip and Transient Voltage Calculations. The Contractor shall provide Steady-State Voltage-Dip and Transient Voltage Calculations. [300-03-1479]
- 300.15 Harmonic Analysis. The Contractor shall provide a Harmonic Analysis to verify the electrical power generation and distribution system design. [300-03-1495]
- 300.16 OEM Published Datasheets. The Contractor shall provide OEM Published Datasheets. [300-03-2270]
- 300.17 Programmable Electrical Equipment Parameters and Settings drawing. The Contractor shall provide a Programmable Electrical Equipment Parameters and Settings drawing. Parameters and settings for programmable electrical and electronic equipment, such as circuit breaker trip elements, motor drives, switchboard control equipment and auxiliary control equipment shall be documented. [300-03-2271]
- 300.18 Cable Running Sheets drawing and Database. The Contractor shall provide Cable Running Sheets drawing and Database (COED). [300-03-2277]

**302 Motors**

- 302.1 List. The Contractor shall provide a List of Motors. [302-03-1502]
- 302.2 Drawings. The Contractor shall provide Motor Drawings. [302-03-1468]

**303 Protective Devices**

- 303.1 Protective Device Coordination Study. The Contractor shall provide a Protective Device Coordination Study. [303-03-1511]

**304 Cable**

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- 304.1 Cable Installation Drawing. The Contractor shall provide Cable Installation Drawing including Cableway Locations. [304-03-1514]
- 304.2 Voltage Drop and Cable Sizing Calculations. The Contractor shall provide Voltage Drop and Cable Sizing Calculations. [304-03-1512]
- 304.3 Data Sheets. The Contractor shall provide published Data Sheets for the cables used. [304-03-1517]

**310 Generators**

- 310.1 Schematic Diagram & Description. The Contractor shall provide a Generator Prime Mover Remote Control Systems Schematic Diagram & Description. [310-03-1519]
- 310.2 Reactance Calculations. The Contractor shall provide Generator Reactance Calculations. [310-03-1521]
- 310.3 Torsional Vibration Calculations. The Contractor shall provide Generator Torsional Vibration Calculations. [310-03-1522]

**313 Storage Batteries and Service Facilities**

- 313.1 De-rating curves. The Contractor shall provide De-rating curves for equipment operating above the temperature rating specified on the OEM datasheet. [313-03-1532]
- 313.2 Calculations. The Contractor shall provide Battery Calculations. [313-03-1530]
- 313.3 Capacity Calculations. The Contractor shall provide Battery Capacity Calculations. 313-03-1531]

**314 Electric Power Supply Conversion Equipment**

- 314.1 UPS Characteristics. The Contractor shall provide UPS Characteristics. [314-03-1482]
- 314.2 Transformer Sizing Calculations. The Contractor shall provide Transformer Sizing Calculations. [314-03-1516]
- 314.3 UPS Battery Size Calculations. The Contractor shall provide UPS Battery Size Calculations. [314-03-1535]

**320 Electric Power Distribution Systems**

- 320.1 Export Power Design Report. The Contractor shall update the Export Power Design Report. [320-03-1537]

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- 320.2 Power Quality Report. The Contractor shall provide Power Quality Report. [320-03-1510]
- 320.3 Service Loads. The Contractor shall update the List of Essential Service Loads. [320-03-2253]
- 320.4 Deck Plan. The Contractor shall provide Electrical Power System Deck Plan. [320-03-1542]
- 320.5 DC System One Line Diagram. The Contractor shall provide a DC System One Line Diagram. [320-03-2255]
- 320.6 Feeders and Mains. The Contractor shall provide a List of Feeders and Mains (Power). [320-03-2278]
- 320.7 Stability Study. The Contractor shall provide an Electrical Stability Study. [320-03-2258]
- 320.8 Wireway Key Plan. The Contractor shall provide a Wireway Key Plan. [320-03-2276]
- 320.9 Power Load Flow Analysis. The Contractor shall provide a Power Load Flow Analysis. [320-03-2272]
- 320.9.1 The Load Flow Analysis shall be performed in accordance with IEEE STD 399-1997, Chapter 6.

**324 Switchboards and Panels for Electric Power and Lighting**

- 324.1 Operation Description. The Contractor shall provide the Operation Description for Electric Plant Control System. [324-03-1554]
- 324.2 Arc Flash Hazard Analysis. The Contractor shall provide Arc Flash Hazard Analysis. [324-03-1562]
- 324.3 Switchboards and Load Centers Drawings. The Contractor shall provide Switchboards and Load Centers Drawings. [324-03-1569]

**331 Lighting**

- 331.1 One-line diagrams. The Contractor shall provide General Lighting, normal and alternate one-line diagrams. [331-03-1627]
- 331.2 Deck Plan. The Contractor shall provide Lighting System Deck Plan. [331-03-1628]
- 331.3 Calculations. The Contractor shall provide Lighting Calculations (Illumination). [331-03-1629]
- 331.4 Feeders and Mains. The Contractor shall provide a List of Feeders and Mains (Lighting). [331-03-2279]
- 331.5 Lighting and Receptacle Load Calculations. The Contractor shall provide Lighting and Receptacle Load Calculations. [331-03-2245]

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**400 Electronic Systems**

- 400.1 C4ISR system Documentation. For the C4ISR system (OPC System Specification Section 400) and the meteorological system, the Contractor shall provide the following products:
- 400.1.1 Updated Functional Block Diagrams (FBDs). [400-03-2327]
  - 400.1.2 Electronic System Elementary Wiring Diagrams. [400-03-2335]
  - 400.1.3 Interface Design Descriptions (IDDs) that define the interfaces (type, characteristics, length, frequency, etc.) between the components. [400-03-2061]
  - 400.1.4 Installation Control Drawings (ICDs) for installing activities to develop plans and drawings for the installation of the equipment. [400-03-2321]
- 400.2 Test and Integration Facility. The Contractor shall establish a C4ISR Test and Integration Facility (TIF).
- 400.2.1 The TIF shall support design, development, integration, demonstration, testing, verification and documentation of the C4ISR system.
  - 400.2.2 TIF activities shall include:
    - 400.2.2.1 Verifying software operation and functionality;
    - 400.2.2.2 Verifying C4ISR operation, and internal and external interfaces;
    - 400.2.2.3 Verifying system HMI display layout and content;
    - 400.2.2.4 Conducting integration level tests;
    - 400.2.2.5 Conducting software integration;
    - 400.2.2.6 Conducting networking tests, system integration tests, and system response time measurements;
    - 400.2.2.7 Conducting pre-installation testing of the operating system and upgrades;
    - 400.2.2.8 Testing and validation information assurance security;
    - 400.2.2.9 Testing and validating system data-logging functions;
    - 400.2.2.10 Testing and validating system built-in test equipment functions;
    - 400.2.2.11 Testing software and/or hardware changes;
    - 400.2.2.12 Testing corrective actions to fix software and/or hardware defects;
    - 400.2.2.13 Duplicating, troubleshooting, fixing & testing problems that occur during shipboard integration testing and trials and,

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- 400.2.2.14 Validating and developing C4ISR system shipboard test plans and procedures.
- 400.2.3 The Contractor shall maintain and operate the TIF through delivery of the lead ship.
- 400.2.4 The TIF shall be capable of demonstrating:
  - 400.2.4.1 Failure of systems,
  - 400.2.4.2 Switchboard functions and malfunctions,
  - 400.2.4.3 Network failures,
  - 400.2.4.4 Interface failures,
  - 400.2.4.5 Sensor failures,
  - 400.2.4.6 Auxiliary system functions and malfunctions,
  - 400.2.4.7 Failures and events identified in the FMEA and FMECA reports.
- 400.3 Production Facility. The Contractor shall establish a C4ISR Production Facility (PF).
- 400.4 System Design Report. The Contractor shall provide the C4ISR System Design Report. [400-03-2324]

**402 Secure Electronic Information Processing Systems**

- 402.1 Information Assurance Plan. The Contractor shall update the Information Assurance (IA) Plan.[402-03-2344]
  - 402.1.1 For this update, the Contractor shall:
    - 402.1.1.1 Develop, document, manage, deliver, and implement classified systems to be compliant with standards, protocols, and best practices as established by applicable DISA or DHS STIGs, to include compliance on but not limited to operating systems, applications, network devices, cross domain solutions, and security systems. The Contractor shall support the Government in validating design, procedural, and programmatic conformance to the STIGs.
    - 402.1.1.2 Review and evaluate applicable United States Cyber Command (USCYBERCOM) published Communications Tasking Orders (CTOs). The Contractor shall review and evaluate applicable USCYBERCOM published Information Assurance Vulnerability Alerts (IAVAs) and Information Assurance Vulnerabilities Bulletins (IAVBs).
    - 402.1.1.3 Report the results of both evaluations as a proposed CTO and Information Assurance Vulnerability Management (IAVM) implementation baseline for the system design. This report shall include the vulnerabilities which will be left open and mitigating controls that will be put into place to reduce the risk without effecting system functionality.

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- 402.2 IA Design Review Information Package. The Contractor shall develop an IA Design Review Information Package (DRIP) detailing the IA characteristics of the Network design. [402-03-2345]

**404 C4ISR Radio Frequency (RF) Transmission Lines**

- 404.1 Waveguide Routing Drawing. The Contractor shall update the Waveguide Routing Reservation Drawing to become the Waveguide Routing Drawing. [404-03-1641]

**405 Antenna Systems Arrangements**

- 405.1 Topside Antenna Systems Arrangement. The Contractor shall update the Topside Antenna Systems Arrangement. [405-03-1090]

**407 Electromagnetic Environmental Effects (E3) and Bonding and Grounding**

- 407.1 Electromagnetic Compatibility Advisory Board support. The Contractor shall provide support to the USCG Electromagnetic Compatibility Advisory Board (EMCAB) for resolving EMC issues that arise in the course of design and construction.
- 407.2 EMC Control Plan. The Contractor shall update and implement the EMC Control Plan. [407-03-1657]
- 407.3 EMC Integration and Analysis Report. The Contractor shall provide the EMC Integration and Analysis Report. [407-03-2127]
- 407.4 TEMPEST Control Plan. The Contractor shall update and implement the Telecommunications Electronics Material Protected from Emanating Spurious Transmissions (TEMPEST) Control Plan. [407-03-1638]

**415 Computing Network System**

- 415.1 Network Architecture Report. The Contractor shall update the C4ISR Network Architecture Report. [415-03-2333]

**420 Navigation Systems**

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- 420.1 Diagrams. The Contractor shall provide the Electronic Navigation Systems Diagrams. [420-03-1662]
- 420.2 Report. The Contractor shall update the Navigation Systems Report. [420-03-2122]

**421 Non-Electrical / Electronic Navigation Aids**

- 421.1 Drawing. The Contractor shall provide the Non-Electrical / Electronic Navigation Aids drawing. [421-03-2257]

**422 Navigation Lights, Signal Lights, Searchlights and Lights for Night Flight Operations.**

- 422.1 Navigation Lights Controls and Wiring Diagram. The Contractor shall provide the Navigation Lights Controls and Wiring Diagram. [422-03-1661]
- 422.2 Electrical Navigation Aids Diagram. The Contractor shall provide the Electrical Navigation Aids Diagram. [422-03-1660]
- 422.3 Arrangements Drawing. The Contractor shall provide Navigation Lights, Signal Lights, and Searchlights Arrangements Drawing. [422-03-2280]
- 422.4 Calculations. The Contractor shall provide the Navigation Lights, Signal Lights, and Searchlights Calculations. [422-03-2304]

**428 Integrated Bridge Systems**

- 428.1 Navigation Monitoring Systems Operational Description. The Contractor shall provide a complete Operational Description of the Relevant Navigation Monitoring Systems Including a List of Alarms and Displays. [428-03-1664]
- 428.2 Arrangement Drawing and Equipment List of the IBS equipment. The Contractor shall provide an Arrangement Drawing and Equipment List of the IBS equipment. [428-03-1665]

**430 Internal Communication Systems**

- 430.1 Systems Report. The Contractor shall update the Internal Communication (IC) Systems Report. [430-03-1673]

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**432 Telephone Systems**

- 432.1 System Block Diagram. The Contractor shall provide a separate Sound Powered Telephone System Block Diagram. [432-03-2260]
- 432.2 System Isometric and Elementary Wiring Diagrams. The Contractor shall provide a separate Sound Powered Telephone System Isometric and Elementary Wiring Diagrams. [432-03-2261]

**433 Amplified Voice Communication Systems**

- 433.1 General Announcing System Isometric Wiring Diagram. The Contractor shall provide a General Announcing System (1MC) Isometric Wiring Diagram. [433-03-1701]
- 433.2 Captain Command Announcing System Isometric Wiring Diagram. The Contractor shall provide a Captain Command Announcing System (21MC) Isometric Wiring Diagram. [433-03-1706]

**436 Electrical Alarm, Safety and Warning Systems**

- 436.1 Documentation. The Contractor shall provide the following documentation for the Electric Alarm, Safety and Warning System:
- 436.1.1 The Contractor shall provide a Cable Insulation Resistance Monitoring Alarm System Block Diagram. [436-03-2179]
- 436.1.2 The Contractor shall provide a Cable Insulation Resistance Monitoring Alarm System Elementary Wiring Diagram. [436-03-2180]
- 436.1.3 The Contractor shall provide an Electrical Alarm, Safety, and Warning System Schematic/Block Diagram. [436-03-1688]
- 436.1.4 The Contractor shall provide an Electrical Alarm, Safety, and Warning System Elementary Wiring Diagram. [436-03-2247]
- 436.1.5 The Contractor shall provide a Steering Gear Power Failure Alarm System Block Diagram. [436-03-2175]
- 436.1.6 The Contractor shall provide a Steering Gear Power Failure Alarm System Elementary Wiring Diagram. [436-03-2176]
- 436.1.7 The Contractor shall provide an Emergency Wash Alarm System Block Diagram. [436-03-2162]
- 436.1.8 The Contractor shall provide an Emergency Wash Alarm System Elementary Wiring Diagram. [436-03-2163]
- 436.1.9 The Contractor shall provide a Hazardous Space Airflow Alarm System Functional Diagram and Block Diagram. [436-03-2167]

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- 436.1.10 Diagram The Contractor shall provide a Hazardous Space Airflow Alarm System Elementary Wiring Diagram. [436-03-2249]
- 436.1.11 The Contractor shall provide a Washdown Countermeasure Actuation Alarm System Block Diagram. [436-03-2164]
- 436.1.12 The Contractor shall provide a Washdown Countermeasure Actuation Alarm System Elementary Wiring Diagram. [436-03-2165]
- 436.1.13 The Contractor shall provide an Engineer's Assistance-Needed Alarm System Block Diagram. [436-03-2173]
- 436.1.14 The Contractor shall provide an Engineer's Assistance-Needed Alarm System Elementary Wiring Diagram. [436-03-2174]
- 436.1.15 The Contractor shall provide a Gyrocompass Failure Alarm System Block Diagram. [436-03-2177]
- 436.1.16 The Contractor shall provide a Gyrocompass Failure Alarm System Elementary Wiring Diagram. [436-03-2178]
- 436.1.17 The Contractor shall provide a Hazardous Gas Detection System Functional Diagram and Block Diagram. [436-03-2166].
- 436.1.18 The Contractor shall provide a Hazardous Gas Detection System Elementary Wiring Diagram. [436-03-2248]
- 436.1.19 The Contractor shall provide a High Temperature Alarm System Functional Diagram and Block Diagram. [436-03-2168]
- 436.1.20 The Contractor shall provide a High Temperature Alarm System Elementary Wiring Diagram. [436-03-2328]
- 436.1.21 The Contractor shall provide a Security Alarm System Block Diagram. [436-03-2169]
- 436.1.22 The Contractor shall provide a Security Alarm System Elementary Wiring Diagram. [436-03-2170]
- 436.1.23 The Contractor shall provide a AFFF Actuation Alarm System Block Diagram. [436-03-2190]
- 436.1.24 The Contractor shall provide a AFFF Actuation Alarm System Elementary Wiring Diagram. [436-03-2191]
- 436.1.25 The Contractor shall provide a MOBI System Block Diagram. [436-03-2181]
- 436.1.26 The Contractor shall provide a MOBI System Elementary Wiring Diagram. [436-03-2182]
- 436.1.27 The Contractor shall provide a Sprinkling System Alarm System Block Diagram. [436-03-2192]
- 436.1.28 The Contractor shall provide a Sprinkling System Alarm System Elementary Wiring Diagram. [436-03-2193]
- 436.1.29 The Contractor shall provide a General Alarm System Block Diagram. [436-03-1692]
- 436.1.30 The Contractor shall provide a General Alarm System Isometric Wiring Diagram and Elementary Wiring Diagram. [436-03-1700]

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- 436.1.31 The Contractor shall provide an Aqueous Potassium Carbonate (APC) Release and Low Pressure Alarm System Block Diagram. [436-03-2188]
- 436.1.32 The Contractor shall provide an Aqueous Potassium Carbonate (APC) Release and Low Pressure Alarm System Elementary Wiring Diagram. [436-03-2189]
- 436.1.33 The Contractor shall provide a Fire Suppression Release Alarm System Block Diagram. [436-03-2186]
- 436.1.34 The Contractor shall provide a Fire Suppression Release Alarm System Isometric Wiring Diagram and Elementary Wiring Diagram. [436-03-2187]
- 436.1.35 The Contractor shall provide Fire Detection and Alarm System Isometric Wiring Diagram and Elementary Wiring Drawing. [436-03-1690]
- 436.1.36 The Contractor shall provide a Fire Detection and Alarm System Block Diagram. [436-03-1691]
- 436.1.37 The Contractor shall provide a Navigation Horn Operating System Block Diagram. [436-03-2183]
- 436.1.38 The Contractor shall provide a Navigation Horn Operating System Elementary Wiring Diagram. [436-03-2184]

**437 Indicating, Order and Metering Systems**

- 437.1 Documentation. The Contractor shall provide the following documentation for the Indicating, Order and Metering Systems:
  - 437.1.1 The Contractor shall provide a Depth Sounder System Functional Diagram and Block Diagram. [437-03-2196]
  - 437.1.2 The Contractor shall provide a Depth Sounder System Elementary Wiring Diagram. [437-03-2197]
  - 437.1.3 The Contractor shall provide a Underwater Speed Log System Elementary Wiring Diagram. [437-03-2195]
  - 437.1.4 The Contractor shall provide a Wind Speed and Direction System Elementary Wiring Diagram. [437-03-2199]
  - 437.1.5 The Contractor shall provide a Steering System and Autopilot Isometric Wiring Diagram and Elementary Wiring Diagram. [437-03-2201]
  - 437.1.6 The Contractor shall provide a Engine Order Telegraph System Isometric Wiring Diagram and Elementary Wiring Diagram. [437-03-2259]

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**443 Visual and Audible Systems**

- 443.1 Documentation. The Contractor shall provide the following documentation for the Visual and Audible Systems:
- 443.1.1 The Contractor shall provide a Whistle Operating System Elementary Wiring Diagram. [443-03-2172]
- 443.1.2 The Contractor shall provide an Acoustical Isometric Wiring Diagram and Elementary Wiring Diagram as part of the C4ISR Elementary Wiring Diagrams. [400-03-2335]

**494 Meteorological Systems**

- 494.1 MORIAH Support. The Contractor shall support the Government configuration of the MORIAH AN/SQM-13 wind speed system.

**501 Auxiliary Systems**

- 501.1 Documentation. The Contractor shall provide the following documentation for the Auxiliary System:
- 501.1.1 The Contractor shall update the Machinery Arrangement Drawings. [501-03-2028]
- 501.1.2 The Contractor shall provide, Auxiliary Systems Diagrams as applicable to the design. [501-03-2029]
- 501.1.3 The Contractor shall update Auxiliary Systems calculations. [501-03-2034]
- 501.1.4 The Contractor shall submit the Auxiliary Systems diagrams concurrently with the Auxiliary Systems calculations.
- 501.1.5 The Contractor shall update the Miscellaneous Tanks Drawing. [501-03-2032]
- 501.1.6 The Contractor shall provide the Machinery and Piping Label Plates Drawing. [507-03-2037]
- 501.1.7 The Contractor shall provide Auxiliary Systems Arrangement and Detail Drawings. [501-03-2030]

**502 Auxiliary Machinery**

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502.1 Auxiliary Diesel Engine Drawings. The Contractor shall provide the Auxiliary Diesel Engine Drawings and Particulars as described in OPC System Specification. [502-03-2094].

**512 HVAC and Refrigeration**

- 512.1 Documentation. The Contractor shall provide the following documentation for the HVAC and Refrigeration Systems:
- 512.1.1 The Contractor shall update the HVAC system diagram. [501-03-2029]
  - 512.1.2 The Contractor shall update the HVAC Equipment List. [512-03-1718]
  - 512.1.3 The Contractor shall update HVAC Heating and Cooling Load Calculations. [512-03-1719]
  - 512.1.4 The Contractor shall perform HVAC Duct Pressure Loss Calculations and provide a report. [512-03-1725]
    - 512.1.4.1 The Contractor shall provide system type selection, air flow and pressure calculations associated with each mode of system operation.
  - 512.1.5 The Contractor shall demonstrate that design flow rates and design pressures will be met under every mode of operation.
  - 512.1.6 The Contractor shall provide the A/C Unit Arrangement and Detail Drawings. [514-03-1730]
  - 512.1.7 The Contractor shall update Refrigeration System Sizing Calculations. [516-03-1732]
  - 512.1.8 The Contractor shall update the Refrigeration System Design Report. [516-03-2275]
    - 512.1.8.1 The Contractor shall include a description of the system and a detailed explanation of methodology used to calculate the flow rates and pressures required by the system. The Contractor shall include calculations, diagrams, drawings, manufacturer data/cut-sheets, and a list of equipment.
    - 512.1.8.2 The Contractor shall calculate flows, pressures and temperatures associated with each mode of system operation. The Contractor shall demonstrate that design flow rates and design pressures will be met under every mode of operation.
    - 512.1.8.3 The Contractor shall show the temperatures on the inlet and outlet sides of heat exchangers.
    - 512.1.8.4 The Contractor shall show the actual flow rates and pressures under modes of operation.

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- 512.1.8.5 The Contractor shall calculate fluid velocity in piping and it shall show that fluid flows are within the required velocity limits.
- 512.1.8.6 The Contractor shall provide computer flow analysis models.
- 512.1.9 The Contractor shall provide the Refrigeration System Arrangement and Detail Drawings. [516-03-2038]
- 512.1.10 The Contractor shall provide the Reefer Box Arrangement and Detail Drawings. [516-03-2039]

**549 Lubricants**

- 549.1 Master Lubricants Database. The Contractor shall provide a Master Lubricants Database that includes data pertaining to the ship's machinery, equipment and component lubricants and hydraulic fluids. The database shall be capable of being unique to each hull. [549-03-1788]
- 549.1.1 The database shall permit personnel (after delivery) to update inventories of lubricants and hydraulic fluids on board in working reservoirs, quantities on board in bulk stowage, and quantities on board in Hazardous Stores. The database shall permit personnel to add / edit / delete lubricants and hydraulic fluids, technical documentation, equipment and lubricant requirements.
- 549.1.2 The database shall permit personnel (after delivery) to identify the lubricants and hydraulic fluids (and quantities thereof) that need to be procured to replace stock on board, to conduct long term maintenance, or conduct reservoir changes.
- 549.1.3 The Contractor shall determine the required quantity of lubricants to be stowed on board to support maintenance actions of six or less months periodicity (time based maintenance) or two back to back patrol periods (hour based maintenance).
- 549.1.4 The Contractor shall determine the annual engine oil consumption based on projected service hours.
- 549.1.5 The Contractor shall determine total lubricants and hydraulic fluids required for annual replacement.
- 549.1.6 The Contractor shall determine the lubricants and hydraulic fluids required for overhauls (only) and Condition Based Maintenance reservoir changes (intervals greater the annual).
- 549.1.7 The Contractor shall determine the total stowed lubricant and hydraulic fluid volume subtotals by equipment. Fluid volumes in working reservoirs, in bulk reservoir stowage, and Hazardous Stores shall be separately subtotaled.

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- 549.1.8 In the calculation of lubricant quantities, the Contractor shall consider the following:
- 549.1.8.1 OEM recommendations and OEM recommended maintenance actions.
  - 549.1.8.2 Anticipated equipment usage cycles, which may differ from OEM design standards.
  - 549.1.8.3 Equipment environmental exposure, which may accelerate contamination.
- 549.1.9 The Contractor shall determine the general lubricants required for distributed systems or common equipment, such as door hinges, watertight door and hatch dogs, loose cargo gear sheaves etc. The Contractor shall reduce the number of general lubricants to single line item entries with an estimate of occurrences and estimate of lubricant required.

**555 Firefighting Systems**

- 555.1 System Calculations. The Contractor shall update Type Approved and Packaged Fixed Fire Fighting System Calculations. [555-03-2040]

**556 Hydraulic Power Transmission System**

- 556.1 The Contractor shall update the Hydraulic Systems diagrams. [501-03-2029]
- 556.2 The Contractor shall perform Hydraulic Power Transmission Systems calculations and update the report. [501-03-2034]

**561 Steering Systems**

- 561.1 Documentation. The Contractor shall Update and provide the following documentation for the Maneuvering Systems Calculations and Drawings:
- 561.1.1 Steering Equipment and Arrangement. [561-03-1812]
  - 561.1.2 Steering Gear Sizing Calculations. [561-03-1810]

**562 Rudders**

- 562.1 Documentation. The Contractor shall Update and provide the following documentation for the Rudders:

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- 562.1.1 Contractor shall update the Rudder and Rudder Stock Design Calculations in accordance with the Specification. [562-03-1820]
- 562.1.2 The Contractor shall provide Rudder and Support Structure Arrangement and Detail drawings. [562-03-1822]
- 562.1.3 Stabilizing Systems
- 562.1.3.1 The Contractor shall provide detail calculations and specifications for any stabilizing system, if provided.

**568 Bow Thrusters**

- 568.1 Calculations and Analysis. The Contractor shall update the Thruster Design Calculations and Analysis. [568-03-1828]
- 568.1.1 Thruster Design Calculations and Analysis shall include curves of thrust, power and efficiency for various operating conditions and drafts.
- 568.1.2 Tunnel Erosion - Include data on design measures to minimize and protect the tunnel from erosion. Such data shall include identification of the propeller tip speed, design details for a wear ring in-way of propeller blade tips, and other methods as appropriate. ASTM F841 shall be used as guidance.
- 568.2 Arrangement Drawings. The Contractor shall update the Thruster Arrangement Drawings. [568-03-1827]

**571 Replenishment at Sea Systems**

- 571.1 Replenishment at sea arrangement. The Contractor shall provide drawings that show the arrangements and Details of the Replenishment-at Sea (RAS) and Supporting Systems. The RAS systems shall include the Alongside Fuel Receiving Fueling Station, the Alongside Fuel/Water (i.e, DFM, JP-5 and Potable Water) Delivery Stations, and the Astern Refueling/Water Stations (i.e., DFM, JP-5 and Potable Water). [571-03-1843]

**572 Stores Handling Systems**

- 572.1 Documentation. The Contractor shall provide the following documentation for the Stores Handling Systems:
  - 572.1.1 The Contractor shall provide a drawing showing the arrangements and details of the Stores Elevator Systems. [572-03-1854]

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- 572.1.2 The Contractor shall provide loose cargo gear certifications. Copies of the certifications shall be incorporated into the Registry of Lifting Appliances. [580-03-1868]
- 572.1.3 The Contractor shall provide elevator calculations for the Cargo Elevator if one will be installed. [572-03-1852]
- 572.1.4 The Contractor shall provide a Stores Flow Path Diagram. [071-03-1849][Loeser: Duplicates task in Sect. 071]

**573 Boom Systems**

- 573.1 Trolley Hoist Boom Systems. If a Trolley Hoist Boom System is provided, the Contractor shall provide the following:
- 573.1.1 Trolley Hoist Boom Systems Arrangements and Details Drawings of the systems. [573-03-2157]
- 573.1.2 Trolley Hoist Boom Systems Calculations. [573-03-2158]
- 573.2 Design calculations. If stick booms are provided, the Contractor shall provide design calculations. [573-03-1860]

**580 Weight Handling Systems**

- 580.1 Diagram. The Contractor shall provide a Securing and Lifting Fittings Diagram. [580-03-1871]
- 580.2 As-Built Configuration. The Contractor shall provide a Registry of Lifting Appliances that represents the "as built" configuration of the ship. [580-03-1868]
- 580.3 Arrangements and details. The Contractor shall provide arrangements and details of the anchoring, mooring, and towing equipment and systems. They shall be depicted on a consolidated drawing with details that fully depict each the system. [580-03-1876]

**581 Anchor Stowage Handling**

- 581.1 Drawing. The Contractor shall provide an anchor drawing showing sufficient details of the anchors to permit procurement of replacement anchors. [581-03-2160]
- 581.2 Calculations. The Contractor shall provide Anchor Windlass/Mooring Capstan Machinery Calculations. [581-03-1883]
- 581.3 Nomograph. The Contractor shall provide an anchor nomograph. After acceptance it shall be incorporated into the Ship Information Book. [581-03-1877]

## STATEMENT OF WORK FOR DETAIL DESIGN

**582 Mooring and Towing Systems**

- 582.1 Calculations Report. The Contractor shall provide a Mooring and Towing Systems Calculations Report. [582-03-1888]
- 582.2 Towing Capability Chart. The Contractor shall provide a Towing Capability Chart, based on the primary and secondary towing hawser breaking strengths, plotting displacement tons versus sea state and speed. After acceptance it shall be incorporated into the Ship Information Book, under ship capabilities. [582-03-2264]

**583 Boat Handling Systems**

- 583.1 Documentation. The Contractor shall provide the following documentation for the Boat Handling System:
- 583.1.1 The Contractor shall provide Boat Davit Design Drawings. [583-03-1899]
- 583.1.2 The Contractor shall provide Boat Stowage and Handling General Arrangement and Detail Drawings. [583-03-1895]
- 583.1.3 The Contractor shall provide a Life Raft Stowage Arrangement and Detail Drawings. [583-03-1896]
- 583.1.4 The Contractor shall analyze the boat davit system to verify that the system's structural interface, power train and rigging satisfy strength requirements when subjected to the required ship motions while in operation and when stowed. [583-03-1901]

**588 Aircraft Stowage, Handling, Launching and Landing Facilities**

- 588.1 Documentation. The Contractor shall provide the following documentation for the Aircraft Stowage, Handling, Launching and Landing Facilities:
- 588.1.1 The Contractor shall provide a drawing showing the arrangements and details for following aviation spaces: [588-03-1911]
- 588.1.2 The Contractor shall provide the Talon Grid Design Calculations and Analysis Report. [588-03-1929]
- 588.1.3 The Contractor shall provide the calculations and analysis for the hangar door. [588-03-1914]
- 588.1.4 Drawings and stowage plans developed shall be included in the Ship Information Book. [086-03-1269]

## STATEMENT OF WORK FOR DETAIL DESIGN

**589 Cranes and Hoists**

- 589.1 Documentation. The Contractor shall provide the following documentation for Cranes and Hoists:
- 589.1.1 If a Trolley Hoist and Rail System is provided, the Contractor shall provide Trolley Hoist and Rail General Arrangement and Detailed Drawings. [589-03-1932]
- 589.1.2 If a Trolley Hoist and Rail System is provided, the Contractor shall provide design calculations for the Trolley Hoist and Rail System and components. [589-03-1872]
- 589.1.3 The Contractor shall provide Assembly and Detailed Drawings for Stores Crane(s). [589-03-1934]
- 589.1.4 The Contractor shall analyze the stores crane system(s) to verify that the system's structural interface, power train and rigging satisfy strength requirements when subjected to the required ship motions while in operation and when stowed. [589-03-1933]

**593 Environmental Pollution Control Systems**

- 593.1 Environmental Pollution Control Systems Design Report. The Contractor shall update the Environmental Pollution Control Systems Design Report that includes waste stream diagrams, system and stowage concepts. [593-03-1938]

**602 Hull Designating and Marking**

- 602.1 Drawings. The contractor shall provide Labels, Label Plates, and Plaque Drawings. [602-03-1257]

**604 Locks Keys and Tags**

- 604.1 Key Tag index. The Contractor shall provide the Key Tag index that implements the lock requirements for every access closure with access restrictions. [604-03-1976]

**605 Ratproofing**

- 605.1 Booklet of Standard Details. The contractor shall provide the Booklet of Standard Details for Ratproofing. [605-03-1977]

## STATEMENT OF WORK FOR DETAIL DESIGN

**611 Hull and Deck Fittings**

- 611.1 Liferails, lifelines, and safety nets. The contractor shall provide Liferails, lifelines, and safety nets.
- 611.2 Alien Migrant Interdiction Operations awning deployment drawing. The contractor shall provide an Alien Migrant Interdiction Operations (AMIO) awning deployment drawing showing stowage, locations, stanchions and installation methods.

**622 Ladders, Handrails, Floor Plates, Staging, Gratings and Service Platforms****624 Non-Structural Closures**

- 624.1 Schedule. The Contractor shall provide the Doors, Manholes, Hatches, Scuttles and Hardware Schedule. [624-03-1980]

**630 Corrosion Prevention Control**

- 630.1 Plan. The Contractor shall update the Corrosion Prevention and Control Plan. [630-03-1981]

**631 Painting**

- 631.1 Schedule. The Contractor shall provide the Paint Schedule. [631-03-2243]

**633 Deck Covering**

- 633.1 Schedule. The Contractor shall provide the Deck Covering Schedule. [634-03-2244]

**635 Thermal, Acoustic Absorptive and Fire Protection Insulation Treatment of Compartments**

- 635.1 Schedule. The Contractor shall provide the Insulation schedule. [635-03-2299]

## STATEMENT OF WORK FOR DETAIL DESIGN

**637 Sheathing**

- 637.1 Schedule. The Contractor shall provide the Sheathing schedule. [637-03-2300]

**640 Habitability Spaces**

- 640.1 Color Coordination Manual. The Contractor shall provide a Color Coordination Manual. [640-03-1988]
- 640.2 Arrangement Drawings. The Contractor shall provide Space Arrangement Drawings for each space. [640-03-1987]

**651 Food Service Spaces**

- 651.1 Drawing. The Contractor shall incorporate the revised Food Service Space Contract Drawing arrangements into the detail design.

**702 Armament Systems**

- 702.1 Weapons and Ammunition Handling Analysis and Flow Diagram. The Contractor shall update the Weapons and Ammunition Handling Analysis and Flow Diagram. [702-03-2015]
- 702.2 System Safety Plan. The Contractor shall provide a Weapons System Safety Plan. [702-03-2016]
- 702.2.1 The Contractor shall develop and provide a plan for conducting a Consolidated Operability Tests (COT). [702-03-2301]. The presentation shall be provided to the Government prior to conducting the COT.
- 702.2.2 How the Weapons Systems Safety Plan will be followed during the COT.
- 702.2.3 How comments on the Weapons Systems Safety Plan provided by the Weapons Systems Explosives Safety Review Board (WSESRB) have been be addressed.
- 702.2.4 A list of the documentation (Test reports, Certifications, etc.) showing that the ship in ready the COT shall be provided in the presentation.
- 702.2.5 The Contractor shall provide a list of any discrepancies noted during the COT and a plan of action to resolve each discrepancy. [702-03-2302]

## STATEMENT OF WORK FOR DETAIL DESIGN

- 702.3 Weapons and Magazine Location Arrangement Drawings. The Contractor shall update the Weapons and Magazine Location Arrangement Drawings to reflect the ship's configuration and shall include: [702-03-2013]
- 702.3.1 The locations of the Weapons, decoy systems, and magazines.
  - 702.3.2 The Weapons system pointing, firing, blast zones.
  - 702.3.3 The arrangement of the magazines showing the stowage aids and accesses.
  - 702.3.4 The arrangement of the Small Arms Armory, the Law Enforcement/Web Gear Locker Room, and the Law Enforcement Armory.
  - 702.3.5 The locations of each ready service locker.
  - 702.3.6 The locations of the pyrotechnics and grenades lockers.
  - 702.3.7 The locations and details of rails, stanchions, rigging, and other safety devices/systems related to weapons systems.
    - 702.3.7.1 Weapons Mounts.
    - 702.3.7.2 Ammunition handling and stowage.
    - 702.3.7.3 Small arms ammunition, miscellaneous ordnance and pyrotechnics handling and stowage.
      - 702.3.7.3.1 Ready Service Lockers.
    - 702.3.7.4 Pyrotechnics Lockers. Small arms stowage.

## EXHIBIT XX - DETAIL DESIGN

**CONTRACT DATA REQUIREMENTS****General**

This Attachment includes the Data Item requirements for Phase I and Phase II. Phase I and Phase II form DD 1423 templates are provided as enclosures (1) and (2).

The definitions for Block 10 and Block 12 acronyms are in Tables 1 and 2.

Data Item Numbers: Data items are identified using the following 3-part approach:

- XXX: SWBS identifier for the item
- YY: Indicates the following Program Periods:
  - 01 - Phase I Preliminary and Contract Design
  - 03 - Phase II Detail Design
  - 04 - Phase II Construction
  - 05 - Life Cycle Engineering
- ZZZZ: Unique Sequence Number - Identifies a submittal.

There are no data delivery requirements associated with the General Statement of Work.

There is a separate group of submittals for each Program Period. Where submittals associated with different Program Periods have identical Sequence Numbers, the data requirements for later submittals are the same as for earlier submittals, except where noted. Where the Form DD 1423 does not provide specific additional data requirements for each submittal, the Contractor shall provide an update of the previous submittal.

**Example:**

A Phase I Preliminary and Contract Design submittal has a Data Item Number of 562-01-1820.

A Phase II Detail Design submittal has a Data Item Number of 562-03-1820.

The base data requirements for the Phase II Detail Design submittal are as specified in the Phase I Preliminary and Contract Design version of the 1423 with any additional requirements specified.

**DD 1423 Block information:**

Block 1 Data Item No.: See attached forms DD 1423.

Block 2 Title of Data Item: See attached forms DD 1423.

Block 3 Subtitle: Not used.

Block 4 Authority: See attached forms DD 1423.

## EXHIBIT XX - DETAIL DESIGN

Block 5 Contract Reference: Not used. The Data Item Number provides the contract cross reference to the applicable section(s) of the SOW.

Block 6 Requiring Office: Not used.

Block 7 DD 250 Req: See Section C.

Block 8 Approval Code: During Phase I, deliverables are for Acceptance only. During Phase II, deliverables are for Acceptance, Approval, or Information as indicated in the 1423. These are defined as follows:

Acceptance: The USCG will provide a response that indicates acceptance, comments identifying non-compliance, or rejection.

Approval: The USCG will provide a response that indicates approval, comments identifying non-compliance, or disapproval. Where an item is required to be submitted for approval, it is intended that work shall not proceed until notification of approval is received. In the event the subject item is not approved, rationale will be provided and subject effort shall not proceed until such time as a satisfactory and mutually agreeable resolution has been resubmitted and approved.

Information: The USCG may provide comments.

Block 9 Distribution Statement: Not used.

Block 10 Frequency: See attached forms DD 1423. See Table 1.

Block 11 As of Date: Not used.

Block 12 Date of initial Submission: See attached forms DD 1423. See Table 2.

Block 13 Date of Subsequent Submission: See attached forms DD 1423. See Table 2.

Block 14 Distribution: Not used.

Block 15 Total: Not used.

Block 16: Remarks: See attached forms DD 1423.

## EXHIBIT XX - DETAIL DESIGN

Table 1	Submittal Codes: Frequency
Blank	In BLK 10, there are no periodic (e.g., monthly, quarterly, annually) submittals.
WKLY	Weekly
BI-WKLY	Bi-weekly (every other week)
MTHLY	Monthly
BI-MTHLY	Bi-monthly (every other month)
QTRLY	Quarterly
SEMI-ANNLY	Every six months
ANNLY	Annually
ASREQ	As required

Table 2	Submittal Codes: Initial / Subsequent Submittal
YYYY/MM/DD	Specific Year/Month/Day
RAR	ReSubmit As Required (use only for Phase II Approval CDRLs)
DAC	Days After Contract Award; i.e., 15 DAC (include the space)
DAOE	Days After Option Exercised
DAPAC	Days after Post Award Conference.
DARP	Days After Reporting Period
DPPMC1	Days Prior to Program Management Conference #1
DPPDR	Days Prior to Preliminary Design Review
DAPDR	Days After Preliminary Design Review
DPPMC3	Days Prior to Program Management Conference #3
DPKDR	Days Prior to Contract Design Review
DPKOM	Days Prior to Kick-Off Meeting
DAKOM	Days After Kick-Off Meeting
DPIBR	Days Prior to IBR
DPICDR	Days Prior to Initial Critical Design Review
DAICDR	Days After Initial Critical Design Review
DPFCDR	Days Prior to Final Critical Design Review
DPPRR	Days Prior to Production Readiness Review
DAPRR	Days After Production Readiness Review
DPT	Days Prior to Test
DATC	Days After Test Complete
DPL/D	Days Prior to Launching / Docking
DPBT	Days Prior to Builders Trials
DPAT	Days Prior to Acceptance Trials

## EXHIBIT XX - DETAIL DESIGN

DAAT	Days After Acceptance Trials
DPD	Days Prior to Delivery
DAD	Days After Delivery

During Phase I, the Contractor shall incorporate responses to USCG comments in the next submittal of the deliverable, unless otherwise specified in the USCG response. During Phase II, the Contractor shall respond to USCG comments and resubmit deliverables updated in response to the comments within 30 days of receipt of the comments.

In subsequent submittals of a deliverable, the Contractor shall indicate on the cover page the version being submitted and include a change page that indicates changes to the paragraph level.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 040-03-1001

BLK02-TITLE OF DATA ITEM: Management Plan

BLK04-AUTHORITY: DID Number: DI-MGMT-80004  
DID Title: Management Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DAOE

BLK 13-DATE OF SUBS SUBM: 90 DPICDR  
90 DPFCDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 040-03-1009

BLK02-TITLE OF DATA ITEM: Major Review Plans and Presentations.

BLK04-AUTHORITY: DID Number: SEE BLK16  
DID Title:

BKL08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: SEE BLK16

BLK 13-DATE OF SUBS SUBM: SEE BLK16

BLK16-REMARKS:

BLK04:

Milestone Design Review Plan: The plan shall include:

- Introduction with Purpose, Scope, Overview and Applicable Documents
- Plan with Organizational Responsibilities, Team Responsibilities, Government Participation, Top Level Inputs, Review Process, Review Schedule, Process for resolving Requests for Action (RFA)
- Metrics with Entrance and Exit Criteria a check list supporting each criterion.
- Meeting announcement template
- Meeting agenda templates
- Meeting presentation template
- Request for Action (RFA) template

Milestone Design Review Presentations: This shall consist of the presentation material, including speaker's notes for each slide, videos and hard copy material not available electronically.

BLK12:

The Contractor shall provide the following initial submittal:

- Initial ICDR Plan: 30 DAOE
- Initial FCDR Plan: 30 DAOE
- Initial IBR Plan: 30 DAOE
- Initial PRR Plan: 30 DAOE
- Initial LRR Plan: 30 DAOE

BLK13:

The Contractor shall provide the following subsequent submittals:

- Final IBR Plan: 30 DPIBR
- Initial IBR Presentations: 14 DPIBR

## EXHIBIT XX - DETAIL DESIGN

- Final IBR Presentations: 14 DAIBR
- Final ICDR Plan: 30 DPICDR
- Initial ICDR Presentations: 14 DPICDR
- Final ICDR Presentations: 14 DAICDR
- Final FCDR Plan: 30 DPFCDR
- Initial FCDR Presentations: 14 DPFCDR
- Final FCDR Presentations: 14 DAFCDR
- Final PRR Plan: 30 DPPRR
- Initial PRR Presentations: 14 DPPRR
- Final PRR Presentations: 14 DAPRR
- Final LRR Plan: 30 DPLRR
- Initial LRR Presentations: 14 DPLRR
- Final LRR Presentations: 14 DALRR

For IBR the following shall be included with the presentations:

- Time phased (e.g. monthly) Budgeted Cost of Work Scheduled (BCWS), Performed (BCWP) and Actual (ACWP) in both hours and dollars which are decomposed by and include fields for control account, labor category or division, labor cost pool, Contract Work Breakdown Structure (CWBS) element and Organizational Breakdown Structure (OBS) element, whether material or labor cost. All of the foregoing elements of data shall be included in the time phased hours and cost data for BCWS, BCWP and ACWP. This time phased data shall be developed such that all costs and hours are unique to the line item of data and do not include costs for hours that are included other line items. The summation of all amounts for hours and dollars for any/all subsets or groups constitute the total costs and hours for that subset or group. (e.g. sum of all hours for line items for the electrical division is the total hours for the electrical division; or, the sum of all costs of all line items of data constitutes the cost Budget at Completion (BAC))
- PMB BAC summary by control account and labor category in hours and dollars
- Responsibility Assignment Matrix by CWBS (Hours and Dollars)
- SOW, CWBS, CWBS Dictionary and SOW to CWBS traceability matrix
- Integrated Master Schedule
- Contract Deliverable Requirements List (CDRL)

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 040-03-1029

BLK02-TITLE OF DATA ITEM: Conference Meeting Agenda, Presentation  
Material, Actions, Action Tracking

BLK04-AUTHORITY: DID Number: Conference  
Meeting Agenda, Presentation  
Material, Actions, Action Tracking  
DID Title: SEE BLK16

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: SEE BLK16

BLK13-DATE OF SUBS SUBM: SEE BLK16

BLK16-REMARKS:

This does not apply to the major reviews addressed in 042-03-1009.

BLK04:

The Conference Meeting Agenda shall include the following:

- Program Name
- Program Element Name from Program Plan
- Conference Title / Subject
- Conference date, time and location
- Contractor POC / e-mail / phone
- Agenda topics

Presentation Material shall include:

- Slides
- Videos
- Hardcopy material not available electronically

Actions and Action Tracking shall include:

- Identification number
- Action short title
- Action description
- Name of person responsible for responding to the item
- Name of person authorized to close the item
- Due date for action response
- Outlook date
- Actual Response Date
- Date Closed
- Status / Closure comments

EXHIBIT XX - DETAIL DESIGN

BLK12:

The Contractor shall submit the initial Conference Meeting Agenda 14 days prior to the meeting.

The Contractor shall submit initial presentation material 7 days prior to the meeting.

The Contractor shall submit Actions 14 days after the meeting.

BLK13:

The Contractor shall submit the final Conference Meeting Agenda at the meeting.

The Contractor shall submit final presentation material 14 days after the meeting.

The Contractor shall provide Action Tracking quarterly after the Actions have been submitted until the Actions have been closed by the person authorized to close the action.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 040-03-2288

BLK02-TITLE OF DATA ITEM: Integrated Management Schedule

BLK04-AUTHORITY: DID Number: DI-MGMT-81650  
DID Title: Integrated Master Schedule (IMS)

BLK08-APP CODE:

BLK10-FREQUENCY: MNTHLY

BLK12-DATE OF 1ST SUBM: 30 DAOE

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04:

The IMS shall be a Detailed Schedule. In addition, the schedule shall include:

- Initial submittal:
  - o GFI deliveries and dependencies.
  - o Key model test milestones.
  - o Deliverable submittals.
  - o Summary (Top Level) of Logistics activities
- Subsequent submittal shall also include:
  - o GFE deliveries and dependencies.
  - o Long lead time material RFP dates and in-yard-need-dates.
  - o Erection Sequence Schedule
  - o Key Event Schedule
  - o Schedule of Required Dates for Materials
  - o Material Ordering Schedule
  - o Test Schedule

BLK 16:

The initial schedule shall go to a 3 digit ESWS level from contract award through Lead Ship delivery. The schedule after FCDR shall go to a 5 digit ESWS level through Lead Ship delivery. The schedule shall go to a summary level for the Follow ships.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 041-03-1000

BLK02-TITLE OF DATA ITEM: Configuration Status Reports

BLK04-AUTHORITY: DID Number: DI-CMAN-81253  
DID Title: Configuration Status  
Accounting Information

BLK08-APP CODE:

BLK10-FREQUENCY: QTRLY

BLK12-DATE OF 1ST SUBM: ICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 04:

Modify DI-CMAN-81253 as follows:  
Change DID reference from MIL-HDBK-61 to MIL-HDBK-61A and ANSI/EIA-649-1998 to ANSI/EIA-649A-2004.

Paragraph 2 Format & Content. Add the following:  
CSA reports shall be extracted from the approved Coast Guard CSA Tool. The CSA Report shall contain the data in accordance with the Configuration Status Accounting Data Elements (2011-12-08\_ATCH\_CDMD-OA\_DATA\_ELEMENTS)

BLK 10:

Recurring submissions shall be monthly after ICDR, on the 15th day of the month.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 041-03-1013

BLK02-TITLE OF DATA ITEM: Configuration Management (CM) Plan

BLK04-AUTHORITY: DID Number: Contractor's  
format

DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The plan shall also include any updates including C4ISR, GFE, and GFI.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 041-03-1021

BLK02-TITLE OF DATA ITEM: Physical Configuration Audit (PCA) Summary Report

BLK04-AUTHORITY: DID Number: DI-CMAN-81022  
DID Title: Configuration Audit Summary Report

BLK08-APP CODE:

BLK10-FREQUENCY: See Block 16

BLK12-DATE OF 1ST SUBM: 30 DA PCA

BLK13-DATE OF SUBS SUBM: See Block 16

BLK16-REMARKS:

BLK04:

Modify the DID as follows: Change DID reference from MIL-HDBK-61 to MIL-HDBK-61A and ANSI/EIA-649-1998 to ANSI/EIA-649A-2004.

BLK 10:

The report shall be submitted monthly until the contractor resolves all physical configuration discrepancies.

BLK 12:

The first submission shall identify all discrepancies and address the contractor's plan to resolve discrepancies in the government's PCA. Allow 30 days for government review and approval.

BLK 13:

The final report shall be submitted after the contractor resolves all discrepancies and shall document all corrective actions.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 041-03-1022

BLK02-TITLE OF DATA ITEM: Engineering Change Proposals (ECP)

BLK04-AUTHORITY: DID Number: DI-CMAN-80639  
DID Title: ENGINEERING CHANGE PROPOSAL (ECP)  
DID Number: DI-CMAN-80642  
DID Title: NOTICE OF REVISION (NOR)

BLK08-APP CODE:

BLK10-FREQUENCY: ASREQ

BLK12-DATE OF 1ST SUBM: See Block 16

BLK13-DATE OF SUBS SUBM: See Block 16

BLK16-REMARKS:

BLK 04:

Change DID references from MIL-HDBK-61 to MIL-HDBK-61A and ANSI/EIA-649-1998 to ANSI/EIA-649A-2004. The Contractor shall refer to ANSI/EIA-649A-2004, paragraph 5.3 Configuration Change Management for guidance on ECP processes.

The report shall be submitted electronically in a Microsoft Office format.

BLK 12:

45 days after approval of Engineering Change Request (ECR).

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 041-03-1025

BLK02-TITLE OF DATA ITEM: Request For Deviation (RFD)

BLK04-AUTHORITY: DID Number: DI-CMAN-80640  
DID Title: Request for Deviation  
(RFD)

BLK08-APP CODE:

BLK10-FREQUENCY: ASREQ

BLK12-DATE OF 1ST SUBM: See Block 16

BLK13-DATE OF SUBS SUBM: See Block 16

BLK16-REMARKS:

BLK 04:

Modify Paragraph 2. Format and content as follows:  
Change Table and paragraph references to Paragraph 6.3 and Table 6-9,  
respectively.

BLK 13:

30 days after Government disposition.

A. BLK 16: The Contractor shall classify RFDs in accordance with  
MIL-HDBK-61.

B. Each RFD shall:

3.1.1.1.B.1 Identify the affected item(s),

3.1.1.1.B.2 Provide a detailed description of the difference  
between the configuration of the item and the configuration  
baseline document,

3.1.1.1.B.3 Provide justification for the deviation,

3.1.1.1.B.4 Provide a discussion of the consequences of approval,  
to include technical details explaining the degree of non-  
compliance and the effects on equipment or system operation  
constraints,

3.1.1.1.B.5 Describe how the deviation will be documented in the  
hull(s) configuration documentation.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 041-03-1043

BLK02-TITLE OF DATA ITEM: Justification for Technical Determination (JTD)

BLK04-AUTHORITY: DID Number:  
DID Title:

BLK08-APP CODE: A

BLK10-FREQUENCY: AS REQ

BLK12-DATE OF 1ST SUBM:

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Shall be submitted on forms provided by ABS.

BLOCK 8: Requires approval by both ABS and the Government.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 041-03-1046

BLK02-TITLE OF DATA ITEM: Master Index of Primary Reference Documents  
(MIPRD) ReportBLK04-AUTHORITY: DID Number: Contractor  
format.

DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

ANNNLY

BLK12-DATE OF 1ST SUBM:

180 DAPAC

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The MIPRD shall be a database or an Excel spread sheet containing the referencing SWBS section, reference document number, title, applicable revision, issue date, hull effectivity and comments. The MIPRD shall be capable of identifying the specific set of document versions for each hull.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 041-03-1646

BLK02-TITLE OF DATA ITEM: GFE Load-out and Installation Plan

BLK04-AUTHORITY: DID Number: DI-MGMT-80033  
DID Title: Site Preparation Requirements and  
Installation Plan

DID Number: DI-CMAN-80858  
DID Title: Contractor's Configuration  
Management Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK 13-DATE OF SUBS SUBM: 45 DPICDR and 45 DPFCDR

BLK16-REMARKS:

The GFE Load-out and Installation Plan shall describe the handling of GFE from in-yard stowage through shipboard Installation. The Plan shall minimize the in-yard period to installation and coordinate Schedule B services. The Plan shall address issues including cabling, piping, ventilation ducts, Bulkhead Openings cut, and other miscellaneous items necessary for GFE installation and performance or stowage.

The GFE Load-out and Installation Plan shall include a database or an Excel spread sheet containing the following:

- Schedule A Revision date
- Schedule A Item Number
- Quantity
- Item Description
- Identification Number
- Installation Control Drawing Number
- Approximate In-yard Date
- Expected Installation Date
- Technical Support Services - Shipboard Integration Total Man Days per ship (from Schedule B)
- Comment or Issues

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 041-03-2225

BLK02-TITLE OF DATA ITEM: Data Accession List (DAL)

BLK04-AUTHORITY: DID Number: Contractor format  
DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY: Annually

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The Data Accession List shall be in Contractor format that includes the data item, title, and location in the IDE.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 041-03-2306

BLK02-TITLE OF DATA ITEM: Engineering Change Request (ECR)

BLK04-AUTHORITY: DID Number: DI-CMAN-80639  
DID Title: Engineering Change Proposal (ECP)  
DID Number: DI-CMAN-80642  
DID Title: Notice Of Revision (NOR)

BLK08-APP CODE:

BLK10-FREQUENCY: ASREQ

BLK12-DATE OF 1ST SUBM:

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 04:

Change DID references from MIL-HDBK-61 to MIL-HDBK-61A and ANSI/EIA-649-1998 to ANSI/EIA-649A-2004. The Contractor shall refer to ANSI/EIA-649A-2004, paragraph 5.3 Configuration Change Management for guidance on ECP processes.

The report shall be submitted electronically in a Microsoft Office format.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-1023

BLK02-TITLE OF DATA ITEM: Build Strategy and Producibility Report

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and  
Technical Reports System

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: SEE BLK 16

BLK13-DATE OF SUBS SUBM: SEE BLK 16

BLK16-REMARKS:

1<sup>st</sup> Submission: 30 DPICDR2<sup>nd</sup> Submission: 30 DPFCDR3<sup>rd</sup> Submission: 30 DPPRR

SUBS SUBM: Subsequent submissions are required based on updates or revisions to the OPC Build Strategy and Producibility Report due to production lessons learned and/or design changes which impact production practices and/or alter or improve the build strategy. Final updated submission due 30 DPCDD

The Build Strategy and Producibility Report shall include results of the referenced SOW tasking and include the following:

1. An updated detailed organization including key personnel resumes and their contact information.
2. Industrial base capabilities and limitations (including supplied equipment)
3. Outfit zones, hull block and sub-block definitions
4. Describe rationale for outfit zones, hull block and sub-block breaks
5. Describe the dimensional reference system to be applied
6. Define any unusual tolerances of alignment procedures required
7. Describe hull, deckhouse and machinery space and weapon systems outfitting approaches (including on-unit, on-block and grand block, on-board outfitting goals, outfit package concepts, etc.)
8. Describe the rationale for scheduling and erection sequencing
9. Describe the approach for deckhouse fabrication, assembly and integration
10. Describe the approach to critical foundation selection and alignment
11. Shore power capacity and quality
12. Copies of the work instructions and processes.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-1032

BLK02-TITLE OF DATA ITEM: Contractor/ABS Communications Report

BLK04-AUTHORITY: format. DID Number: Contractor

DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY: QTRLY

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Contractor / ABS Communications shall include any e-mails or formal correspondence between the Contractor / ABS that will not appear on the ABS O2E and O2K databases.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-1072

BLK02-TITLE OF DATA ITEM: Purchase Orders, and Index of Purchase Orders

BLK04-AUTHORITY: DID Number: CGDI-ADMN-90014  
DID Title: Purchase Orders, Copies  
of/Index of

BLK08 APP CODE: I

BLK10-FREQUENCY: QTRLY

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK13-DATE OF SUBS SUBM: See BLK 16

BLK16-REMARKS:

BLK04:

Within paragraph 10.1: After "USCG" insert "hull" and delete the last sentence: "Purchase orders shall be typewritten and legible."

Paragraph 10.2: Delete first two sentences and replace with "Purchase Orders shall contain the following information in the order identified below:"

Delete 10.2M "Contractor assigned provisioning technical documentation control number that items G above will be shown and date material is due."

For each item listed, the index shall include the purchase order number, date of issue, nomenclature, end use of equipment, name of manufacturer, manufacturer model or type number, APL number as available, LSA Control Number and Equipment Functional Description (EFD).

The applicable procurement specification such as Military, Federal, USCG approval authority shall be specified in every case. The index shall also include associated drawings, or technical manual requirements, as applicable.

BLK 12:

Submission shall be 60 days prior to the issue of each Purchase Order.

BLK 13:

Submit revised index only if changes have occurred during the previous reporting period. If no changes have been made, submit a letter so stating

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-1420

BLK02-TITLE OF DATA ITEM:Requirements Specification (RS)

BLK04-AUTHORITY:

DID Title:	DID Number: DI-IPSC-81433
	Software Requirements Specifications

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK 13-DATE OF SUBS SUBM: See BLK 16

BLK16-REMARKS:

BLK02:

Applies to:

- System/Subsystem Requirements Specification (SSRS)
- Interface Requirements Specification (IRS)
- Software Requirements Specification (SRS)

BLK 13:

60DPICDR, 90DPFCDR, and 60 days after additional changes to reflect changes through delivery. Final version shall be 60DAD and reflect the as-built condition.

BLK16:

Separate packages shall be provided for C4ISR and Machinery Control Systems (MPCMS, PCS, EPCS).

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-1424

BLK02-TITLE OF DATA ITEM: Software Architecture Document (SAD)

BLK04-AUTHORITY: DID Number: DI-MGMT-81644  
DID Title: DoD Architecture Framework  
Documentation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK 13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

The updates shall also include:

AV-2 Integrated Dictionary

SV-2 SYSTEMS COMMUNICATIONS DESCRIPTION

- Identify all C4ISR internal system nodes (physical elements/localities) associated with the subject system.
- Define ports for each specified connection between system nodes.
- Define connectors for each communications path between ports.
- "Roll up" similar interfaces (i.e., those using the same identifier) where appropriate to alleviate unnecessary testing.

SV-4 SYSTEMS FUNCTIONALITY DESCRIPTION

- Establish a hierarchical format for the SV-4 diagram(s).

SV-6 SYSTEMS RESOURCE FLOW MATRIX

- Construct one or more entries (rows) on the SV-6 for every interface identified in the SV-2.
- Depict two-way interfaces from the SV-2 on the SV-6 using two rows.
- Depict one-way (receive only) interfaces from the SV-2 on the SV-6 using only one row.

SV-9 SYSTEMS TECHNOLOGY FORECAST

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-1550

BLK02-TITLE OF DATA ITEM: Software Development Plan (SDP)

BLK04-AUTHORITY:

DID Number:

DI-IPSC-81427

DID Title:

Software

Development Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

30DAOE

BLK13-DATE OF SUBS SUBM:

30DPICDR

BLK16-REMARKS

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-1558

BLK02-TITLE OF DATA ITEM: Database Design Description Documents (DBDD)

BLK04-AUTHORITY: DID Number: DI-IPSC-81437  
DID Title: Database Design Description

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DAOE

BLK 13-DATE OF SUBS SUBM: See BLK16

BLK16-REMARKS:

BLK 13:

60DPICDR, 90DPFCDR, and 60 days after each change to reflect changes through delivery. Final version shall reflect the as-built condition.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-2060

BLK02-TITLE OF DATA ITEM: Firmware Support Manual (FSM)

BLK04-AUTHORITY: DID Number: DI-IPSC-81448  
DID Title: Firmware Support Manual

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPD

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The manuals for MPCMS, PCS, EPCS, subsystems, and stand alone systems shall be delivered as separate documents.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-2061

BLK02-TITLE OF DATA ITEM: Interface Design Description

BLK04-AUTHORITY: DID Number: DI-MGMT-81453  
2DID Title: Interface Design Description

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK 13-DATE OF SUBS SUBM: 30DPFCDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-2339

BLK02-TITLE OF DATA ITEM: Request for USCG Resources

BLK04-AUTHORITY: DID Number: Contractor format  
DID Title:

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: ASREQ

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

This is to request the support of USCG uniformed personnel to support model and mockup operational and maintenance testing.

BLK04:

The request shall contain the following information:

- a. Project Name.
- b. Project Contract Number / CLIN.
- c. Contractor Company Name.
- d. Point of Contact Name / Title / Phone / e-mail.
- e. SOW reference for task for which support is requested.
- f. For the support being requested, provide the following:
  - i. Description
  - ii. Proposed schedule.
  - iii. Location, if applicable, of where the support is to be performed.
  - iv. Characteristics / skills / expertise of requested personnel support.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03- 2341

BLK02-TITLE OF DATA ITEM: .Cost Performance Reports (CPR)

BLK04-AUTHORITY: DID Number: DI-MGMT-81466  
DID Title: Contract Performance Report (CPR)

BLK08-APP CODE:

BLK10-FREQUENCY: MTHLY

BLK12-DATE OF 1ST SUBM: 30 DAIBR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 4:

DI-MGMT-81466 shall be tailored as follows:

CPR formats - WBS requirement for format 1: the WBS and level of reporting detail shall match the CWBS. However, when the budgeted value of a CWBS element exceeds 20% of the applicable contract budget baseline (CBB) then such element will be reported at a lower level where none of the lower reporting elements exceed 20% of the CBB.

General: The contract performance report shall contain separate analysis and report formats for each option exercised.

Variance thresholds: The report shall contain variance analysis narrative explanations for man-hours, direct labor dollars, material dollars and overhead dollars separately. Narrative explanations shall identify engineering and production contribution to variance and discuss reason for the variance, impact to program, and corrective action / problem resolution when the following thresholds are exceeded:

Detail design man-hours:

- o Current cost variance: +/- 10% and greater than 300 hours
- o Current schedule variance: +/- 10% and greater than 300 hours
- o Cumulative cost variance: +/- 7% and greater than 900 hours
- o Cumulative schedule variance: +/- 7% and greater than 900 hours
- o Variance at completion: +/- 7%

Detail design direct labor dollars:

- o Current cost variance: +/- 10% and greater than 7k dollars
- o Current schedule variance: +/- 10% and greater than 7k dollars
- o Cumulative cost variance: +/- 7% and greater than 30k dollars
- o Cumulative schedule variance: +/- 7% and greater than 30k dollars
- o Variance at completion: +/- 7%

Detail design material dollars:

- o Current cost variance: +/- 10% and greater than 50k dollars

## EXHIBIT XX - DETAIL DESIGN

- o Current schedule variance: +/- 10% and greater than 50k dollars
- o Cumulative cost variance: +/- 7% and greater than 200k dollars
- o Cumulative schedule variance: +/- 7% and greater than 200k dollars
- o Variance at completion: +/- 7%

## Overhead:

- o Current cost variance: +/- 10%
- o Current schedule variance: +/- 10%
- o Cumulative cost variance: +/- 7%
- o Cumulative schedule variance: +/- 7%
- o Variance at completion: +/- 7%

Unless otherwise specified, variance analysis shall be provided for CWBS/OBS reporting elements which have cumulative CV, cumulative SV or VAC exceeding a +/- \$500k or +/- 10% threshold for dollars (whichever is less) and which have cumulative CV, cumulative SV or VAC exceeding a +/- 15,000 hour or +/- 10% threshold for hours (whichever is less).

Cost variance explanations need not be reported until the cumulative ACWP exceeds 10% of the CWBS BAC. Schedule variance explanations need not be reported until the cumulative BCWS exceeds 10% of the CWBS BAC. Man-hours, direct labor dollars, and material dollars variance thresholds apply to the lowest levels of the WBS required for format 1 sub-format reports (e.g. format 1a, 1b, 1c). Overhead dollar variance thresholds apply to the overhead level of reporting for the format 1 contract summary report.

Variance analysis thresholds shall be evaluated on an annual basis.

**Supplemental CPR Support Data:** Supplemental CPR support data shall be included in the monthly report including:

- Current and cumulative Labor (Hours and Dollars) & Material Dollar data at the Control Account level and the lowest level of the Contractor's Work Breakdown and Organizational Breakdown Structure (CWBS & OBS).
- Current and cumulative Overtime hours expended at the Control Account level.
- Contract budget log reflecting internal and/or external Labor (Hour and Dollar), Material Dollar, and Indirect Dollar changes to the performance measurement baseline (PMB) at the control account level.
- Time phased Labor (Hours and Dollars) Material Dollar, and Indirect Dollar PMB and estimate at completion (EAC) shall be provided as risk situations warrant, but as a minimum quarterly and consistent with the periodic progress reviews

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-2342

BLK02-TITLE OF DATA ITEM: Supplemental CPR Support Data

BLK04-AUTHORITY: DID Number: DI-SESS-81309  
DID Title: Internal Contractor Technical Data Report

BLK08-APP CODE:

BLK10-FREQUENCY: MTHLY

BLK12-DATE OF 1ST SUBM: 30 DAIBR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The report shall provide additional insight into contract cost and/or schedule performance, including:

1. Current and cumulative Labor (Hours and Dollars) & Material Dollar data at the Control Account level and available on request down to the lowest level of the Contractor's Work Breakdown and Organizational Breakdown Structure (CWBS & OBS).
2. Current and cumulative Overtime hours expended at the Control Account level.
3. Contract budget log reflecting internal and/or external Labor (Hour and Dollar), Material Dollar, and Indirect Dollar changes to the performance measurement baseline (PMB) at the control account level.
4. Time phased Labor (Hours and Dollars), Material Dollar, and Indirect Dollar PMB and estimate at completion (EAC) shall be provided as risk situations warrant, but as a minimum quarterly consistent with the periodic progress reviews.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-2343

BLK02-TITLE OF DATA ITEM: Earned Value Management System Plan (EVMS)

BLK04-AUTHORITY: DID Number: Contractor Format  
(DI-MGMT-80004 for guidance)  
DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90DP PRR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-2347

BLK02-TITLE OF DATA ITEM: Display Screen Designs/Layouts, Button Actions,  
and Operator Actions for Console & Work  
StationsBLK04- AUTHORITY: DID Number: DI-IPSC-81443  
DID Title: Software User Manual (SUM)

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK 13-DATE OF SUBS SUBM: 30DPFCDR

BLK16-REMARKS:

The Display Screen Designs shall show final screen layouts to be coded and developed. These shall include:

- Positioning of the screens at the workstations, Operator's keyboard, buttons, joy-stick(s), or other devices to be incorporated into a User Manual or Quick Reference Guide for the Operator
- Layouts of the partitioned sections and tabular or itemized data for all partitioned sections
- The Operator Actions for:
  - o Start-up procedures
  - o Screen selection procedures
  - o Shut-down procedures
  - o File or program access control or maintenance procedures
  - o Messages and alerts

Separate packages shall be provided for C4ISR and MPCMS.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-2347

BLK02-TITLE OF DATA ITEM: Display Screen Designs/Layouts, Button Actions,  
and Operator Actions for Console & Work  
StationsBLK04- AUTHORITY: DID Number: DI-IPSC-81443  
DID Title: Software User Manual (SUM)

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK 13-DATE OF SUBS SUBM: 30DPFCDR

BLK16-REMARKS:

The Display Screen Designs shall show final screen layouts to be coded and developed. These shall include:

- Positioning of the screens at the workstations, Operator's keyboard, buttons, joy-stick(s), or other devices to be incorporated into a User Manual or Quick Reference Guide for the Operator
- Layouts of the partitioned sections and tabular or itemized data for all partitioned sections
- The Operator Actions for:
  - o Start-up procedures
  - o Screen selection procedures
  - o Shut-down procedures
  - o File or program access control or maintenance procedures
  - o Messages and alerts

Separate packages shall be provided for C4ISR and MPCMS.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 042-03-2350

BLK02-TITLE OF DATA ITEM: Software Development Schedule

BLK04-AUTHORITY: DID Number: DI-MGMT-81650  
DID Title: Integrated Master Schedule (IMS)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 045-03-1077

BLK02-TITLE OF DATA ITEM: Care of Ship During Construction Plan

BLK04-AUTHORITY: DID Number: BLK 16  
DID Title:

BLK-08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPPRR

BLK13-DATE OF SUBS SUBM: BLK 16

BLK16-REMARKS:

BLK 4:

The Care of -ship During Construction Plan (CCDCP) shall be in the Contractor's format and shall contain, as a minimum, the following sections. Subordinate plans shall be provided as Appendices in sufficient detail to be used as stand-alone documents when removed from the overarching plan.

1. The Contractor's organizational structure, points of contact, processes, equipment and material to ensure care and protection during construction and execute the plan
2. Plan to maintain the CCDCP and subordinate plans current and incorporate lessons learned.
  - a. BLK 16: The CCDCP and subordinate plans shall be finalized 30 DPPRR, incorporating Government comments.
  - b. BLK 16: The CCDCP and subordinate plans shall be updated annually, 30 days prior to the start of the regions seasonal severe weather patterns or environmental conditions.
3. Plan for routine machinery and equipment (CFE & GFE) maintenance actions and material condition and submission of the Care of Ship Report.
  - a. Description of the Equipment Time Log Database Report for maintenance and operation
4. Plan for protection of and response to loss or damage to the ship, material, machinery and equipment (CFE or GFE), or spares and submission of the Care of Ship - Damage Incident Report.
5. Plan for Inventory, Control, Safeguard & Security of the ship, material, machinery and equipment (CFE or GFE), or spares.
6. Plan to execute OEM and vendor operation and maintenance procedures for -ship machinery and equipment for maintenance, installation, operation, testing and trials.
7. Plan for the prevention of and protection against fire and flooding
  - a. Location and Description of the Central Casualty Control Station (CCCS)
  - b. Description of the Fire Prevention and Protection Plan (FPPP).
  - c. Description of the Flooding Prevention and Protection Plan (FLPPP)

## EXHIBIT XX - DETAIL DESIGN

8. Plan for protection from the environment of the ship, material, machinery and equipment (CFE & GFE) and spares.
  - a. Description of the Destructive Weather Plan (DWP).
9. Plan to provide corrosion prevention and cathodic protection for the ship.
10. Plan to ensure sanitary construction of the ship
11. Plan for Monitoring, Alarms and Controls
12. Plan for periodic drills
13. Plan to provide and maintain a Safe Building and Launching Facility.
  - a. Plan to or provide a Certified Safe Building and Launching Facility.
14. Plan to provide written procedures, calculations for and conduct launching, docking, and undocking of the ship
15. Plan for Care of Ship Condition at Delivery

## APPENDICES

- A. CCDC Organizational Chart
- B. Shipyard Layout identifying Casualty, Fire & Flooding response equipment locations & facilities
- C. Copies of Shipyard Processes and Instructions
- D. Sample Ship Care Report
  - a. Sample Equipment Time Log Database Report
- E. Sample ship Care - Damage Incident Report
- F. Fire Prevention and Protection Plan (FPPP).
- G. Flooding Prevention and Protection Plan (FLPPP)
- H. Destructive Weather Plan (DWP).
  - a. Normal and Severe Weather/Storm Mooring Drawing

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 068-03-1081

BLK02-TITLE OF DATA ITEM: Requirements Traceability Matrix and  
Verification Plan

BLK04-AUTHORITY: DID Number: DI-MISC-80508  
DID Title: Technical Report  
- Study/Services

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK13-DATE OF SUBS SUBM: 60 DPFCDR

BLK16-REMARKS:

The update shall include Software Requirements Traceability and  
Verification.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 068-03-1083

BLK02-TITLE OF DATA ITEM: Contractor's Risk Management Plan and Database  
(CRMP)BLK04-AUTHORITY  
Manangement PlanDID Number: DI-MGMT-81808  
DID Title: Contractor's Risk

BLK08-APP CODE:

BLK10-FREQUENCY:

QTRLY

BLK12-DATE OF 1ST SUBM:

60 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The following definitions shall be used to assess and rate risk events:

## Probability of Occurrence

Level		Normal approaches and processes	
Remote	Very Low (<10%)	1	Will effectively avoid or mitigate this risk based on standard practices
Unlikely	Low (11-35%)	2	Have usually mitigated this type of risk with minimal oversight in similar cases
Likely	Medium (36-65%)	3	May mitigate this risk, but workarounds will be required
Highly Likely	High (66-90%)	4	Cannot mitigate this risk, but a different approach might mitigate this risk
Near Certaint Y	Very High (>90%)	5	Cannot mitigate this type of risk, no known processes or workarounds are available

## EXHIBIT XX - DETAIL DESIGN

## Severity of Consequence

Level		Cost	Schedule	Technical	Programmatic	Support
Minimal Impact	1	Minimal deviation from planned budget	Minimal schedule impact	Similar system in field currently meets all requirements	Issues that have minimal impact	Similar system currently being supported with established logistics
Marginal	2	<10% deviation from planned budget	Meet schedule with additional project resources or additional activities	Meets objective requirement but margin is low	Issues that can be mitigated by the Contractor alone	Support plan not fully resourced but multiple alternatives exist in the current market
Significant	3	10-15% deviation from planned budget	Slip less than 4 months in key milestones	Meets threshold with adequate margin	Issues that may require Government support	Support plan not fully resourced but one alternative exists in the current market
Critical	4	15-20% deviation from planned budget	More slip (over 4 months) in key milestones	Meets threshold with low or no margin	Issues that require extensive Government support	Support plan not fully resourced but alternatives will be available in the near future
Unacceptable	5	>20% deviation from planned budget	Cannot meet key milestones	Does not meet threshold	Issue cannot be resolved	Support requirement exceeds resource capabilities

EXHIBIT XX - DETAIL DESIGN

Risk Rating Matrix

Severity of Consequence	5	Unacceptable	5	10	15	20	25
	4	Critical	4	8	12	16	20
	3	Significant	3	6	9	12	15
	2	Marginal	2	4	6	8	10
	1	Minimal or no impact	1	2	3	4	5
		Remote	Unlikely	Likely	Highly Likely	Near Certainty	
		1	2	3	4	5	
Probability of Occurrence							

Risk Rating	Definition
High Risk	Unacceptable. Major disruption likely. Priority management attention required
Moderate Risk	Some disruption. Additional management attention required.
Low Risk	Minimal impact. Normal oversight needed to ensure risk remains low.

BLK04: The following definitions shall be used for the headings in Section 2.3 of the DID:

- a. Introduction: This section addresses the purpose and objective of the plan, and provide a brief summary of the program, to include the approach being used to manage the program, and the acquisition strategy.
- b. Scope: This section describes the extent that the CRMP covers all possible risks that may occur during design and construction. This section also lists assumptions that have gone into creating the CRMP.
- c. Program Summary: This section contains a high level description of the Contractor’s Risk Management program and how it supports the acquisition strategy.
- d. Risk Management Strategy and Process: Provide an overview of the risk management approach, to include the status of the risk management effort to date, and a description of the program risk management strategy.
- e. Responsible /Executing Organizational Component. Describe the risk management organization and list the responsibilities of each of the risk management participants.
- f. Risk Management Process and Procedures: Describe the program risk management process to be employed; i.e., risk planning, assessment, handling, monitoring and documentation, and a basic explanation of these components. Also provide application guidance for each of the risk management functions in the process. It shall address how the information associated with each element of the risk management process will be documented and made available to all participants in the process, and how risks will be tracked, to include the identification of specific metrics if possible.

## EXHIBIT XX - DETAIL DESIGN

g. Risk Identification: This section describes the risk planning process and provides guidance on how it will be accomplished, and the relationship between continuous risk planning and this CRMP. Guidance on updates of the CRMP and the approval process to be followed shall also be included.

h. Risk Analysis: This section of the plan describes the assessment process and procedures for examining the critical risk areas and processes to identify and document the associated risks. It also summarizes the analyses process for each of the risk areas leading to the determination of a risk rating. This rating is a reflection of the potential impact of the risk in terms of its variance from known Best Practices or probability of occurrence, its consequence/impact on schedule, acquisition costs, and life cycle costs, and its relationship to other risk areas or processes. This section shall include:

- Overview and scope of the assessment process;
- Sources of information;
- Information to be reported and formats;
- Description of how risk information is documented; and
- Assessment techniques and tools

i. Risk Mitigation Planning: This section describes the procedures used to determine and evaluate various risk handling options.

j. Risk Mitigation Implementation: This section identifies tools that can assist in implementing the risk handling process. It also provides guidance on the use of the various handling options for specific risks.

k. Risk Tracking: This section provides the procedure to document risks throughout the design and construction process. It also provides the procedure to identify how risks have been mitigated throughout the design and construction process.

Add subparagraph m to Section 2.3 as follows:

m. Definitions: Definitions used by the Contractor shall be consistent with DHS definitions for ease of understanding and consistency.

The Risk Database shall be included as an appendix. The risk database shall also include Cross-reference risk events to applicable sections of the OPC System Specification. The database shall include closed risks that reflect the status as closed.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 068-03-2106

BLK02-TITLE OF DATA ITEM: Master Equipment List (MEL)

BLK04-AUTHORITY: DID Number: Contractor  
format.

DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK13-DATE OF SUBS SUBM: 60 DPFCDR

BLK16-REMARKS:

BLK04:

The MEL shall be in Microsoft Office Excel spreadsheet format. The MEL shall contain an entry for each configuration item with its associated data.

The MEL shall include:

- ESWBS: The appropriate 5-digit code selected from the SFLC ESWBS List [2011-12-08\_ATCH\_SFLC\_ESWBS\_DEFINITIONS.]
- Equipment Name
- Equipment Location: The compartments that the equipment is located in.
- Quantity per Location
- Next higher assembly (NHA) ESWBS HSC.
- NHA Nomenclature.
- Equipment Performance Characteristics
- Equipment Configuration Data
  - o Dimensions in inches, dimensions with maintenance and operational envelopes in inches
  - o Dry Weight: The weight of the equipment without operating fluids in pounds.
  - o Wet Weight: The total weight of the equipment including operating fluids in pounds.
  - o Electrical Power: The connected power required by the equipment in kW.
  - o Electric Phase: The electric phase of the equipment.
  - o Electrical Frequency: The electrical frequency of the equipment in Hz.
  - o Voltage: The voltage required by the equipment in volts.
- Original Equipment Manufacturer(OEM) CAGE code.
- (OEM) Name.
- Reference Number: Each potential OEM's part number.
- Manufacturing Lead Time: Identifies the equipment's lead time in months.

## EXHIBIT XX - DETAIL DESIGN

- Essentiality Code: Indicates the degree to which the failure of the part affects the ability of the applicable ship's mission system to perform its intended operation:
  - 041.8 1 - Failure to this part will render the end item inoperable.
  - 041.9 3 - Failure to this part will not render the end item inoperable.
  - 041.10 5 - Item does not qualify for the assignment of code 1, but is needed for personnel safety.
  - 041.11 6 - Item does not qualify for assignment of code 1, but is needed for legal, climatic, or other requirements peculiar to the planned operational environment of the end item.
  - 041.12 7 - Item does not qualify for the assignment of code 1, but is needed to prevent impairment of or the temporary reduction of operational effectiveness of the end item.
- Notes: Details describing the basis for the equipment characteristics.
- Date: The date the record was established/updated in the MEL.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 068-03-2285

BLK02-TITLE OF DATA ITEM: Systems Engineering Management Plan (SEMP)

BLK04-AUTHORITY: DID Number: DI-SESS-81785  
DID Title: Systems Engineering Management  
Plan (SEMP)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DAOE

BLK 13-DATE OF SUBS SUBM: 45 DPICDR, 45DPFCDR

BLK16-REMARKS:

The updated SEMP shall provide the Contractor's organization for the design, development, integration, simulation/stimulation, testing, demonstration, and documentation of the C4ISR system. The updated SEMP shall describe the planned usage of the C4ISR Test and Integraton Facility (TIF).

The updated SEMP shall describe the plan for establishing and using a C4ISR Production Facility (PF) with relation to the following:

1. Facility design including similarities/deviations from ship's compartment
2. Fixed plant equipment, foundations and wiring
3. Flow-through sequencing and plans for ship's equipment
4. Simulation or stimulation requirements
5. Process for C4ISR equipment receipt, setup, interface testing, troubleshooting, disassembly
6. Process for involving TIF design engineers for troubleshooting and resolving problems discovered during checkout of ship's equipment at the PF.

The updated SEMP shall describe the plan for establishing and using an MPCMS Land Based Test Facility (LBTF) with relation to the following:

1. Extent to which MPCMS design, development, integration, simulation/stimulation, testing, demonstration, and documentation will be accomplished at the MPCMS LBTF
2. Facility design including similarities/deviations from ship's machinery control compartment
3. Fixed plant equipment, foundations and wiring
4. Flow-through sequencing and plans for ship's MPCMS equipment
5. Simulation or stimulation requirements
6. Process for MPCMS equipment receipt, setup, interface testing, troubleshooting, disassembly
7. Process for involving MPCMS design engineers in troubleshooting and resvoling design problems discovered during checkout of ship's equipment at LBTF.

SE Reviews: Include the following in the appropriate submittal for each formal SE reviews:

## EXHIBIT XX - DETAIL DESIGN

1. Description of how focused technical reviews will build to each formal SE Review
  - a. Describe the relationship between technical reviews, C4ISR TIF, PF testing and demonstrations, and the formal SE reviews.
  - b. Describe the relationship between technical reviews, MPCMS LBTR testing and demonstrations, and the formal SE reviews.
2. Provide a table for each review that links the Contractor's products to the entrance criteria.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 068-03-2317

BLK02-TITLE OF DATA ITEM: C4ISR Integration Plan (CIP)

BLK04-AUTHORITY: DID Number: DI-MGMT-80033  
DID Title: Site Preparation Requirements and  
Installation Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DAOE

BLK13-DATE OF SUBS SUBM: See Block 16

BLK16-REMARKS:

BLK13:

Updates shall be provided 30DPICDR, 30DPFCDR, 30DP to the TIF and 30DP to the PF events.

In addition to the requirements included in Phase I, the CIP shall:

- Document a Critical Path Analysis for C4ISR installation/integration.
  - (a) Provide a schedule, strategy and procedures (component level) for the installation/integration of the hardware and software components into completely tested and validated C4ISR system in accordance with the OPC Systems Specifications.
  - (b) Document engineering and technical services for equipment installation and integration, testing and evaluation, and checkout of various C4ISR systems and associated interface systems, hardware, software, subsystems, or related systems.
  - (c) Identify/document interaction and interference problems that could jeopardize performance in the operational environment.
  - (d) The CIP shall include the Contractor's strategy for establishing the C4ISR Test and Integration Facility (TIF) for C4ISR assembly and interface check-out.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 070-03-1091

BLK02-TITLE OF DATA ITEM: Topside Design Arrangement Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81002  
DID Title: Developmental Design  
Drawings/Models and Associated  
Lists

BLK08- APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK 13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

The Topside Design Drawing shall be delivered with each issue of the General Arrangements Drawing.

The Drawing shall show Port and Stbd Outboard Profiles, Topside Plan, Bow and Stern views.

The Drawing shall show the design waterline, and shall show hull and appendages below the waterline for completeness.

The Drawing shall show and label all major HM &E equipment and features, including but not limited to mooring and towing gear, flight deck and markings, safety nets, exterior doors, bulwarks, stanchions, cranes, boats and davits, windows and portlights, deck hatches and scuttles, lifesaving devices, stacks and macks, vertical and inclined ladders, RAS/FAS equipment, navigation and other lights, shore connections and VERTREP zones.

The Drawing shall show mast(s) and antenna systems iaw the Topside Antenna Systems Arrangements drawing, however only major antennas shall be labeled in order to avoid unnecessary drawing clutter.

The Drawing shall show and label weapons and decoy systems in their deployed configuration

The Drawing shall include the following lists in tabular format: Lights, Weapons and Decoys, Boats and Boat Handling Systems.

The Topside Drawing shall be delivered in a format compatible with AutoCAD. Reservation notes indicating design development reservations, with items lined out as reservations are resolved shall be included in the Drawing.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 070-03-1105

BLK02-TITLE OF DATA ITEM: General Arrangement Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPICDR

BLK13-DATE OF SUBS SUBM: See BLK16

BLK16-REMARKS:

BLK13 - 45 DPFCDR, and then 60 days after each change to reflect changes through delivery. Final version shall reflect the as-built condition.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 070-03-1956

BLK02-TITLE OF DATA ITEM: Integrated Topside Design Analysis Report

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and  
Technical Reports- Elements,  
Organization, and Design

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPICDR

BLK13-DATE OF SUBS SUBM: 45 DPFCDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 071-03-1124

BLK02-TITLE OF DATA ITEM: Shipboard Access Study

BLK04-AUTHORITY: DID Number: DI-DRPR-81000  
DID Title: Product Drawings and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 071-03-1849

BLK02-TITLE OF DATA ITEM: Stores Flow Path Diagram

BLK04-DID Number: DID Number: DI-DRPR-81000  
DID Title: Product Drawings and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The drawing shall include:

Loading of stores provisions (i.e., freeze, chill, and dry) from the VERTREP area and the fantail to their respective storerooms. Moving the stores provisions between their respective storerooms and the Galley;

Loading of general stores, repair parts, and supplies from the VERTREP area and the fantail to their respective storerooms (i.e., Aviation Storerooms, Boat Gear Storeroom, Boatswain Storerooms (Forward and Aft), Electric Storeroom, Electronic Storeroom, Engineer Storeroom, General Storeroom, Medical Storeroom, Ship's Store Storeroom, and Vending Stores Storeroom);

Loading of combustible and flammable liquids from the flight deck and the fantail to their storeroom. Moving the combustible and flammable liquids between to the Hazardous Material Stowage and Issue Room and the Boatswain Workshops, Main and Auxiliary Machinery rooms, the Armories, the Machine Workshop/Tool Issue Room, and Aviation Shop/Office;

Unloading of waste and trash from the Compacted Trash Stowage to the flight deck and fantail.

Loading of AMIO stores from the VERTREP area and the fantail to the AMIO Storeroom. Moving AMIO stores from its storeroom to the Galley;

Loading/unloading of two 4-foot by 4-foot by 6-foot pallets from the flight deck to inside the hangar; and

The drawing shall show the location and types of handling equipment/systems used to handle the stores/cargo.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 071-03-1965

BLK02-TITLE OF DATA ITEM: Compartment and Access Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPFCDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Compartments shall be labeled with the compartment name and compartment number, in accordance with OPC System Specification. Accesses shall be shown and labeled, including doors, hatches, manholes, scuttles, access panels, bolted plates, deck openings, and archways. Each labeled item shall include all pertinent and necessary details to include, but not limited to, features such as being hinged, spring balanced, flush, raised, quick acting, dogged, having fixed lights, and/or whether there are any locks or alarms.

Doors shall be labeled by type and/or tightness. These can include but aren't limited to watertight, airtight, oiltight, fumetight, weathertight, joiner, dutch, and roller doors.

The location of accesses will be labeled along with details. Sizes of access equipment or openings are to be shown, as well as any sill heights.

Bulkhead are to be labeled as to their tightness including fire zone bulkheads, expanded metal and stainless steel sheathing.

Windows are to be called out, as well as air vent hose connections.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 071-03-2109

BLK02-TITLE OF DATA ITEM: Equipment Removal and Maintenance Access  
Arrangement DrawingsBLK04-AUTHORITY: DID Number: DI-DRPR-81000  
DID Title: Product Drawings and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPFCDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Updated deliverable shall include padeye locations keyed to equipment removal routes.

Updated deliverable shall also include the EIRL (Equipment Item Removal List).

EIRL shall include the following:

- Dimensions and weight of each system or equipment over 100 pounds.
- Identification of systems or equipment whose removal requires cuts in primary hull structure. Primary hull structure includes strength decks, shell plating, tank tops, longitudinal bulkheads, transverse bulkheads, and their supporting framing.
- System or equipment nomenclature.
- System or equipment location (compartment).
- System or equipment removal destination.
- Access or removal code (An identification code that corresponds to a removal route code on the various access control drawings).

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 073-03-1135

BLK02-TITLE OF DATA ITEM: Noise Control Program Implementation Plan

BLK04-AUTHORITY: DID Number: DI-MGMT-80004  
DID Title: Management Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 073-03-1139

BLK02-TITLE OF DATA ITEM: Propulsion System Vibration Analysis

BLK04-AUTHORITY DID Number: DI-GDRQ-80650  
DID Title: Design Data and Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 073-03-1142

BLK02-TITLE OF DATA ITEM: Hull Girder, Superstructure, Mast and  
Foundations Vibration Analysis and Report

BLK04-AUTHORITY: DID Number: DI-MISC-80296  
DID Title: Design Data and  
Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Analysis and report shall be updated to reflect design development.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 073-03-1147

BLK02-TITLE OF DATA ITEM: Resilient Mount Index

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and  
Technical Reports - Preparation,  
Presentation and Preservation.

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPICDR

BLK13-DATE OF SUBS SUBM: 60 DPPRR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 073-03-2079

BLK02-TITLE OF DATA ITEM: Airborne Noise Category Assignment List

BLK04-AUTHORITY: DID Number: Contractor Format  
DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK 13-DATE OF SUBS SUBM: See BLK16

BLK16-REMARKS:

BLK13: 90 DPICDR, 60 DPPRR. Once construction begins, the Airborne Noise Category Assignment List shall be submitted annually.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 073-03-2081

BLK02-TITLE OF DATA ITEM: Airborne Noise Control/Design History Booklet

BLK04-AUTHORITY

DID Number:

Contractor Format

DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

QTRLY

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM: See BLK16

BLK16-REMARKS:

BLK13: No submittals required after PRR.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 074-03-1378

BLK02-TITLE OF DATA ITEM: Welding and Fabrication Procedures and Sequences

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports - Preparation, Presentation, and Preservation

BLK08-APP CODE:

BLK10-FREQUENCY: QTRLY

BLK12-DATE OF 1ST SUBM: 60 DPPRR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

A list of Contractor Welding Procedure Specifications (WPSs) and associated revision dates that shall at a minimum include all applicable weld processes.

Welder qualification documentation to include the last date the welder performed the indicated process.

Supporting Procedure Qualification Records (PQRs) and full WPS documentation.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 076-03-1152

BLK02-TITLE OF DATA ITEM: Reliability, Maintainability and Availability  
(RM&A) Assessment Report

BLK04-AUTHORITY:

DID Number: DI-SESS-81613  
 DID Title: Reliability & Maintainability (R & M) Program Plan  
 DID Number: DI-ILSS-80498  
 DID Title: Critical Item Recommendation  
 DID Number: DI-ILSS-81495  
 DID Title: Failure Modes, Effects & Criticality (FMECA) Report  
 DID Number: DI-RELI-81496  
 DID Title: Reliability Block Diagrams  
 DID Number: DI-RELI-81497  
 DID Title: Reliability Prediction & Documentation of Supporting Data  
 DID Number: DI-RELI-80255  
 DID Title: Failure Summary & Analysis Report

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 140 DPFCDR

BLK13-DATE OF SUBS SUBM: 360DPTD

BLK16-REMARKS:

BLK 10: RMA Assessments shall be submitted when engineering changes or maintenance task changes are made to items (or subcomponents of those items) that are identified in the MEL, CIL, or, after production readiness review, the MECL. At least annually after PRR which meets the requirements of Objective 4 of GEIA-STD-0009 and section 4.3 of SAE JA1010.

RMA Assessment report and all attachments shall be delivered in a Microsoft Office or .pdf format that is optical character reader (OCR) capable.

1st submission shall consist of:

1. Update to the previous submissions based on design changes and project updates
1. Assessment that demonstrates progress and accomplishment of those analyses that support Critical Design Review of Objective 2 of GEIA-STD-0009 and section 4.2 of SAE JA1010.
2. Update CIL, FMECA, Maintainability Analyses, RBD (The data shall be delivered in GEIA-STD-0007A format.)
3. An update that demonstrates progress and accomplishment of those analyses that support Objective 3 of the GEIA-STD-0009 and section 4.3 of the SAE JA1010.
4. Allow 45 day for Government review and approval.

## EXHIBIT XX - DETAIL DESIGN

2nd submission shall consist of

1. Assessment that demonstrates how the RMA program is accomplishing Objective 3 of the GEIA-STD-0009 and section 4.3 of the SAE JA1010.
2. Update CIL, FMECA, Maintainability Analyses, RBD (The data shall be delivered in GEIA-STD-0007A format .)
3. Status of the FRACAS system and program.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 076-03-2105

BLK02-TITLE OF DATA ITEM: Failure Reporting and Corrective Action System  
(FRACAS) ReportBLK04-AUTHORITY: DID Number: DI-SESS-81315  
DID Title: Failure Analysis and  
Corrective Action Report

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK13-DATE OF SUBS SUBM: See BLK 16

BLK16-REMARKS:

BLK 12: The Contractor shall deliver the Preliminary report within 14 days of induction into repair

BLK 13: Final Failure Analysis and Corrective Action Reports (FRACAS) not later than 30 days after completion of corrective action.

Change paragraph 2. in DI-SESS-81315A to read as follows:

2. Format: The report shall be submitted electronically in an MicroSoft EXCEL or MicroSoft ACCESS compatible format and shall be the same for both the Preliminary and Final Report.

Change paragraph 3.1 g.-3.1 j. . in DI-SESS-81315A to read as follows:

3.1.g) Equipment, title, reference number, serial , number, and the Hierarchical Structure Code

3.1.h) Assembly title, reference number, serial number, and the Hierarchical Structure Code

3.1.i) Subassembly title, reference number, serial number, and the Hierarchical Structure Code

3.1.j) OEM Part Nomenclature, reference number, serial number, date code, OEM name, and the Hierarchical Structure Code.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 077-03-1162

BLK02-TITLE OF DATA ITEM: Hazardous Materials Management Program (HMMP)  
PlanBLK04-AUTHORITY: DID Number: Contractor  
format.  
DID Title:

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM: 20DARC

BLK16-REMARKS:

The Contractor shall develop a Hazardous Materials Management Plan (HMMP) using Attachment (1) task description as guidance in the development of this CDRL.

The HAZMAT data shall be tracked in the Hazard Tracking System (HTS).

(Attachment 1)

## HAZARDOUS MATERIALS MANAGEMENT PLAN

1.Purpose. To develop a Hazardous Materials Management Plan (HMMP). Hazardous materials management is an integral part of the hazard management effort that occurs within the project's systems engineering process using the MIL-STD-882 methodology. The HMMP shall describe how the USCG and Contractor will coordinate activities required to eliminate or reduce HAZMAT in systems; system components; associated support items; required operations and support processes; and those which are generated during support, demilitarization, or disposal of the system.

2.Task description. The HMMP will define USCG and Contractor roles, responsibilities, and procedures needed to accomplish HAZMAT management and tracking of contractual requirements included in the general and special provisions of the contract. The approved HHMP shall require item-by-item accounting for all contractually-required tasks and responsibilities. At a minimum, the HMMP shall include HAZMAT targeted for elimination and reduction; the process for approving HAZMAT usage where HAZMAT cannot be eliminated; the USCG and Contractor processes to properly identify, control, analyze, and track HAZMAT to protect human health, safety, and the environment and to support end user needs.

HAZMAT Identification. HAZMAT is defined as any substance that, due to its chemical, physical, toxicological, or biological nature, causes safety, public health, or environmental concerns. The HMMP will describe the procedures and criteria that the USCG and Contractor will use, in an

## EXHIBIT XX - DETAIL DESIGN

iterative process, to create a HAZMAT map for the system through identification of the HAZMAT contained within the system that are required for the operation or support of the system, or are generated to support or dispose of the system. The HMMP will not include HAZMAT used by the contractor for production or manufacturing processes unless mutually agreed upon by the USCG and contractor. . Examples of criteria that the USCG and contractor can use to identify HAZMAT, managed under the HMMP, include, but are not limited to:

a. Materials covered pursuant to the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard.

b. Materials covered pursuant to the Emergency Planning and Community Right-to-Know Act.

c. Materials covered pursuant to Section 112 of the Clean Air Act; Section 302.4 of the Comprehensive Environmental Response, Compensation, and Liability Act; Section 311(b)(2)(A) and Section 307(a) of the Federal Water Pollution Control Act; Section 3001 of the Resource, Conservation and Recovery Act; and Section 7 the Toxic Substances Control Act. These include materials that appear on a list of hazardous materials prepared by a Federal, state, or local regulatory agency, or those that have characteristics defined as hazardous by such an agency.

d. Materials that must be routinely tracked or reported under Federal or state laws.

e. High profile materials (contract-specified).

f. Materials subject to statutory phase-outs or regulatory use restrictions because of operating in or with DoD deliverables (e.g., ozone-depleting substances (ODS) and greenhouse gases).

g. Deliverable materials subject to special shipping requirements under Department of Transportation (DOT) regulations.

h. Radioactive materials.

i. Propulsion fuels, propellants, and explosives.

j. Materials identified as hazardous or toxic through other system safety analyses.

k. Materials that can become hazardous from combustion or breakdown during mishaps (e.g., fibers from composite materials).

l. Materials of evolving regulatory interest (e.g., emerging contaminants).

m. DoD Component-specified targeted toxic and hazardous materials and chemicals.

## EXHIBIT XX - DETAIL DESIGN

Categorization of identified HAZMAT. Working together, the USCG and the Contractor will categorize identified HAZMAT as prohibited, or restricted.

a. Prohibited HAZMAT are materials that require the Contractor to obtain USCG approval before those materials can be included in systems, subsystems, and support equipment or planned for system operations and support.

b. Restricted HAZMAT are those materials the Contractor will target for elimination or minimization.

Modification of HAZMAT list or categorizations. Dialogue between the USCG and the Contractor will continue after the exercise of the Phase II option.. Because of the shifting regulatory environment, materials may be added or the categorization (prohibited, restricted, and tracked) of included materials may change, requiring additional Contractor and Contract Officer action. The HMMP will describe procedures for modifying the HAZMAT list and will provide procedures for requesting contract modifications, including price, if HAZMAT modifications add to the cost of the program.

HAZMAT data tracking The HMMP will describe how the Contractor will integrate data required to manage HAZMAT with the information included in a Hazard Tracking System. At a minimum, the Contractor will be required to track all identified HAZMAT in the Hazard Tracking System. The minimum additional data elements required for HAZMAT management and tracking include:

- a. Location of HAZMAT within the system during its entire lifecycle.
- b. Quantity of HAZMAT within the system during its entire lifecycle.
- c. Process or activity whereby quantities of HAZMAT are used or generated during operations, support, or disposal of the system.
- d. Reasonably anticipated hazardous materials that are used or generated during the lifecycle of the system (e.g., installation, test and evaluation, normal use, maintenance or repair, and disposal of the system).
- e. Reasonably anticipated hazardous materials to be used or generated in emergency situations (e.g., exhaust, fibers from composite materials released during accidents, combustion byproducts, etc.).
- f. Special HAZMAT control, training, handling measures, and personal protective equipment needed, including provision of required MSDSs.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 077-03-1165

BLK02-TITLE OF DATA ITEM: Operating and Support Hazard Analysis (O&amp;SHA)

BLK04-AUTHORITY:  
Task 206

DID Number: MIL-STD 882 C,

DID Title: Operating and Support  
Hazard Analysis (O&SHA)

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DPPRR

BLK13-DATE OF SUBS SUBM: 60 DPCDD

BLK16-REMARKS:

The Contractor shall ensure that the mitigations from this document are incorporated into the procedures, technical manuals and Maintenance Procedure Cards (MPC).

The USCG will comment on each delivery and provide comments back to the Contractor NLT 30 days after each submittal. Within 10 days of each submittal the Contractor shall actively participate in a USCG-led adjudication. Final delivery, to incorporate comments, shall be delivered NLT 10 days after adjudication.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 077-03-1170

BLK02-TITLE OF DATA ITEM: System Safety Program Plan (SSPP)

BLK04-AUTHORITY: DID Number: DI-SAFT-81626  
DID Title: System Safety Program Plan (SSPP)

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The SSPP shall be prepared IAW DI-SAFT-81626 and include all requirements for format and content contained therein.

1. SSPP document comments will be returned to the Contractor during DD & C. Adjudication with the USCG System Safety Team by phone shall be supported by the Contractor's System Safety Manager within 10 days after comments are returned to the Contractor.

041.14

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 077-03-1174

BLK02-TITLE OF DATA ITEM: System Safety Program Progress Summaries Reports (SSPPSR)

BLK04-AUTHORITY: DID Number: DI-SAFT-80105  
DID Title: System Safety Program Progress Report (SSPP)

BLK08-APP CODE: A

BLK10-FREQUENCY: QTRLY

BLK12-DATE OF 1ST SUBM: 30 DAOE

BLK13-DATE OF SUBS SUBM: 7 DARP

BLK16-REMARKS:

041.15 Subsequent submittals: Provide until completion of lead hull.

041.16

041.17

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 077-03-1177

BLK02-TITLE OF DATA ITEM: Material Safety Data Sheets (MSDS)

BLK04-AUTHORITY: DID Number: Contractor  
format.

DID Title:

BLK08-APP CODE: A

BLK10-FREQUENCY: QTRLY

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: See Block 16.

BLK16-REMARKS:

Subsequent Submittals: Final submittal 120 DPD.

These MSDS's shall be delivered in a final, electronically searchable file and updated quarterly as each material is determined for use. One hundred and twenty (120) days before lead ship delivery, a hard-copy binder and searchable electronic copy containing all MSDS's shall be provided to the USCG.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 077-03-2046

BLK02-TITLE OF DATA ITEM: System Hazard Analysis (SHA)

BLK04-AUTHORITY:  
Task 205

DID Number: MIL-STD-882C;

DID Title: System Hazard Analysis  
(SHA)

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM: See Block 16.

BLK16-REMARKS:

Subsequent submittals: 60 DPPRR and 60 DPD

The Contractor shall perform and document a System Hazard Analysis (SHA) to identify hazards and assess the risk of the integrated system design, including software and subsystem interfaces. This analysis shall include a review of subsystem interrelationships for:

n. Compliance with specified safety design criteria;

o. Possible independent, dependent, and simultaneous hazardous events, including system failures, failures of safety devices, common cause failures and events, and system interactions that could create a hazard or result in an increase in risk;

p. Degradation of a subsystem or the total system affecting safety;

q. Design changes that affect subsystems;

r. Effects of reasonable human errors;

s. Determination of:

- (1) Potential contribution of hardware and software events (including those that are developed by other contractors/sources, GFE, or COTS hardware or software), faults, and occurrences (such as improper timing) on the safety aspects of the system;
- (2) Sufficient technical detail required to permit design engineers to adequately develop and assess design criteria resulting from the analysis;
- (3) Evidence that the method(s) implementing the hardware, software, and facilities/installation design requirements and

## EXHIBIT XX - DETAIL DESIGN

corrective actions have not introduced any new hazards or negatively impacted safety-related aspects of the system.

If no specific analysis techniques are directed, or if the Contractor recommends a different technique than the one specified by the Government, the Contractor shall obtain Government approval of techniques to be used before performing the analysis. The SHA may be combined with or performed using similar techniques to those used for the Functional Hazard Analysis (FHA) and Subsystem Hazard Analysis (SSHA).

When software to be used within the system is being developed under other software development requirement documents, the Contractor performing the SHA shall monitor, obtain, and use the output of each phase of the formal software development process in evaluating the software contribution to the SHA. Problems identified that require the reaction of the software developer shall immediately be reported to the PM.

The Contractor shall incorporate updates to the SHA following any system design change, including software design changes that may affect system safety.

Report requirements. The Contractor shall prepare a report that contains the results from the task which includes:

- a. System description. The system description provides the physical and functional characteristics of the system and its components. Reference to more detailed system and component descriptions, including specifications and detailed review documentation, shall be supplied when such documentation is available. The capabilities, limitations, and interdependence of these components shall be expressed. The system and components shall be addressed with respect to the mission and the operational environment. System block diagrams or functional flow diagrams may be used to clarify system descriptions. Software, its role(s), the scope and physical boundaries, and assumptions shall be included in this description.
- b. Hazard analysis results. The results will consist of a summary and a total listing of the hazard analysis. The content and format requirements for hazard analysis results include:
  - (1) A summary of the results.
  - (2) A listing of identified hazards, including:
    - (a) Hazard nomenclature
    - (b) Life-cycle phases affected by the hazard
    - (c) Causal factor (e.g., hardware, software, and human)
    - (d) Effects
    - (f) Mishap
    - (g) Risk Assessment Matrix index and associated risk category

## EXHIBIT XX - DETAIL DESIGN

- (h) Target Risk Assessment Matrix index and associated risk category
- (i) Event Risk Assessment Matrix index and associated risk category
- (j) Mitigation measures
- (k) Hazard status
- (l) Hazard traceability (running history of actions taken or planned with rationale to mitigate risks)
- (m) Remarks. Summarizes the data used for the analysis and provides any information relating to the hazard not already addressed in the previous sections.

This analysis shall include Verification and Validation of the mitigations in which the Contractor is responsible, and the appropriate method used for Verification and Validation.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 077-03-2308

BLK02-TITLE OF DATA ITEM: Sub-System Hazard Analysis (SSHA)

BLK04-AUTHORITY:  
Task 204

DID Number: MIL-STD-882C;

DID Title: Subsystem Hazard  
Analysis (SSHA)

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAOE

BLK13-DATE OF SUBS SUBM: See Block 16.

BLK16-REMARKS:

Subsequent submittals: 90 DPPRR and 90 DPD

This analysis shall include Verification and Validation of the mitigations in which the Contractor is responsible, and the appropriate method used for Verification and Validation.

The Contractor shall perform and document a Subsystem Hazard Analysis (SSHA) to identify all components and equipment, including software, whose performance, performance degradation, functional failure, or inadvertent functioning could result in a hazard; or whose design does not satisfy contractual safety requirements. The analysis shall include a determination of:

- a. Modes of failure, including reasonable human errors, as well as single point failures and the effects on safety when failures occur in subsystem components;
- b. Potential contribution of software (including that which is developed by other contractors) events, faults, and occurrences (such as improper timing) on the safety of the subsystem.
- c. Safety design criteria in the software ensuring specification(s) have been satisfied.
- d. Method of implementation of software design requirements and corrective actions, ensuring each has not impaired or compromised the safety of the subsystem, nor has introduced new hazards.

The Contractor performing the SSHA shall monitor, obtain and use the output of each phase of the formal software development process in evaluating the software contribution to the SSHA. Any problems identified requiring the reaction of the software developer shall be reported to the Government in time to support the ongoing phase of the software development process.

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The Contractor shall update the SSHA when needed as a result of any system design changes, including software design changes which affect system safety.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 077-03-2309

BLK02-TITLE OF DATA ITEM: Health Hazard Assessment (HHA)

BLK04-AUTHORITY:

DID Number: MIL-STD-882C; Task 207

Assessment (HHA)

DID Title: Health Hazard

BLK08-APP CODE: A

BLK10-FREQUENCY: ANNL

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM: See Block 16.

BLK16-REMARKS:

Subsequent submittals: 45 DPPRR and 45 DPLD

This analysis shall include Verification and Validation of the mitigations in which the Contractor is responsible, and the appropriate method used for Verification and Validation.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 077-03-2349

BLK02-TITLE OF DATA ITEM: Hazardous Spaces Classification Report

BLK04-AUTHORITY: format. DID Number: Contractor

DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The report shall be provided in a tabular format.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 079-03-1196

BLK02-TITLE OF DATA ITEM: Model Test Plan

BLK04-AUTHORITY: DID Number: ASNI-Z39.18  
DID Title: Scientific and  
Technical Reports - Elements,  
Organization, and Design

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DAOE

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The plan shall address the self propulsion

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 079-03-1201

BLK02-TITLE OF DATA ITEM: Flooding Water Levels Report and V-Lines  
AnalysisBLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and  
Technical Reports - Preparation,  
Presentation, and Preservation

BLK08-APP CODE:

BLK10-FREQUENCY: SEMIA

BLK12-DATE OF 1ST SUBM: 180 DAC

BLK13-DATE OF SUBS SUBM: 30 DPICDR

## BLK16-REMARKS:

The Flooding Water Levels calculations shall be in accordance with ABS NVR, Part 0, Chapter 5, Section 3, sub-section 2, Flooding Water Levels (FWL or V-Lines). The analysis report shall include a discussion of how the V-Lines were calculated, a tabular listing of the results, and the V-Lines shall be drawn on at least three ship sections.

The Flooding Water Levels (V-Lines) report shall be delivered as either a separate report or shall be included as an appendix to the Intact and Damage Stability Analysis reports.

The reports shall be in Microsoft Word, Microsoft Excel, or a compatible format. The reports shall be in electronic format with the ability to search/find and copy/export text or tabular data to another Microsoft Word or Excel file.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 079-03-1202

BLK02-TITLE OF DATA ITEM: Intact and Damage Stability Analyses

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and  
Technical Reports - Preparation,  
Presentation, and Preservation

BLK08-APP CODE:

BLK10-FREQUENCY: SEMIA

BLK12-DATE OF 1ST SUBM: 180 DAC

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The Intact and Damage Stability Analyses shall show compliance with the specification and present the following: assumptions/conditions and the standards on which the stability analyses are based. This shall include: the stability criteria for intact and damage, overall buoyant envelope, bulkhead deck location, margin line description, details of the load conditions analyzed, assumptions and method for inclusion of free surface effects, details and discussion of intact stability analyses and the damage stability analyses. The analyses details shall include: a discussion of any heeling moments, identification of flooded compartment combinations, liquid runoff, downflooding points, identification of critical intact conditions and cases of damage, and their governing criteria. Results shall include: a limiting KG curve over the range of operating conditions, comparison of allowable KG to the actual KG, discussion of the use and design, if any, of cross-connected tanks/spaces, and the discussion of the affect of anti-rolling tanks, if any, on intact stability and the initial and final stability after damage. The hull form and major appendages shall be included electronically and in the NAVSEA SHCP format. A complete listing of the ship compartments, and their numerical boundaries, used in the stability analysis shall be included.

The reports shall be in Microsoft Word, Microsoft Excel, or a compatible format. The reports shall be in electronic format with the ability to search/find and copy/export text or tabular data to another Microsoft Word or Excel file.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 079-03-2220

BLK02-TITLE OF DATA ITEM: Model Test Report

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports  
- Preparation, Presentation, and  
Preservation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Model Test Report shall be delivered 45 days after completion of testing. If testing program is segmented into multiple phases (resistance, seakeeping, maneuvering, etc.) the Report shall be delivered in phases, no later than 45 days after completion of each testing phase.

The Report shall include standard ship and model data presentations (including ship dimensions and coefficients) applicable to the hull form.

The Report shall include photographs of the fully-appended model out of the water, and photographs of the model during all tests at all speeds.

The Report shall provide all resistance data expanded to full scale using ITTC friction coefficients and a correlation allowance of 0.0005. There will be no form factor, and self-propulsion data shall be provided at the self-propulsion point and also for 5% of thrust over the self propulsion point.

The Report shall provide tabulation of the predicted full scale EHP and SHP values as appropriate, at 2 knot speed intervals for each displacement tested developed from the completed tests. The tabulation shall be as a function of full scale ship speed, speed-length ratio, and Froude Number (Fn). In addition to any model test facility standard data presentations, the Report shall include: total resistance coefficient, frictional resistance coefficient, residual resistance coefficient, EHP and SHP (in British horsepower) and resistance coefficients for the model and the ship.

The Report shall provide stock and design propeller open water characteristics, a drawing and tabulation of propeller geometry, and for CRP propellers this data shall be provided for each P/D tested.

The Reports shall include plots of bow and stern rise and sinkage versus speed as well as trim as a function of ship speed; Fn and speed-length ratio for each displacement.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 080-03-1209

BLK02-TITLE OF DATA ITEM: Diminishing Manufacturing Sources and Material Shortages Forecast Report

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports - Preparation, Presentation, and Preservation

BLK08-APP CODE:

BLK10-FREQUENCY: See BLK 16

BLK12-DATE OF 1ST SUBM: 60 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: Modify the DID as follows:  
Replace Section 3 (c) with:

- (1) Introduction
- (2) Current status of the planned or current System.
- (3) The scope of any immediate non-availability and obsolescence problems.
- (4) The size and magnitude of future problems.
- (5) Alternatives or courses of action for alleviating the impacts.
- (6) Status of any actions taken to mitigate an issue (Engineering Change Proposal, Design Change Notice, etc.) or any recommended corrective actions.
- (7) System Vendors Surveyed.
- (8) Alternate Supply Sources.
- (9) Repair Data Development Status.
- (10) COTS Procurement Status.
- (11) Status of COTS Items Under Repair and Related Repair Issues.
- (12) ECP Development Status and Issues.
- (13) COTS Obsolescence Item List Additions/Deletions.
- (14) Related COTS Issues.

BLK 10: The report shall be generated as DMS issues arise, however an overall status shall be submitted annually until 1 year after the lead ship is delivered.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 080-03-1210

BLK02-TITLE OF DATA ITEM: Interim Support Plan (ISP)

BLK04-AUTHORITY: DID Number: DI-ILSS-80395  
DID Title: Integrated Support Plan (ISP)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DPD

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 04: The Interim Support Plan (ISP) shall be in the contractor's format and shall describe the contractor's plans for the management, control, execution, interface and integration of all aspects of the Contractor's interim support efforts.

Change all MIL-STD-1388-1 and 2 (when utilized) and MIL-STD-440 references to GEIA-STD-0007A

SECTION 4 (ILS PROGRAM TASKS): Change sentence to read, "Provide a detailed description of plans for the accomplishment of interim logistics support task(s) and subtask(s) as reflected in the contract as they relate to development and implementation of interim contractor support. The contents of the ICSP shall address plan requirements as contained in

BLK 08: Government review and approval for content, management approach, and completeness. Allow 45 days for Government review.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 080-03-2211

BLK02-TITLE OF DATA ITEM: Integrated Logistics Support Plan (ILSP)

BLK04-AUTHORITY: DID Number: DI-ILSS-80095  
DID Title: Integrated Logistics Support Plan

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: The ILSP shall describe the contractor's plans for the management, control, execution, interface and integration of all aspects of the ILS Program in accordance with GEIA-STD-0007A, & GEIA-HB-0007. The Contractor may utilize MIL-STD-1388-1A as guidance. The contractor shall identify how logistics support analyses shall comply the GEIA-STD-0007A and what logistics data management software they intend to use to generate LSAR and may use DI-ILSS-80531 Logistic Support Analysis Plan as guidance. In addition, the ILSP shall include a Diminishing Manufacturing Sources and Material Shortages (DMSMS) management plan which describes the contractor's approach to managing the loss, or impending loss of manufacturers or suppliers of parts and/or material. The plan shall:

- Identify the key participants in the contractor's DMSMS Program and the organizational structure associated with the Program.
- Identify the major components of the contractor's DMSMS Program.
- Identify the contractor's DMSMS Program objectives.
- Identify milestones and scheduling of key events associated with the DMSMS Program.
- Describe how the components, organizational structure and efforts of the participants are integrated to achieve the contractor's DMSMS Program objectives.
- Identify the scope of the DMSMS Program.

Change the following in DI-ILSS-80095:

All references to "DoD" or "Department of Defense" shall be changed to "U.S. Coast Guard" unless specifically directed otherwise.

All references to "Reliability, Availability, Maintainability" or "RAM" shall be synonymous with the OPC RFP's "RM&A", "Reliability, Maintainability, and Availability."

The contractor shall provide a reference or hyperlink to specific documentation requirements or lists that are required in other Statement of Work Contract Deliverable Requirement. For example, paragraph 10.9.7 "Chapter 7, Configuration Management". This requirement is part of another analysis and management plan. The contractor shall reference the report or list by title, latest version and approval date, and CDRL data identification number instead of reproducing the entire text of the report, list or analysis in the

## EXHIBIT XX - DETAIL DESIGN

ILSP.

Para 7.2 of change reference from "DOD-STD-1702(NS)" to "GEIA-STD-0007A, GEIA-HB-0007".

Delete paragraph 10.9.1.2.1

Delete paragraphs 10.9.2.2.1 through 10.9.2.2.4

Delete paragraphs 10.9.2.3 through 10.9.2.7.1

Delete section 10.9.8 Chapter 8, Installation and Facilities.

Delete section 10.9.10 Chapter 10, Funding

Delete section 10.10. Annex A, Instructions for Developing Annex A of an ILS Plan.

Delete section 10.11 Annex B

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 081-03-1224

BLK02-TITLE OF DATA ITEM: Equipment Condition Based Monitoring Report

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and  
Technical Reports - Preparation,  
Presentation, and Preservation

BLK08-APP CODE:

BLK09-DIST STMT REQ'D:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK13-DATE OF SUBS SUBM: 45DPFCDR

BLK16-REMARKS:

The report shall be in an MS Office format.  
The monitoring candidate lists shall include the following:

1. HSC
2. Component nomenclature.
3. Reference Number
4. CAGE CODE
5. Required performance monitoring parameters, including data sampling frequency.
6. Prioritized failure modes derived from the FMECA.
7. Recommended component monitoring health indicators and rationale, including data sampling frequency.
8. Required corrective action for each failure mode.
9. Installation and development costs associated with each monitoring candidate.
10. Alternative predictive or scheduled maintenance tasks for systems and equipment not approved for integration into MPCMS.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 083-03-1213

BLK02-TITLE OF DATA ITEM: Provisioning Guidance Conference

BLK04-AUTHORITY:

DID Number: DI-ADMN-81249

DID Title: Conference Agenda

BLK08-APP CODE:

BLK10-FREQUENCY:

ASREQ

BLK12-DATE OF 1ST SUBM:

see BLK 16

BLK13-DATE OF SUBS SUBM:

see BLK 16

BLK16-REMARKS:

BLK 12: Conference shall convene within 60 DAOE. The Provisioning Guidance Conference agenda shall. Submit draft for each conference NLT 30 days prior to PGC for approval of subjects to be covered. Approval copy NLT 10D prior to PGC.

BLK 13: Draft 15 days prior to other scheduled meetings. Final due at event. During the PGC it will be determined if additional conferences are required.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 083-03-1222

BLK02-TITLE OF DATA ITEM: Design Change Notices

BLK04-AUTHORITY: DID Number: DI-SESS-81758  
DID Title: Logistics Product Data

BLK08-APP CODE:

BLK10-FREQUENCY: ASREQ

BLK12-DATE OF 1ST SUBM: SEE BLK 16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DCNs shall be submitted in accordance with 2011-11-29\_ATCH\_PTD\_LISTS.  
BLK 12: DCN's shall be submitted within 30 days of a change to any item  
subject to provisioning requirements.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 083-03-1226

BLK02-TITLE OF DATA ITEM: Engineering Data for Provisioning

BLK04-AUTHORITY: DID Number: DI-ALSS-81557  
DID Title: Supplemental Data for  
Provisioning (SDFP)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK13-DATE OF SUBS SUBM: See BLK 16

BLK16-REMARKS:

BLK 04:

Modify the DID as Follows:

Change Paragraph 7.2 b. to read:

"b. Identified in the Federal Logistics Information System with a TYPE  
4, or TYPE 1 NSN.

Change Section 10 to read:

"10.1 Format. EDFP shall be submitted in Portable Document Format  
(PDF) format with Optical Character Recognition (OCR) with search  
capability [.pdf]. Each PLISN shall have its own EDFP file. The file  
name shall consist of the item CAGE followed by the manufacturer's part  
number and formatted in accordance with the GEIA-STD-0007 data element  
definitions as follows:

(commercial\_and\_government\_entity\_code )\_(reference\_number)

For example a 2 ½ in butterfly valve would be: "15646\_22924-1314312"

10.2 Content. EDFP shall consist of the data necessary to provide the  
NSN type required in the OPC Lead Allowance Parts List EDFP Guidance  
[2011-12-01\_ATCH\_LEAD\_APL\_EDFP\_GUIDANCE.xls].

BLK 10: EDFP will be provided for each cutter to account for changes.

BLK12: Delivery shall be concurrent with all applicable PTD  
deliverables. Government will provide a letter or approval or  
disapproval 60 days after receipt of the EDFP. Contractor shall  
resubmit 30 days after receipt of the Government's disapproval.BLK13: Revisions shall be submitted within 60 days after approval of a  
change by the Government and delivered concurrent with the Design  
Change Notices.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 083-03-1229

BLK02-TITLE OF DATA ITEM: Outfitting Operations Plan

BLK04-AUTHORITY: DID Number: DI-ILSS-80947  
DID Title: Outfitting Operations Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 04:  
Modify the DID as follows:  
The report shall be in a Microsoft Office format.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 083-03-1231

BLK02-TITLE OF DATA ITEM: Provisioning Technical Documentation (PTD)

BLK04-AUTHORITY: DID Number: DI-SESS-81758  
DID Title: Logistics Product Data

BLK08-APP CODE:

BLK10-FREQUENCY: See BLK 16

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The PTD shall contain the end item, component or assembly and all support items which can be disassembled, reassembled, or replaced, and which when combined, constitutes the end item, component or assembly and shall include items such as parts, materials, connecting cabling, piping, and fittings required for operation and maintenance of the end item, component, or assembly. This includes all repairable commercial off-the-shelf (COTS) items unless excluded by the provisioning requirements. It does not include a breakdown of government furnished equipment. PTD shall include items such as parts, materials, connecting cabling, piping, and fittings required for operation and maintenance of the end item/equipment. The PTD shall contain all tools, test equipment, repair parts sets required to maintain the end item, component, or assembly equipment.

PTD shall be submitted in accordance with 2011-11-29\_ATCH\_PTD\_LISTS.  
BLK 10: Provisioning Technical Data will be provided for each cutter,  
BLK 12:

24 Months Prior to Ship Delivery	40%
18 Months Prior to Ship Delivery	60%
12 Months Prior to Ship Delivery	80%
04 Months Prior to Outfitting	100%

Percentages of work accomplished are based on the projected total quantity of ship's provisioning list items

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 083-03-2298

BLK02-TITLE OF DATA ITEM: Provisioning Technical Documentation Submission Schedule

BLK04-AUTHORITY: Performance Schedule  
DID Number: DI-SESS-81713  
DID Title: Provisioning

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK13-DATE OF SUBS SUBM: See BLK 16

BLK16-REMARKS:

BLK 10: Subsequent Submissions shall be submitted QTRLY after the date of the first submission to reflect changes in the schedule, until the last cutter completes the provisioning process.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 085-03-1215

BLK02-TITLE OF DATA ITEM: 3-Dimensional Technical Data Package (3D TDP)

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DPFCDR

BLK13-DATE OF SUBS SUBM: 30 DAD

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 085-03-1244

BLK02-TITLE OF DATA ITEM: Drawing Number Assignment Report

BLK04-AUTHORITY: DID Number: DI-SSES-81011  
DID Title: Drawing Number  
Assignment Report

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAOE

BLK13-DATE OF SUBS SUBM: 30 Days Prior to PMCs

BLK16-REMARKS:

The Drawing Number Assignment Report shall include the scheduled delivery dates for the detail design and construction drawings. The Drawing Number Assignment Report shall reflect the current status on completion for each submission and current revision.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 085-03-2293

BLK02-TITLE OF DATA ITEM: As-Built Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings /  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAD

BLK13-DATE OF SUBS SUBM: RAR

BLK16-REMARKS:

BLK 12:  
The 1<sup>st</sup> Submission of the Deliverable with the As- Built Drawings shall be 90 DPD

The complete set of As- Built Drawings for each hull shall reflect the as-built, as-delivered configuration of the ship and shall be complete, without attached change paper and with current revision blocks and numbers.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 086-03-1027

BLK02-TITLE OF DATA ITEM: Technical Manual Source Data Quality Assurance  
(TMSDQA) ProgramBLK04-AUTHORITY: DID Number: DI-TMSS-81817  
DID Name: Technical Manual Quality Assurance  
(TMQA) Program Plan  
DID Number: DI-TMSS-81818  
DID Name: Technical Manual Validation Plan  
DID Number: DI-TMSS-81819  
DID Name: Technical Manual Validation  
Certificate

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The TMSDQA Program Plan shall define the development of technically accurate and complete source data. The plan shall detail the organization, planning, methods, and data control to be performed on the source data. This shall include processes for incorporating the OPC Business Rules.

The TMSDQA Program Plan shall also address the following:

- Source data collection including graphics and illustrations, Quality reviews, verification and validation, and technical manual source data configuration management.
- Intermediate product.
- System capability.
- Validation.
- Internal coordination (documentation of preparing activity operating procedures).
- Record keeping.
- Verification support.
- Final product.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 086-03-1223

BLK02-TITLE OF DATA ITEM: Technical Data Organizational Plan (TDOP)

BLK04-AUTHORITY: DID Number: DI-TMSS-81810  
DID Title: Technical Manual  
Organization Plan (TMOP)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 086-03-1240

BLK02-TITLE OF DATA ITEM: OPC Project Level Business Rules

BLK04-AUTHORITY: DID Number: DI-TMSS-81784  
DID Title: Army S1000D Project  
Business Rules

BLK08-APP CODE: See BLK 16

BLK10-FREQUENCY: See BLK 16

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 08:  
Government review and approval for technical content, completeness,  
format and clarity.

BLK 10:  
The contractor shall develop Project Level S1000D Business Rules IAW MIL-STD-3031 and the S1000D Specification (Chapter 2.5, Business Rules). The Project business rules shall reference all business rules at a higher level as described in the Business rules layered model for S1000D. The contractor shall use MIL-STD-3031 for guidance on the scope and depth of coverage in developing the Project level business rules. The contractor shall use the Standard Numbering System (SNS) defined in Chapter 8.2.8 of the S1000D specification. A proposed SNS will be provided by the contractor and approved by the government.

For the purposes of this project, all references to Army or Department of Defense in the referenced DID and MIL-STD shall be replaced with U.S. Coast Guard.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 086-03-1249

BLK02-TITLE OF DATA ITEM: Contractor Developed Technical Data

BLK04-AUTHORITY: DID Number: MIL-DTL-24784/22  
DID Title: Technical Content Development Requirements For Combat System Technical Operations Manuals (CSTOMS); Hull, Mechanical, And Electrical (HM&E) System And Equipment Manuals; Electronic [Including Service Test Electronic, Experimental Electronic And Interior Communication (IC)] System And Equipment Manuals; And Weapon Systems And Weapon Equipment Manual

BLK08-APP CODE:

BLK10-FREQUENCY: SEE BLK 16

BLK12-DATE OF 1ST SUBM: SEE BLK 16

BLK 13-DATE OF SUBS SUBM: SEE BLK 16

BLK16-REMARKS:

Technical Information Modules (IMs) shall be submitted in an XML file format in accordance with the OPC S1000D Business Rules.

The following information modules (IMs) shall be developed per MIL-DTL-24784/22:

- 3.7 Descriptive (3.7)
  - 3.7.1 General IM
  - 3.7.2 Supporting IM
  - 3.7.3 Descriptive IM
  - 3.7.4 Functional description IMs
- 3.8 Procedural information
  - 3.8.1 Operation IM
  - 3.8.2 System/equipment installation IM
  - 3.8.3 Operational checkout and troubleshooting IM.
- 3.9 Illustrated parts breakdown (IPB) IM

BLK 10,12, 13: Technical Manual Data delivery shall be concurrent with all applicable Commercial Equipment Manuals, Drawings or Data submittals.

BLK 13: Revisions shall be submitted within 60 days after approval of a change by the Government and delivered concurrent with the revised or changed Commercial Equipment Manuals, Drawings or Data submittals.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 086-03-1267

BLK02-TITLE OF DATA ITEM: Technical Data Index

BLK04-AUTHORITY: DID Number: Contractor  
format.

DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY: SEE BLOCK 16

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK 13-DATE OF SUBS SUBM: SEE BLOCK 16

BLK16-REMARKS:

BLK04:

Format:

Microsoft Excel format to allow for easy sorting by cross-referenced categories."

Content.

- (a) ESWBS shall map to the ESWBS based HSC number assignment for equipment.
- (b) The Technical Data Index shall include all Contractor Developed Technical Data products, COTS Technical Manuals and Supplemental Data, and Damage Control Technical Data products that are not developed as a Drawing, List, or 3D Technical Package.
- (c) The TDI shall be submitted in accordance with the Technical Data Index Template, [2012-03-08\_ATCH\_APO\_TECHNICAL\_DATA\_INDEX\_TEMPLATE.xls]."

BLOCK 10, 13: After initial submission, the TDI shall be submitted concurrently with the Technical Data Status Report.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 086-03-1269

BLK02-TITLE OF DATA ITEM: Cutter Information Book (CIB)

BLK04-AUTHORITY: DID Number:  
DID Title: OPC CIB Technical Manual Contract  
Requirements (2011-11-  
29\_ATCH\_APO OPC\_CIB\_TMCR.doc)

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45DPD

BLK 13-DATE OF SUBS SUBM: DAD

BLK16-REMARKS:

The CIB shall provide a general overview of the OPC's capacities and characteristics and shall contain operating instructions for systems, equipment, and components in the ship. The information shall be given in sufficient detail to permit tracing the systems and circuits of control. System diagrammatics shall be referenced to supplement the written descriptions. System working drawings may be referenced in lieu of the diagrammatics upon approval of the Contracting Officer. The CIB shall provide a source of technical information relative to the shipboard arrangements and systems. The CIB shall be titled "Cutter Information Book and Operating Manual for United States Coast Guard Offshore Patrol Cutter" and shall consist of chapters with titles. Specifications and final drawings shall be incorporated. Drawings, drawing indexes, drawing booklets, lists, schedules and publications shall be appropriately referenced in the text.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 086-03-1272

BLK02-TITLE OF DATA ITEM: Technical Data Status Report

BLK04-AUTHORITY: DID Number: DI-TMSS-81812  
DID Title: Technical Manual  
Schedule and Status Report

BLK08-APP CODE:

BLK10-FREQUENCY: MTHLY

BLK12-DATE OF 1ST SUBM: 360 DPFCDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: Modify the DID (DI-TMSS-81812) as follows:

Replace paragraph 1 with the following:

1. Format. The TM Schedule and Status Report shall be presented in a Microsoft Office electronic format based upon the Technical Data Index (TDI).

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 086-03-1273

BLK02-TITLE OF DATA ITEM: Commercial Equipment Manuals, Drawings and Data  
(Technical Manuals)BLK04-AUTHORITY: DID Number: MIL-DTL-24784/4  
DID Title: Commercial Off-the-Shelf (COTS)  
Equipment Manual Requirements

BLK08-APP CODE:

BLK10-FREQUENCY: SEE BLK 16

BLK12-DATE OF 1ST SUBM: SEE BLK 16

BLK13-DATE OF SUBS SUBM: SEE BLK 16

BLK16-REMARKS:

BLK 10,12, 13:

24 Months Prior to Ship Delivery	40%
18 Months Prior to Ship Delivery	60%
12 Months Prior to Ship Delivery	80%
02 Months Prior to Ship Delivery	100%

These percentages indicate the progress based on the quantity of government approved technical manuals from the entire anticipated quantity of technical manuals that the Contractor shall submit. The Contractor shall submit revised technical manuals within 21 days of approval of an ECP of modification of a component for which a technical manual has been previously submitted.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 086-03-2112

BLK02-TITLE OF DATA ITEM: Technical Repair Standards

BLK04-AUTHORITY: DID Number: DI-TMSS-81354  
 DID Title: Technical Manual  
 Research and Analysis Source Data

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK13-DATE OF SUBS SUBM: See BLK 16

BLK16-REMARKS:

Modify DI-TMSS-81354 as follows: Change all references from "MIL-M-24784" to "MIL-DTL-24784".

Format Content.

TRS's shall be developed in accordance with MIL-DTL-24784/7B and MIL-DTL-24784B for the following equipment (as applicable):

- 1.) Main engines
- 2.) Reduction gears
- 3.) Controllable Pitch Propeller Hub
- 4.) Propellers
- 5.) Propulsion Shafts
- 6.) Rudders
- 7.) Fin stabilizers
- 8.) Generators (prime movers and generators)
- 9.) Thrusters
- 10.) Auxiliary (Loiter) Drives
- 11.) Davits
- 12.) Cranes

BLK 12, 13: The Contractor shall submit a TRS for one of the selected components in BLK 16 for government review and approval. The government will provide input to standardize the format, content and appearance of the remaining TRSs.

06 Months Prior to Ship Delivery	40%
03 Months Prior to Ship Delivery	60%
01 Months Prior to Ship Delivery	80%
02 Months After Ship Delivery	100%

These percentages indicate the progress based on the quantity of government approved Technical Repair Standards from the entire anticipated quantity of TRSs that the Contractor shall submit. The Contractor shall submit revised TRSs within 21 days of approval of an ECP of modification of a component for which a TRS has been previously submitted.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 086-03-2113

BLK02-TITLE OF DATA ITEM: Damage Control Technical Data

BLK04-AUTHORITY: DID Number: DI-TMSS-81513  
DID Title: DAMAGE CONTROL Books  
and Diagrams for US Navy Surface  
Ships

BLK08-APP CODE: A

BLK10-FREQUENCY: See BLK 16

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK 13-DATE OF SUBS SUBM: See BLK 16

BLK16-REMARKS:

Modify the DID as follows:

"10.2 Format and Content. The format and content of the surface ship Damage Control books and Diagrams shall be in accordance with the requirements of NAVSEA Technical Specification (NTS) 9090-820, and COMDTINST M9000.6(series). COMDTINST M9000.6(series) shall supersede any conflicting requirements with NTS 9090-820.

'All DC Diagrams shall be developed and submitted in an editable AutoCAD format.

The format of surface ship DC Book Contents shall be delivered in Microsoft Word file format. The DC Book content shall include all requirements in NTS 9090-820, with the exception of all damage control fitting lists.'

'DC Fitting lists shall be submitted and in accordance with the Coast Guard Automatic Damage Control System (AUTODAM) Standard (ATCH\_XXXXXX). The data shall be submitted in a MS Access file format in the template provided (2012-01-10\_ATCH\_SFCLC\_DC\_DATA\_ELEMENT\_IMPORT\_TEMPLATE.xls). Data element definitions are provided in the AutoDAM Data Import Definition (2011\_03-11\_ATCH\_SFCLC\_AUTODAM\_DATA\_IMPORT\_DEF.doc)"

BLK 10/12/13 Three Submittals of the Damage Control Products are required:  
30 days prior to BT, draft  
60 days prior to DD, for update  
90 days after DD, final.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 086-03-2329

BLK02-TITLE OF DATA ITEM: Commercial Equipment Manuals, Drawings and Data  
(Technical Manuals), Supplemental DataBLK04-AUTHORITY: DID Number: MIL-DTL-24784/4  
DID Title: Commercial Off-the-Shelf (COTS)  
Equipment Manual Requirements

BLK08-APP CODE: A

BLK10-FREQUENCY: SEE BLK 16

BLK12-DATE OF 1ST SUBM: SEE BLK 16

BLK13-DATE OF SUBS SUBM: SEE BLK 16

## BLK16-REMARKS:

Supplemental data shall be submitted in an XML file format in accordance with the OPC S1000D Business Rules.

BLK 10,12, 13:: Supplemental Technical Manual Data delivery shall be concurrent with all applicable Commercial Equipment Manuals, Drawings or Data submittals.

BLK 13: Revisions shall be submitted within 21 days after approval of a change by the Government and delivered concurrent with the revised or changed Commercial Equipment Manuals, Drawings or Data submittals.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 087-03-1277

BLK02-TITLE OF DATA ITEM: Facilities Plan and Drawings

BLK04-AUTHORITY

DID Number: DI-FACR-80976

DID Title: Facilities Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

See BLK 16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: Section 10.2: Delete Content requirements  
Section 10.2.1: Delete the first sentence and replace with "The Facilities Plan and Drawings shall provide the following information for the PRO, PCAF, and PreComDet:"  
Section 10.2.1: Delete "b. Identification of whether technical support real property or non-technical support real property"  
Section 10.2.1: Delete "c. Single line sketch of item"  
Section 10.2.1: Delete "k. Estimated construction costs."  
Section 10.2.2: Delete entire section

BLK 12: The facilities drawings shall be submitted when the first of the following events occurs:

- 1.) 30 days after Phase II Option Exercise
- 2.) 45 days before facility (new or renovated) construction occurs
- 3.) 45 days before a lease agreement is signed for temporary structures

BLK 16: The Facilities Plan and Drawings shall demonstrate:  
Location of the PCAF and PreComDet and their proximity to the Contractor's offices and ship production area  
The space layout of the PRO, PCAF, and PreComDet including offices, conference rooms, cubicles, partitions, restrooms, and LAN, telephone, and cable television connections  
The condition and readiness of all facilities allocated for Government use  
If any new facilities need to be constructed or purchased to accommodate Government personnel and representatives, the Contractor shall include drawings and plans in the Facilities Plan and Drawings that demonstrate the facilities will meet contract requirements.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 088-03-1281

BLK02-TITLE OF DATA ITEM: Human Systems Integration Program Plan (HSIPP)

BLK04-AUTHORITY: DID Number: DI-HFAC-81743  
DID Title: Human Systems  
Integration Program Plan (HSIPP)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Tailoring: DI-HFAC-81743 paragraph 4.n., section head shall be, "Human Systems Integration in System Safety and Occupational Health (SSOH)".

For any section whose content is substantially covered in another document (such as the Human Engineering Program Plan), the Contractor shall provide a summary of the content in the HSIPP and a reference to the document section(s) that contain the content.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 088-03-1282

BLK02-TITLE OF DATA ITEM: Human Engineering Program Plan (HEPP)

BLK04-AUTHORITY:

DID Number: DI-HFAC-81742

Program Plan

DID Title: Human Engineering  
(HEPP)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DI-HFAC-81742 Section 3b, Tailoring. The HEPP shall also comply with the following:

- All activities in Phase II shall be included in the plan.
- The HEPP shall include a table of shipboard spaces in an Appendix indicating whether or not each space is normally manned, the types of human/machine interfaces and watchstations located within, and the type of human engineering analyses to be performed against that space.

For the analyses and activities the contractor may use MIL-HDBK-46855A for general guidance and instruction on conducting HFE tasks.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 088-03-1285

BLK02-TITLE OF DATA ITEM: Manpower Mix Analysis Report

BLK04-AUTHORITY:  
format.

DID Number: Contractor

DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY: QTRLY

BLK12-DATE OF 1ST SUBM: 45 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The contractor shall include two sections titled: Operational Crew and Ashore Support.

The Operational Crew Section shall include only the operations/procedures while cutter is underway and inport. The operational crew section shall include a description of the manning and design concept required to complete all watches, evolutions and tasks.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 088-03-1288

BLK02-TITLE OF DATA ITEM: Crew Labor Hour Calculations Report

BLK04-AUTHORITY: DID Number: Contractor Format  
DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY: QTRLY

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The Manpower Estimate Report for the Maritime Security Cutter- Medium (WMSM) dated 18 March 2011 will be provided as GFI in support of this data item.

This report shall include:

Maintenance tasks, regardless of periodicity, to include corrective, preventive, and facilities maintenance (work required to maintain the material condition of the OPC) both at sea and inport.

Own unit support tasks, both at sea and inport.

Crew evolutions, both at sea and inport involving installed systems.

Include all crew evolutions.

Identify all crew evolutions with examples.

Use the industrial engineering allowances, make ready/put-away allowance and productivity allowance that was used in the Manpower Estimate Report for Maritime Security Cutter Medium document, dated 18 March 2011.

Identify and describe all additional industrial engineering allowances, i.e. special allowances, used for the calculation of the crew labor hours.

Identify the count/quantity, frequency and the duration of all tasks used to calculate crew labor hours. The source of all frequency and duration estimates shall be documented and disclosed.

Identify the required number of required positions or billets for each task.

Provide data regarding the variance associated with count/quantity, frequency and duration estimates used in calculating crew labor hours.

Identify and calculate labor hours for all maintenance tasks, regardless of periodicity.

Identify all constraints and assumptions required to calculate crew labor hours for operations, maintenance, and support.

EXHIBIT XX - DETAIL DESIGN

Identify the count/quantity, frequency and the duration of all tasks used to calculate labor hours.

Document and disclose the source of all count/quantity, frequency and duration estimates.

Identify constraints and assumptions used throughout the report.

Calculations in this report shall be auditable, repeatable and traceable.

Calculations shall have a reference.

Provide all calculations, to at least the task level, in a Microsoft Excel workbook, Microsoft Office version 2007 or later.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 088-03-1290

BLK02-TITLE OF DATA ITEM: Human Engineering Design Approach Document-Maintainer (HEDAD-M)

BLK04-AUTHORITY: DID Number: DI-HFAC-80747  
DID Title: Human Engineering Design Approach Document-Maintainer (HEDAD-M)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Design, installation, or layout changes which have been made since the last HEDAD-M preparation shall be described. The fully developed, final document shall include information pertaining to maintenance actions performed at the organizational level for each of the content areas.

Notional equipment, drawings, descriptions, layouts/arrangements, designs, installation procedures, rationale, special tools/equipment/aids, analyses, depictions, and other content that contained placeholders in Contract Design shall be identified and completely populated.

The HEDAD-M shall describe the extent to which the requirements and applicable human engineering design criteria (e.g., ASTM F1166) have been incorporated into the design, layout, and installation of equipment having a maintainer interface. Results from analysis of maintainer tasks (from the Critical Task Analysis Report shall be presented as part of the rationale supporting the layout, design, and installation of the equipment.

The HEDAD-M shall contain an appendix entitled: Summary of Human Factors Inputs to Equipment Selection and Outcome of Trade Studies (Maintainer).

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 088-03-1291

BLK02-TITLE OF DATA ITEM: Human Engineering Design Approach Document-  
Operator (HEDAD-O)BLK04-AUTHORITY: DID Number: DI-HFAC-80746  
DID Title: Human Engineering  
Design Approach Document-Operator  
(HEDAD-O)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

3.1.1.2 Design, arrangement, or layout changes which have been made since the last HEDAD-O preparation shall be described. The document shall include crew station and operator-related information for each of the content areas.

3.1.1.3 Notional equipment, drawings, crew stations, procedures, tasks, and other content that contained placeholders in Contract Design shall be completely populated in Detail Design.

3.1.1.4 The HEDAD-O shall describe the following: layout, detail design, and arrangement of crew station equipment having an operator interface, operator tasks associated with equipment, and the extent to which human performance requirements and applicable human engineering design criteria (e.g., ASTM F1166) have been incorporated into the layout, design, and arrangement of equipment having an operator interface.

3.1.1.5 Results from analysis of operator tasks from the Critical Task Analysis Report shall be presented as part of the rationale supporting the layout, design, and integration of crew equipment.

The HEDAD-O shall contain an appendix entitled: Valve Criticality Analysis and Results. The appendix shall describe the valve criticality analysis, performed in accordance with ASTM F1337 and the criteria of ASTM F1166 and report the results.

The HEDAD-O shall contain an appendix entitled: Summary of Human Factors Inputs to Equipment Selection and Outcome of Trade Studies (Operator).

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 088-03-1293

BLK02-TITLE OF DATA ITEM: Human Engineering Test Reports (HETR)

BLK04-AUTHORITY:

DID Number:

DI-HFAC-80744

Test Report

DID Title:

Human Engineering

(HETR)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: See BLK16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

HETRs shall be provided 30 days after the completion of each test.

The HETR shall include detailed methodologies for the following Phase II test activities identified in the HEPP:

- Human Performance Testing
- Usability Testing
- Any additional test activities identified in the Contractor's HEPP for Phase II.

Data collection tools such as checklists or questionnaires shall be provided as appendices.

Evidence of compliance with COMDTINST M6500.1 (May 2011) shall be provided in the HETR.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 088-03-1306

BLK02-TITLE OF DATA ITEM: Onboard and Embedded Training Market Research Report

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports - Preparation, Presentation, and Preservation

BLK08-APP CODE:

BLK12-DATE OF 1ST SUBM: 15 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Embedded training. Embedded Training is defined by the Standard Operating Procedures for the Coast Guard's Training System, <http://www.uscg.mil/forcecom/training/>, as using operational equipment that involves simulating or stimulating of equipment performance.

The report shall document that Embedded Performance Support systems have been considered for supporting operations and maintenance of machinery control systems, bridge navigation & control systems and sensor/combat systems.

The report shall include written documentation from the Original Equipment Manufacturer (OEM) and from third party vendors that describes the capabilities and costs of available onboard trainers and/or embedded electronic performance support systems for CFE systems and equipment in the following SWBS groups:

- Electronics (SWBS Group 400)
- Propulsion (SWBS Group 200)
- Electrical (SWBS Group 300)
- Auxiliary (SWBS 500)

The report shall include the following for each onboard trainer/embedded electronic performance support system listed:

- SWBS designator
- system level (part, component, subsystem, system, integrated system)
- OEM or third party provided
- whether such system is included in the basic installation or provided at an extra cost
- total cost (to include installation)
- general requirements (to include space, weight, power requirements), and
- capabilities and limitations

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 088-03-1311

BLK02-TITLE OF DATA ITEM: Training Development Plan

BLK04-AUTHORITY: DID Number: DI-MGMT-80004  
DID Title: Management Plan

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK13-DATE OF SUBS SUBM: See BLK 16

BLK16-REMARKS:

BLK 12: Interim submittals of the Training Development Plan at Program Management Conference (PMC) 1 and PMC 2. Final submittal shall be at PMC 3.

The Training Development Plan shall detail the Contractor's plan for achieving PS&T products. The Training Development Plan shall address both Familiarization and Factory Training and shall include the following sections:

Work Breakdown Structure - For each PS&T product, the plan shall include a work breakdown structure to at least three levels.

Analysis Plan - The plan shall describe their approach or method, resources, prerequisites, extant data, sequence, and tasks associated with conducting the Familiarization and Factory Training Analyses.

Design Plan - The plan shall describe their approach or method, resources, prerequisites, extant data, sequence, and tasks associated with completing the Familiarization and Factory Training Design Documents.

Development Plan - The plan shall describe their approach or method, resources, prerequisites, extant data, sequence, and tasks associated with completing the Familiarization and Factory Training Materials.

Implementation Plan - The plan shall describe their approach or method, resources, prerequisites, extant data, sequence, and tasks associated with conducting Familiarization and Factory Training.

Evaluation Plan - The plan shall describe their approach or method, resources, prerequisites, extant data, sequence, and tasks associated with conducting Familiarization and Factory Training Evaluations.

Development Schedule -The plan shall provide a comprehensive Gantt chart that integrates all PS&T products, allots time for interim technical reviews of each product, links interdependencies between PS&T products and/or other contract products (e.g., engineering analyses, system manuals), and indicates the critical path for each product.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 088-03-2292

BLK02-TITLE OF DATA ITEM: HSI Issue and Decision Database Report

BLK04-AUTHORITY: DID Number: Contractor format.  
DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM: 30 DPFCDR

BLK16-REMARKS:

Contractor shall provide snapshot of HSI Issue and Decision Database.  
In contractor format, the report shall include:

- 1) List of all HSI issues, sorted by domain. List shall include the control number, title, short description of the issue, primary domain, secondary domain (if applicable), and all data in the database columns.
- 2) Summary of issue status by domain: Numbers of issues currently open, closed, pending, etc.
- 3) Number of issues being tracked by the web based Hazard Tracking System.
- 4) Number of issues elevated to Risk Management Program.
- 5) Since last submittal: number of issues opened, closed, moved to Hazard Tracking System, elevated to Risk management Program.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 090-03-1319

BLK02-TITLE OF DATA ITEM: Quality Assurance Plan

BLK04-AUTHORITY: DID Number: Contractor Format  
DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAOE

BLK13-DATE OF SUBS SUBM: 60 DPPRR

BLK16-REMARKS:

BLK 04:

The Quality Assurance Plan shall also include:

- 1) Updates to the Contractor's Structure and Organization Chart depicting how the QA organization interacts with all Phase II activities of Detail Design, Construction, Testing and Delivery of the ship.
- 2) The Contractor's Current QA Certifications
- 3) Copies of the Contractor's OPC specific work instructions and/or processes for QA addressing the actions and authority of their QA organization to finding and resolving QA problems.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 092-03-1321

BLK02-TITLE OF DATA ITEM: Test and Evaluation Program Plan (TEPP)

BLK04-AUTHORITY: DID Number: DI-NDTI-81284  
DID Title: Test and Evaluation Program Plan (TEPP)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAOE

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: Section 10.1.1: Delete the first sentence

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 092-03-1336

BLK02-TITLE OF DATA ITEM: Test Procedure

BLK04-AUTHORITY: DID Number: DI-NDTI-80603  
DID Title: Test Procedure

BLK08-APPROVAL: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: SEE BLK16

BLK 13-DATE OF SUBS SUBM: SEE BLK16

BLK16-REMARKS:

BLK04: Paragraph 3.2.3.2 Add: "e. Estimated Testing Time" This shall be the time in hours required to perform the test once assuming no interruptions. Include the time required to complete the initial conditions and setup and shutdown and securing steps.

Paragraph 3.2.4: Required test equipment includes any computer programs.

Paragraph 3.2.8b: List where each test personnel is to be located during the test.

BLK12: Test Procedure shall be submitted 120 days prior to the execution of a test.

BLK13: Test procedures shall be resubmitted if changed.

The Contractor shall provide the following information in the Test Procedures:

Test name and unique number

Objective of the test and what requirement is being verified

List of test equipment including calibration information

Step-by-step process detailing the actions necessary to obtain the required data

Data sheets with spaces to record all necessary data during the test

Pass/fail criteria against which the results of the test will be measured

Unless specifically required in the test requirement, adjustment of the equipment or system being tested is not permitted while conducting tests.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 092-03-2065

BLK02-TITLE OF DATA ITEM: Software System Test Plan for Machinery Controls

BLK04-AUTHORITY:	DID Number:	DI-NDTI-80566
	DID Title:	Test Plans
	DID Number:	DI-IPSC-81438
	DID Title:	Software Test Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPFCDR

BLK 13-DATE OF SUBS SUBM: 60DPT

BLK16-REMARKS:

The Test Plan for MPCMS, PCS, EPCS and any stand alone control system shall be delivered as both separate documents for each control system and an integrated document showing plans for system integration testing.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 092-03-2224

BLK02-TITLE OF DATA ITEM: Test Reports

BLK04-AUTHORITY: DID Number: DI-NDTI-80809  
DID Title: Test/Inspection Report

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 10 DATC

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

If a test is performed on board the ship, the Test Report shall provide the following information as applicable:

Ship's draft and trim  
Wave height  
Water temperature  
Air temperature and humidity  
Wind conditions

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 092-03-2307

BLK02-TITLE OF DATA ITEM: Test Procedure

BLK04-AUTHORITY: DID Number: DI-NDTI-80603  
DID Title: Test Procedure

BLK08-APPROVAL:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: SEE BLK16

BLK 13-DATE OF SUBS SUBM: SEE BLK16

BLK16-REMARKS:

BLK04: Paragraph 3.2.3.2 Add: "e. Estimated Testing Time" This shall be the time in hours required to perform the test once assuming no interruptions. Include the time required to complete the initial conditions and setup and shutdown and securing steps.

Paragraph 3.2.4: Required test equipment includes any computer programs.

Paragraph 3.2.8b: List where each test personnel is to be located during the test.

BLK12: The Test Procedure shall be submitted 120 days prior to the scheduled execution of a test.

BLK13: Test procedures shall be resubmitted if changed.

The Contractor shall provide the following information in the Test Procedures:

Test name and unique number

Objective of the test and what requirement is being verified

List of test equipment including calibration information

Step-by-step process detailing the actions necessary to obtain the required data

Data sheets with spaces to record all necessary data during the test

Pass/fail criteria against which the results of the test will be measured

Unless specifically required in the test requirement, adjustment of the equipment or system being tested is not permitted while conducting tests.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 092-03-2340

BLK02-TITLE OF DATA ITEM: Schedule of Tests

BLK04-AUTHORITY: DID Number: DI-MGMT-81650  
DID Title: Integrated Master Schedule (IMS)

BLK08-APP CODE:

BLK10-FREQUENCY: QRTLY

BLK12-DATE OF 1ST SUBM: SEE BLK16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: The Schedule of Tests shall be a Detailed Schedule.

BLK12: The Schedule of Tests shall be submitted 180 days prior to executing the first test.

BLK16: The Schedule of Tests shall include a Test Schedule List. The Test Schedule List shall be a tabular listing by test number which shall include the following columns:

- a. Unique Test procedure number starting with the 3 digit ESWS number of the equipment or system
- b. Test procedure revision letter;
- c. Test procedure title;
- d. Scheduled test start dates;
- e. Actual test start dates;
- f. Scheduled test completion dates;
- g. Actual test completion dates; and,
- h. Flag for change since the last schedule issue.

The Schedule of Tests shall include a Test Chart. The Chart shall be a Gantt style chart with horizontal bars showing duration of test conduct and other tests related activities. The tests and activities shall be arranged in accordance with the Ship Work Breakdown Structure (SWBS). For each test the chart shall indicate:

- a. Test procedure number;
- b. Test procedure title;
- c. Scheduled test start date;
- d. Schedule test completion date; and,
- e. Anticipated or actual changes from the scheduled dates (shown by dashed bars).

The Schedule of Tests shall include a Test List and Test Chart that show only the testing to be conducted at the C4ISR Test and Integration Facility.

The Schedule of Tests shall include a Test List and a Test Chart that show only the tests to be conducted at the MPCMS Land Based Test Facility.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 092-03-2346

BLK02-TITLE OF DATA ITEM: Software System Test Plan for C4ISR

BLK04-AUTHORITY: DID Number: DI-NDTI-80566  
DID Title: TEST PLANS  
DID Number: DI-IPSC-81438  
DID Title: SOFTWARE TEST

PLAN

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPFCDR

BLK 13-DATE OF SUBS SUBM: 60DPT

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 094-03-1345

BLK02-TITLE OF DATA ITEM: Ship Trial Report

BLK04-AUTHORITY: DID Number: CGDI-MGMT-90006  
DID Title: Ship Trial Report

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: SEE BLK16

BLK 13-DATE OF SUBS SUBM: SEE BLK16

BLK16-REMARKS:

BLK04: Paragraph 10.3.5: Add  
"f. Previously submitted data sheets containing all recorded  
data, measurements, and observations"  
Paragraph 10.4: Delete in entirety.

BLK12: The first Ship Trial Report shall be submitted 45 days after  
the completion of Builder's Dock Trials.

BLK13: Subsequent Ship Trial Reports shall be submitted 45 days after  
the completion of Builder's Sea Trials and 45 days after the  
completion of Acceptance Trials.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 094-03-1346

BLK02-TITLE OF DATA ITEM: Ship Trials Plan

BLK04-AUTHORITY: DID Number: DI-MGMT-81643  
DID Title: Ship Trial Agenda

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: SEE BLK16

BLK 13-DATE OF SUBS SUBM: SEE BLK16

BLK16-REMARKS:

- BLK04: Paragraph 1.4: Delete "BT, OVT, and FVT" and replace with "Builder's Dock Trials (BDT), Builder's Sea Trials (BST), and Acceptance Trials (AT)."
- Paragraph 2: Trial displacement shall include details of loading conditions, trim, and all significant weights not present during Trials
- Paragraph 3: Delete "BT, OVT, and FVT" and replace with "BDT, BST, and AT"
- Paragraph 4: Add
- "k. Documentation of authorization from FCC to use communication channels
1. Describe the condition of the mooring site to ensure no conditions exist that could damage the cutter
- m. Pass/fail criteria for all tests against which the results will be measured"
- Paragraph 8: Add
- "i. Required license/documentation information for Contractor personnel"
- Paragraph 8.1: Delete and replace with "8.1 Personnel listings shall include all Contractor, Subcontractor, and equipment manufacturer personnel scheduled to attend the Trial Event."
- Paragraph 8.2: Delete
- BLK12: The first Ship Trial Plan shall be submitted 75 days prior to the start of Builder's Dock Trials.
- BLK13: Subsequent Ship Trial Plans shall be submitted 75 days prior to the start of Builder's Sea Trials and 75 days prior to the start of Acceptance Trials.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 096-03-1347

BLK02-TITLE OF DATA ITEM: Allocated Baseline Weight Estimate (ABWE)

BLK04-AUTHORITY: DID Number: SAWE RP 12  
DID Title: Weight Control Technical  
Requirements for Surface Ships

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

A Longitudinal Weight Distribution Report, Government Furnished Material Summary, and Contract Modification Summary Report shall be included with the AWE.

The reports shall be in Microsoft Excel.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 096-03-1351

BLK02-TITLE OF DATA ITEM: Weight Control Program Plan

BLK04-AUTHORITY: DID Number: SAWE RP12  
DID Title: Weight Control  
Technical Requirements for Surface  
Ships

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The reports shall be in Microsoft Word or Microsoft Excel,

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 096-03-1353

BLK02-TITLE OF DATA ITEM: Weight Moment of Inertia Report(s)

BLK04-AUTHORITY: DID Number: SAWE RP12  
DID Title: Weight Control  
Technical Requirements for Surface  
Ships

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAOE (with AWE)

BLK13-DATE OF SUBS SUBM: 90 DAD (with FWR)

BLK16-REMARKS:

The reports shall be in Microsoft Excel.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 096-03-1354

BLK02-TITLE OF DATA ITEM: Accepted Ship Report (ASR)

BLK04-AUTHORITY: DID Number: SAWE RP12  
DID Title: Weight Control Technical  
Requirements for Surface Ships

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: BLK 16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The ASR shall be delivered 60 days after the day of the inclining test. A Longitudinal Weight Distribution Report, Government Furnished Material Summary, and Contract Modification Summary Report shall be included with the ASR.

The reports shall be in Microsoft Word or Microsoft Excel.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 096-03-1356

BLK02-TITLE OF DATA ITEM: Final Weight Report (FWR)

BLK04-AUTHORITY: DID Number: SAWE RP12  
DID Title: Weight Control  
Technical Requirements for Surface  
Ships

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAD

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

A Longitudinal Weight Distribution Report, Government Furnished  
Material Summary, and Contract Modification Summary Report shall be  
included with the FWR.

The reports shall be in Microsoft Word or Microsoft Excel.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 096-03-1357

BLK02-TITLE OF DATA ITEM: Quarterly Weight Reports (QWR)

BLK04-AUTHORITY: DID Number: SAWE RP 12  
DID Title: Society of Allied  
Weight Engineers, Recommended  
Practice No.12

BLK08-APP CODE:

BLK10-FREQUENCY: QTRLY

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

A Longitudinal Weight Distribution Report, Government Furnished Material Summary, and Contract Modification Summary Report shall be included with each QWR.

The reports shall be in Microsoft Word or Microsoft Excel.

Subsequent submissions shall address and resolve any issues that the USCG identified from the Contractor's Weight Control Program and reports.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 097-03-1358

BLK02-TITLE OF DATA ITEM: Stability Check Procedures

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports -  
Preparation, Presentation, and  
Preservation [AI 4-033]

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK13-DATE OF SUBS SUBM: See BLK 16

BLK16-REMARKS:

For guidance see the ASTM F1321.

The Stability Check Procedure shall be delivered at least 60 days prior to the Stability Check.

The report(s) shall be in Microsoft Word, or Microsoft Excel.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 097-03-1359

BLK02-TITLE OF DATA ITEM: Stability Check Test Data and Report

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports -  
Preparation, Presentation, and  
Preservation

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK13-DATE OF SUBS SUBM: See BLK16

BLK16-REMARKS:

For guidance see the ASTM F1321.

Copies of the Stability Check Data shall be delivered on the day of the test, and the Stability Check Report shall be delivered no later than 7 days after the test.

The reports shall be in Microsoft Word, or Microsoft Excel,

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 097-03-1360

BLK02-TITLE OF DATA ITEM: Inclining Experiment Procedures

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports -  
Preparation, Presentation, and  
Preservation

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The Inclining Experiment Procedure shall be delivered at least 60 days prior to the test.

The report(s) shall be in Microsoft Word, or Microsoft Excel.

DRAFT



EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 098-03-2102

BLK02-TITLE OF DATA ITEM: Models, Mockups and Simulation Reports

BLK04-AUTHORITY: DID Number: Contractor Format  
DID Title:

BLK08-APPROVAL:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: BLK 16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The Models, Mockups and Simulation Reports shall document the results and findings from mock-up reviews and modeling and simulation activities and analyses specified in the Modeling and Simulation Plan.

Models, Mockups and Simulation Reports shall be submitted 30 days after completion of the simulation or mock-up review.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 098-03-2103

BLK02-TITLE OF DATA ITEM: Modeling and Simulation Plan

BLK04-AUTHORITY: DID Number: Contractor  
format.

DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK13-DATE OF SUBS SUBM: 60 DPFCDR

BLK16-REMARKS:

The Modeling and Simulation Plan shall update the use of Modeling and Simulation in the design process. The Plan shall include updated schedules for development, tools to be used, expected results and cost savings to be realized. The Plan shall include the M&S efforts to support HSI objectives and include the use of 3D Zone reviews to support maintenance and access.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 100-03-1348

BLK02-TITLE OF DATA ITEM: Design Load Criteria Summary

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and Technical Reports

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DAC

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Contract Design deliverable shall be updated as required by design development.

NVR 1-3-1/6 ii)

Design Loading Criteria Summary shall provide details concerning the specific loads applicable to the design. Unique load cases and load applications that deviate from the requirements of these Rules shall be specifically noted and justified. Reference shall be made to specific load requirements imposed by the Naval Technical Authority. The Design Loading Criteria Summary shall include specifics on supported equipment and cargo, such as vehicle or aircraft dimensions, wheel load, tire imprint data, and tie-down arrangements.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 100-03-1376

BLK02-TITLE OF DATA ITEM: Mid-ship Section Drawing

BLK04-AUTHORITY: DID Number: DI-SESS-81002  
DID Title:

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DAOE

BLK13-DATE OF SUBS SUBM: RAR

BLK16-REMARKS:

DRAFT



EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 100-03-1379

BLK02-TITLE OF DATA ITEM: Hull Girder and Fatigue Analysis Report

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and Technical Reports

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: RAR

BLK16-REMARKS:

The Fatigue Assessment shall update the Contract Design fatigue analysis.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 100-03-1380

BLK02-TITLE OF DATA ITEM: Strength Studies, Calculations and Analyses

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and Technical Reports

BLK08-APP CODE: A

BLK10-FREQUENCY: SEMI-ANNUAL

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Detail design deliverables shall include the full set of required calculations per OPC System Specification (NVR 1-3-1/6).

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 100-03-1382

BLK02-TITLE OF DATA ITEM: Scantling Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models and  
Associated Lists

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DAOE

BLK 13-DATE OF SUBS SUBM: RAR

BLK16-REMARKS:

Scantling drawings shall include:

Decks and Platforms Transverse Watertight and Tank Bulkheads

- A. Superstructure and Deckhouses
- B. Inner Bottom
- C. Hull Sections and Transverse Bulkheads
- D. Longitudinal Bulkheads and Girders
- E. Miscellaneous Structural Bulkheads
- F. Shaft Struts
- G. Shaft Tunnel Drawing
- H. Mast Drawing
- I. Seachest and Transducer Wells
- J. Machinery Trunks, Engine and Main Auxiliary Foundations

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 100-03-1386

BLK02-TITLE OF DATA ITEM: Finite Element Analysis Report and Model

BLK04-AUTHORITY: DID Number: Contractor Format  
DID Title:

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Finite element analysis shall be updated for structural changes in the hull.  
The finite element model(s) shall be submitted with the report.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 100-03-1387

BLK02-TITLE OF DATA ITEM: Structural Design Report

BLK04-AUTHORITY: DID Number: Contractor Format  
DID Title:

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45DAOE

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The Structural Design Report shall be updated for to reflect design development.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 100-03-1389

BLK02-TITLE OF DATA ITEM: Longitudinal Strength Report and Drawing

BLK04-AUTHORITY: DID Number: CGDI-GDRQ-90001  
DID Title: Calculations and Stress Diagrams

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: RAR

BLK16-REMARKS:

Detail Design Deliverables shall include the full set of required calculations per OPC System Specification (NVR 1-3-1/6).

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 100-03-1392

BLK02-TITLE OF DATA ITEM: Detail Design Construction Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90DPFCDR

BLK 13-DATE OF SUBS SUBM: RAR

BLK16-REMARKS:

Ship Structural Construction Drawings shall be complete in detail and scope. Ship Structural Construction Drawings shall include weld details, material identification and part numbers.

The detail design and construction drawing deliverables shall implement the approved structural design in the contractor's construction methodology. (These drawings shall be updated to an "As-built" revision prior to final delivery.)

Structural arrangement drawings shall depict the following:

- a. Location and configuration of structural components including holes for fasteners, piping or wiring shall be dimensioned. Such components need not be separately dimensioned on their structural arrangement drawing.
- b. Information required for identification, fabrication assembly and installation of the hull structure including the penetrations, coamings, except field run shall be included.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 100-03-1395

BLK02-TITLE OF DATA ITEM: Standard Structural Details

BLK04-AUTHORITY: DID Number: Contractor Format  
DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DAOE

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Shall be in accordance with the OPC System Specification.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 100-03-1396

BLK02-TITLE OF DATA ITEM: Docking Plan and Drawing

BLK04-AUTHORITY: DID Number: NSTM S9086-7G-STM-010/CH-997R3  
DID Title: Naval Ships' Technical Manual  
CHAPTER 997 Docking Instructions  
and Routine Work In Dry Dock  
DID Number: NAVSEA DRAWING 803-5184106  
DID Title: Standard Docking Drawing, Surface  
Ships

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: SEE BLK 16

BLK13-DATE OF SUBS SUBM: SEE BLK 16

BLK16-REMARKS:

BLK 12: 1<sup>st</sup> submission shall be delivered 45 days prior to ship launch and the ship becoming waterborne. CG approval is limited to format and completeness. Accuracy of the content remains the responsibility of the Contractor.

BLK 13: Subsequent submission shall be 90 days prior to ship delivery. CG approval is limited to format and completeness. Accuracy of the content remains the responsibility of the Contractor.

BLK 16:

The OPC Docking Plan and Drawing shall conform to NAVSEA Drawing 803-5184106 (Surface Ships) as the master guidance drawing to the maximum extent possible, except that where the drawing format conflicts with COMDTINST M9085.1, the COMDTINST supersedes. The Docking Plan and Drawing shall be "H" size with zones as necessary and shall clearly show the following:

1. Docking arrangements for three docking positions to allow for hull painting.
2. A profile view of the ship supported on the pier keel blocks, showing:
  - a. Location of keel blocks in all three docking positions.
  - b. Location of side blocks in all three docking positions.
  - c. All appendages and their size and locations such as centerline and bilge keels, anodes, blisters, bleeder plugs, shafts, shaft struts, propellers and rudders.
  - d. Shell openings and Diaphragms.
    - i. All openings in the shell, which are capable of discharging sewage while in dry dock, shall be so indicated.
  - e. Major structural transverse bulkheads.
  - f. Location of transducers, rudders, secondary propulsion units, thrusters and similar removable appendages, specifying the

## EXHIBIT XX - DETAIL DESIGN

- clearance below the bottom of the keel required for their removal.
- g. The clearance required beyond the stern reference point for the removal of the shaft(s).
  - h. The rise and location of the bow shall be indicated.
  - i. The height of the bow and the stern shall be indicated.
  - j. Frame spacing of ship shall be indicated.
  - k. Design waterline, forward and aft perpendiculars and all draft marks shall be included.
  - l. Location of bitts and chocks and other mooring fittings.
3. A plan view of the ship showing the following:
    - a. The blocking arrangement, single and pier type side and centerline blocking, to adequately support the ship while in dry dock.
    - b. Location of keel blocks in all three docking positions.
    - c. Location of side blocks in all three docking positions.
    - d. All appendages and their size and locations such as centerline and bilge keels, anodes, blisters, bleeder plugs, shafts, shaft struts, secondary propulsion units, thrusters, propellers and rudders.
    - e. Location of shell openings and hull penetrations such as sea chests, anode windows, transducers, overboard suction and discharges and exhausts.
    - f. Major longitudinal and transverse bulkheads.
    - g. Distances from stern reference point to keel block and side block for three docking positions shall be noted.
    - h. Frame spacing of ship shall be indicated.
  4. Transverse sections of the ship, as required, to illustrate the transverse blocking arrangement, including cases where high blocking is required and stability in dock is a consideration showing the contour of the ship and center keel, size and location of bilge keel and side docking blocks.
  5. Table of offsets of bilge keels and longitudinal bulkheads.
  6. Tables of offsets and dimensioned drawing for side blocks and keel blocks.
    - a. Side block spacing of 8'-0", 12'-0" and 16'-0"
    - b. Keel block spacing of 6'-0" on center
  7. Tables of offsets and dimensioned drawing for side blocks and keel blocks that require shaping to match the contour of the hull.
  8. List of shell openings and bleeder plugs below the design waterline showing sizes and locations from stern reference point, half breadths and heights above (or below) bottom of keel. A table of principal dimensions, including displacements and other properties for docking.
  9. Trim table for propeller clearances
  10. Table showing maximum allowable loads on centerline and side blocks and sections as required, to illustrate the transverse blocking arrangement, especially in cases where high blocking is required.
  11. A Table of block bearing areas and pressures showing maximum allowable loads on centerline and side blocks. These tables shall include the load information required for sizing blocks.
  12. The "as-built" keel line (keel deflection) shown against the amidships keel line extended.

## EXHIBIT XX - DETAIL DESIGN

13. General notes providing any other information considered to be of aid in docking the ship.
14. The OPC Class Guidance Docking Plan shall have two title blocks affixed. One shall be left blank and one shall be completed. The blank title block is included to facilitate the preparation of Individual Standardized Docking Drawings for follow ships of the class.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 161-03-1397

BLK02-TITLE OF DATA ITEM: Shaft Strut Design and Analysis

BLK04-AUTHORITY: DID Number: Contractor Format  
DID Title:

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DAOE

BLK13-DATE OF SUBS SUBM: RAR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 167-03-1980

BLK02-TITLE OF DATA ITEM: Schedule of Doors, Manholes and Hatches

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPCFDR

BLK 13-DATE OF SUBS SUBM: 30DPTD

BLK16-REMARKS:

Detailed schedule shall include:

The structural door schedule shall include, where applicable, the door number, compartment location (to and from), size, type, left-handedright-handed, corner radius, fixed light, louvers, kick-out panels, door closers, hold back devices, lockspadlocks, and hasp and staples. The types of structural door can include, but is not limited to, weather tight, water tight, fume tight, fire zone, and air tight.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 170-03-2104

BLK02-TITLE OF DATA ITEM: Mast Structural Analysis

BLK04-AUTHORITY: DID Number: Contractor Format  
DID Title:

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The report shall document the system of units, coordinate axis system, description of the FEA plots of the full FEA model and local details. The Finite element analysis shall describe the mesh. A discussion of the modeling results and acceptance criteria, t and overall assessment shall be included and a reference list provided.

The finite element models shall be submitted with the report.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 180-03-1401

BLK02-TITLE OF DATA ITEM: Structural Foundations Report

BLK04-AUTHORITY: DID Number: Contractor Format  
DID Title:

BLK08-APP CODE: A

BLK10-FREQUENCY: SEMI-ANNUAL

BLK12-DATE OF 1ST SUBM: 180DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Detail Design calculations shall include load carrying deck equipment and miscellaneous foundations.

Report shall document the analysis from loads development, analysis and assumptions, compliance with limiting stress and deflections. Report shall document the requirements, type of analysis being performed, system of units, coordinate axis system, description of the computer analysis or FEA and other models, plots of the full FEA model and local details. Report shall include all relevant finite element plots with the scales and all accompanying information given or referred to in the legend, element types and degrees of freedom per node, material properties, element properties, finite element loads and boundary conditions, all stress components (primary, secondary and tertiary), where applicable, shall be taken into consideration. When finite element analysis is used for determining the stresses, the mesh size shall be commensurate to the detail in question and to the area of the applicable stress components. Discussion of the modeling results and acceptance criteria, load assessment, strength/resistance assessment, accuracy assessment and overall assessment shall be included. Provide list of references. Electronic FEA models developed as part of the analysis shall be delivered with the reports.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 180-03-2076

BLK02-TITLE OF DATA ITEM: Foundations Drawing

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Production Drawings Models and  
Associated Lists

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPPRR

BLK 13-DATE OF SUBS SUBM: 120DAPRR

BLK16-REMARKS:

Block 12: Detail design to support fabrication and installation of foundations for loads over 500 pounds.

Block 13: Subsequent submittals shall include foundations for loads down to 100 pounds.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 184-03-1406

BLK02-TITLE OF DATA ITEM: Weapon Foundation Design and Structural  
Arrangement Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models and  
Associated Lists

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 184-03-1407

BLK02-TITLE OF DATA ITEM: Weapon Foundation Design Calculations

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models and  
Associated Lists

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DPFCDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The Report shall document the analysis from loads development, analysis and assumptions, compliance with limiting stress and deflections. Report shall document the requirements, type of analysis being performed, system of units, coordinate axis system, description of the computer analysis or FEA and other models, plots of the full FEA model and local details. Report shall include all relevant finite element plots with the scales and all accompanying information given or referred to in the legend, element types and degrees of freedom per node, material properties, element properties, finite element loads and boundary conditions, all stress components (primary, secondary and tertiary), where applicable, shall be taken into consideration. When finite element analysis is used for determining the stresses, the mesh size shall be commensurate to the detail in question and to the area of the applicable stress components. Discussion of the modeling results and acceptance criteria, load assessment, strengthresistance assessment, accuracy assessment and overall assessment shall be included. Provide list of references. Electronic FEA models developed as part of the analysis shall be delivered with the reports.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 184-03-2295

BLK02-TITLE OF DATA ITEM: Ship Master Reference Plane Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models and  
Associated Lists

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 184-03-2330

BLK02-TITLE OF DATA ITEM: Combat System Alignment Plan

BLK04-AUTHORITY: 0101/OP762  
DID Number: SW225-AO-MMA-

DID Title: Theory of Combat System Alignment Manual

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK 13-DATE OF SUBS SUBM: 30DPFCDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 192-03-1973

BLK02-TITLE OF DATA ITEM: Compartment Testing Diagram

BLK04-AUTHORITY: DID Number: DI-NDTI-80603  
DID Title: Test Procedure

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPPRR

BLK13-DATE OF SUBS SUBM: 30 DPBST

BLK16-REMARKS:

The Compartment Testing Drawing shall show the specified test heads and pressures and list the tightness and completion tests which are performed. It shall show the actual date tests were performed and the results of the tests.

Modify BLK 4:

-Paragraph 10.2.2.3.2 Add: "e. Estimated Testing Time" This shall be the time in hours required to perform the test once assuming no interruptions. Include the time required to complete the initial conditions and setup and shutdown and securing steps.

-Paragraph 10.2.2.4: Required test equipment includes any computer programs.

-Paragraph 10.2.2.8b: List where each person is located during the test.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 192-03-2297

BLK02-TITLE OF DATA ITEM: Schedule of Watertight Tests and Inspections

BLK04-AUTHORITY: DID Number: DI-NDTI-80603  
DID Title: Test Procedure

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPPRR

BLK13-DATE OF SUBS SUBM: 30 DPSTT

BLK16-REMARKS:

The Schedule of Periodic Tests and Inspections shall show the compartments to be tested, type of test, and location of air fittings.

Deliverable to be in drawing or booklet format.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 200-03-1408

BLK02-TITLE OF DATA ITEM: Propulsion Redundancy Computations and Analysis Report

BLK04-AUTHORITY  
DID Title: DID Number: ANSI-Z39.18  
Scientific and Technical Reports - Preparation, Presentation, and Preservation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 200-03-1412

BLK02-TITLE OF DATA ITEM: Calculation of Surface Ship Endurance Fuel Requirements

BLK04-AUTHORITY

DID Number: DI-GDRQ-80650

DID Title: Design Data and

Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 135DAOE

BLK13-DATE OF SUBS SUBM: BLK 16

BLK16-REMARKS:

BLK13: Subsequent submissions shall be within 15 days after each submittal of 300-03-835-1474 (EPLA).

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 200-03-1433

BLK02-TITLE OF DATA ITEM: Propulsion System Dynamic Analysis Report

BLK04-AUTHORITY

DID Number: DI-GDRQ-80650

DID Title: Design Data and

Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DPFCDR

BLK13-DATE OF SUBS SUBM:

90 DAAT

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-1275

BLK02-TITLE OF DATA ITEM: Machinery Control System Land Based Test Facility Development Plan

BLK04-AUTHORITY: DID Number: DI-IPSC-81432A  
DID Title: System/Subsystem Design  
Description (SSDD)DID Number: DI-IPSC-81429A  
DID Title: Software Transition Plan (STrP)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAOE

BLK 13-DATE OF SUBS SUBM: 120 DAOE

BLK16-REMARKS:

The LBTF Development Plan shall provide a SSDD as it relates to the LBTF as a whole which includes STIM/SIM, MPCMS, EPCS, PCS, Consoles, and document the tasks associated with transitioning LBTF Software and HM&E software of each ship from the contractor to the Coast Guard for the Life Cycle Management after Cutter delivery.

The LBTF Development Plan shall address the following:

1. Shall Identify the prime and sub contractors for the following:
  - a. LBTF Development
  - b. MPCMS Development
  - c. EPCS Development
  - d. PCS Development
  - e. MODEL Development
  - f. STIM/SIM development
  - g. Configuration Management
  - h. Integration Management
  - i. Hardware and Software Storage
2. Time Line and level of design and development effort that begins at contract award and includes:
  - a. MPCMS Development
  - b. EPCS Development
  - c. PCS Development
  - d. Transition from FAT to LBTF of MPCMS, EPCS and PCS to LBTF
  - e. STIM/SIM development
  - f. MODEL Development
  - g. LBTF Verification, Validation and Testing
  - h. System Integration Testing
  - i. LBTF System correction and validation after BST
  - j. LBTF System correction and validation after AT
  - k. MPCMS, EPCS, and PCS shipboard installation
3. Location of Facility

## EXHIBIT XX - DETAIL DESIGN

This plan shall also provide a detailed description of the development cycle of the STIM/SIM functions of the LBTF, a detailed description of the integration testing environment, and a description of how modifications to the LBTF are to be managed after the BST and AT rounds of testing.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-1420

BLK02-TITLE OF DATA ITEM:Requirements Specification (IRS)

BLK04-AUTHORITY: DID Number: DI-IPSC-81433  
DID Title: Software Requirements  
Specifications

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK 13-DATE OF SUBS SUBM: See BLK 16

BLK16-REMARKS:

BLK02

Applies to:

- System/Subsystem Requirements Specification (SSRS)
- Interface Requirements Specification (IRS)
- Software Requirements Specification (SRS)

BLK 13 - 60DPICDR, 90DPFCDR, and 60 days after additional changes to reflect changes through delivery. Final version shall be 60DAD and reflect the as-built condition.

BLK16: Separate packages shall be provided for C4ISR and Machinery Control Systems (MPCMS, PCS, EPCS).

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-1421

BLK02-TITLE OF DATA ITEM: Signal List

BLK04-AUTHORITY: DID Number: DI-MISC-81338  
DID Title: MASTER INSTRUMENT LIST

BLK08-APP CODE:

BLK10-FREQUENCY: QTRLY

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The updated information shall be a complete list and marked as such and delivered quarterly after the 1st submission. Updates shall reflect revisions and shall document all changes to the final list and shall be delivered quarterly.

Final version shall reflect the as-built condition.

BLK 04- Add the following to the list in Section 10.4.3.3. Data Items of the DID:

- 1) EQUIPMENT NAME: UNIQUE EQUIPMENT NAME "LUBE OIL SYSTEM #1; TEMPERATURE RTD" FOR THE SENSOR, TRANSDUCER OR ACTUATOR. DERIVED (TAILORED) FROM SERVICE ATTRIBUTE AS WELL AS OTHER INFORMATION.
- 2) COMPARTMENT NUMBER: COMPARTMENT NUMBER LOCATION FOR THE DEVICE-LEVEL EQUIPMENT (SUCH AS, SENSOR, ACTUATOR OR TRANSDUCER) THAT THE ECS INTERFACES, EXAMPLE: TO 2-19-1-Q)
- 3) COMPARTMENT LEVEL: COMPARTMENT LEVEL FOR THE DEVICELEVEL EQUIPMENT (SUCH AS, SENSOR, ACTUATOR OR TRANSDUCER) THAT THE ECS INTERFACES IN INSTANCES WHERE A COMPARTMENT OCCUPIES MORE THAN ONE LEVEL.
- 4) CABLE BLOCK DIAGRAM NUMBER: CABLE BLOCK DIAGRAM NUMBER WHERE THE SENSOR, TRANSDUCER, OR ACTUATOR CONNECTIONS ARE IDENTIFIED.
- 5) SYSTEM DIAGRAM NUMBER: SYSTEM DIAGRAM NUMBER WHERE THE SENSOR, TRANSDUCER, OR ACTUATOR ARE SHOWN.
- 6) SCID: CONTRACTOR COMPONENT ID # (AKA INSTRUMENT NUMBER, AKA PIECEPART#) OF THE SENSOR, TRANSDUCER, OR ACTUATOR. THE PURPOSE OF THE SCID IS TO TRACK ITEMS BETWEEN SYSTEM DIAGRAM AND ALL OTHER ARTIFACTS SUCH AS THE MEL, THE ECS SIGNAL DATABASE, CABLE BLOCK DIAGRAMS. EXAMPLE DSW-PT-001 MEL ID: UNIQUE MASTER EQUIPMENT LIST ID NUMBER FOR THE EQUIPMENT THAT FUNCTIONS AS THE SOURCE OR DESTINATION FOR THIS SIGNAL.
- 7) PURCHASE SPEC NUMBER: PURCHASE SPECIFICATION NUMBER FOR THE SENSOR, TRANSDUCER, OR ACTUATOR.
- 8) CN: CATALOG NUMBER FOR THE SENSOR, TRANSDUCER OR ACTUATOR INCLUDING MANUFACTURER NAME, CAGE CODE AND PART NUMBER, OR QPL PART NUMBER
- 9) CNC: FOR ELECTRICAL CONTACTS, IDENTIFY THE CONTACT NORMAL CONDITION (CNC). THIS SHOULD BE DRY CONTACT "SHELF STATE" (OPEN OR CLOSE).
- 10) CSC: FOR ELECTRICAL CONTACTS, IDENTIFY THE CONTACT STATE CONDITION (CSC). THIS SHOULD BE DRY CONTACT "ACTUATED (TRUE) STATE" (OPEN OR CLOSE)

## EXHIBIT XX - DETAIL DESIGN

11) RANGE: RANGE OF ENGINEERING UNIT VALUES THAT IDENTIFIES THE LOWEST VALUE TO THE HIGHEST VALUE THAT IS SPECIFIED FOR THE SENSOR, TRANSDUCER OR ACTUATOR. THIS MAY ALSO BE EXPRESSED AS AN ENUMERATION SUCH AS OPEN/CLOSED OR ON/OFF.

12) UNITS: ENGINEERING UNITS USED IN IDENTIFYING THE RANGE OF THE SENSOR, TRANSDUCER OR ACTUATOR. (EXAMPLE: °F, PSIG, PSID, FEET)

13) MODES OF OPERATION: CONCEPT OF OPERATIONS DESCRIPTIONS OF EACH SUBSYSTEM THAT DESCRIBE HOW THE SYSTEM WILL BE USED AND OPERATED. THIS WILL BE PROVIDED IN THE FORM OF A SYSTEM DESCRIPTION PREPARED IN ACCORDANCE WITH THE SHIPBUILDER PROCEDURES. THIS INFORMATION IS TO ENABLE THE ECS DESIGNER TO DESIGN APPROPRIATE AUTOMATION ALGORITHMS TO MONITOR AND CONTROL THE SYSTEM.

14) POWER UTILIZATION: SENSOR, TRANSDUCER, OR ACTUATOR POWER REQUIREMENTS IN TERMS OF KW, DC VOLTAGE, DC AMPS.

15) INTERFACES BETWEEN SYSTEMS: ANY INTERLOCKS AND PERMISSIVES THAT ARE NECESSARY TO COORDINATE THE ACTIVITY OF TWO OR MORE PROCESSES TO INSURE THAT ONE PROCESS HAS REACHED A SUITABLE STATE SUCH THAT THE OTHER CAN PROCEED. IDENTIFY WHETHER THESE ARE TO BE PROGRAMMED IN SOFTWARE OR HARDWIRED.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-1427

BLK02-TITLE OF DATA ITEM: Machinery Control System Integration Design Report

BLK04-AUTHORITY: DID Number: DI-IPSC-81432  
DID Title: System/Subsystem Design Description (SSDD)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 13 - 90 DPFCDR, and 60 days after each change to reflect changes through delivery. Final version shall reflect the as-built condition.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-1561

BLK02-TITLE OF DATA ITEM: Machinery Controls Software Configuration  
Management PlanBLK04-AUTHORITY: DID Number: DI-CMAN-80858  
DID Title: Contractor  
Configuration Management Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: QTRLY

BLK13-DATE OF SUBS SUBM: 90DPICDR

BLK16-REMARKS:

This plan shall provide the contractor's configuration management plan for the development, deployment, and maintenance of the MPCMS, PCS and EPCS software along with the plan to transition the maintenance of each piece of software to the government. The information for each system/subsystem shall be delivered as a separate document for MPCMS, PCS and EPCS.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-1576

BLK02-TITLE OF DATA ITEM: Computer Software Configuration Items (CSCI)  
Source CodeBLK04-AUTHORITY: DID Number: DI-IPSC-81441  
DID Title: Software Product Specification  
(SPS)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: See Block 16

BLK 13-DATE OF SUBS SUBM: See Block 16

BLK16-REMARKS:

Delivery of 1<sup>st</sup> submission shall be 30 days after Factory Acceptance Test for each control system. This delivery shall include the licenses and software products and files that are required for the Government to have full access to the products described and shall include the following:

1. Programming environment and configuration tools
2. HMI development, configuration, source, and executable code;
3. Computer development, configuration, source, and executable code;
4. PLC development Software, configuration, and source, and executable code;
5. Data Logging Development, configuration, source, and executable code;
6. Network development, configuration, source, and executable code;

Delivery of subsequent submissions shall be 30 days after Land Based Testing Facility Test is completed, and after modifications made by BST and AT. These deliveries shall include the items from the 1<sup>st</sup> submission and add the simulator stimulator software and model data, system computer software, and system network software.

The Final Delivery shall include the HME software for each installed system or device.

DI-IPSC-81441 requires that the executable and source code is either referenced or contained in the document. This CDRL requires that the SPS "contains" the actual executable(s) and source code in electronic media and NOT reference them - see tailoring of DI-IPSC-81441 below:

1. Description - delete "references" The SPS shall "contain" not "reference" the executable, source files and software support information...
2. Paragraph 3.1 - delete "by reference to enclosed"
3. Paragraph 3.2 - delete "by reference to enclosed"

The SPS shall include source code for all identified and approved Computer Software Configuration Items (CSCI) for MPCMS, PCS, EPCS and the respective subsystems. These CSCIs shall be identified in the System Architecture, Requirements Allocation Description (SARAD) deliverable. All CSCI source code shall be in a format that can be compiled. All licenses and tools for modifying, recreating and compiling the source code and any applicable files

## EXHIBIT XX - DETAIL DESIGN

used to operate the software shall be provided to the Coast Guard. The contractor shall provide licenses and source code and all tools referenced in this CDRL by a media agreed to by the Coast Guard.

The contractor shall demonstrate that the deliverables above can be installed, modified, compiled and removed by the government to/from the LBTF.

Delivery of Subsequent Submission shall be 30 days after

DI-IPSC-81441 requires that the executable and source code is either referenced or contained in the document. This CDRL requires that the SPS "contains" the actual executable(s) and source code in electronic media and NOT reference them - see tailoring of DI-IPSC-81441 below:

1. Description - delete "references" The SPS shall "contain" not "reference" the executable, source files and software support information...
2. Paragraph 3.1 - delete "by reference to enclosed"
3. Paragraph 3.2 - delete "by reference to enclosed"

The SPS shall include source code for all identified and approved Computer Software Configuration Items (CSCI) for MPCMS, PCS, EPCS and the respective subsystems. These CSCIs shall be identified in the System Architecture, Requirements Allocation Description (SARAD) deliverable. All CSCI source code shall be in a format that can be compiled. All licenses and tools for modifying, recreating and compiling the source code and any applicable files used to operate the software shall be provided to the Coast Guard. The Contractor shall provide licenses and source code and all tools referenced in this CDRL by a media agreed to by the Government

The contractor shall demonstrate that the deliverables above can be installed, modified, compiled and removed by the government to/from the LBTF.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2048

BLK02-TITLE OF DATA ITEM: Machinery Controls Development Integrated Master Plan (IMP)

BLK04-AUTHORITY: DID Number: DI-MGMT-81650  
DID Title: Integrated Master Schedule  
DID Number: DI-IPSC-81427  
DID Title: Software Development Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90DAOE

BLK13-DATE OF SUBS SUBM: ASREQ

BLK16-REMARKS:

The plan shall reflect the integration of additional hardware, systems, and associated test planning, system performance and updated schedule information.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2049

BLK02-TITLE OF DATA ITEM: Machinery Control System Design Data and Calculations

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data And Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPICDR

BLK13-DATE OF SUBS SUBM: 90 DPFCDR

BLK16-REMARKS:

The information for MPCMS, PCS, EPCS, and any stand alone control system shall be delivered as both separate documents for each control system and an integrated document showing system interfaces and connections. The calculations shall demonstrate compliance with the OPC System Specification.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2050

BLK02-TITLE OF DATA ITEM: Machinery Controls Graphic User Interface (GUI)  
Style Guide

BLK04-AUTHORITY: DID Number: DI-HFAC-80746  
DID Title: Human Engineering Design Approach  
Document - Operator

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90DAOE

BLK13-DATE OF SUBS SUBM: See BLK16

BLK16-REMARKS:

BLK 13 - The Style Guide shall be updated at 90DPFCDR and 60DAD to the  
as-built condition.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2054

BLK02-TITLE OF DATA ITEM: Machinery Control Systems Functional Block Diagrams (FBDs) and Schematic Block Diagrams (SBDs)

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagrams  
DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagrams

BLK08-APP CODE:

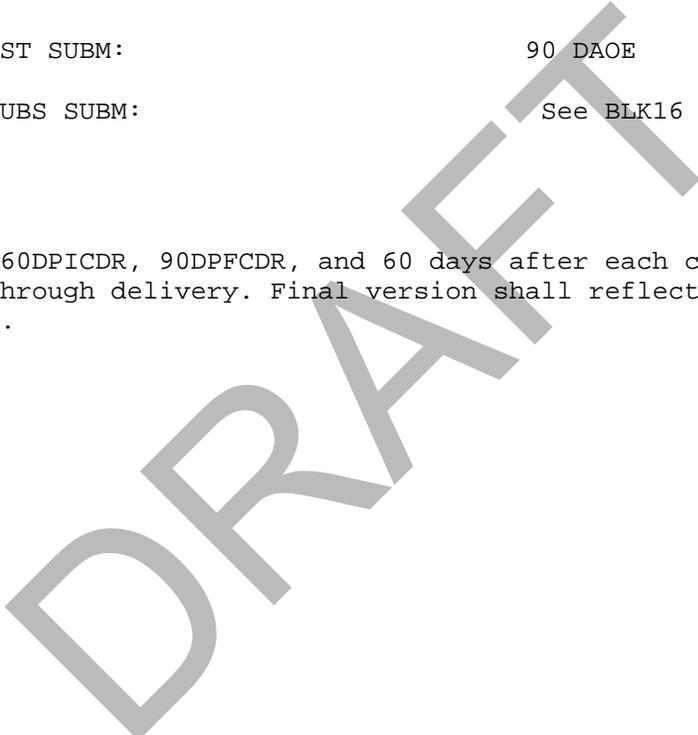
BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM: See BLK16

BLK16-REMARKS:

BLK 13 - 60DPICDR, 90DPFCDR, and 60 days after each change to reflect changes through delivery. Final version shall reflect the as-built condition.



## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2056

BLK02-TITLE OF DATA ITEM: Software Programmer's Guides

BLK04-AUTHORITY: DID Number: DI-IPSC-81633  
DID Title: Software Programmer's Guide

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90DPD

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The Guide for MPCMS, PCS, EPCS and any stand alone control system shall be delivered as separate documents. Additionally, PCS and EPCS documents shall address the interface programming for remote control from MPCMS, and the MPCMS documents shall also address the interface programming of the remote control of PCS and EPCS.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2057

BLK02-TITLE OF DATA ITEM: Software Documentation

BLK04-AUTHORITY: DID Number: DI-IPSC-81756  
DID Title: Software Documentation

DID Number: DI-IPSC-81442  
DID Title: Software Version Description

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90DPD

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The documentation for MPCMS, PCS, EPCS and any stand alone control system shall be delivered as separate documents, including administrator, developer, and user passwords for each system.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2058

BLK02-TITLE OF DATA ITEM: Software User Manual

BLK04-AUTHORITY: DID Number: DI-IPSC-81443  
DID Title: Software User Manual

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90DPBT

BLK13-DATE OF SUBS SUBM: 60DAD

BLK16-REMARKS:

The manuals for MPCMS, PCS, EPCS and any stand alone control systems shall be delivered as separate documents.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2060

BLK02-TITLE OF DATA ITEM: Firmware Support Manual (FSM)

BLK04-AUTHORITY: DID Number: DI-IPSC-81448  
DID Title: Firmware Support Manual

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPD

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The manuals for MPCMS, PCS, EPCS, subsystems, and stand alone systems shall be delivered as separate documents.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2063

BLK02-TITLE OF DATA ITEM: Installation, Wiring and Fabrication Drawings

BLK04-AUTHORITY: DID Number: DI-DRPR-82142  
DID Title: Installation Control Drawings

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90DPFCDR

BLK 13-DATE OF SUBS SUBM: 90DPD

BLK16-REMARKS:

The drawings for MPCMS, PCS, EPCS, and each stand alone control system shall be delivered as both separate documents for each control system showing system interfaces and connections.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2072

BLK02-TITLE OF DATA ITEM: Configuration Audit Report

BLK04-AUTHORITY: DID Number: DI-CMAN-81022  
DID Title: Configuration Audit Summary Report

BLK08-APP CODE:

BLK10-FREQUENCY: QTRLY

BLK12-DATE OF 1ST SUBM: 30DAOE

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The CDRL information for MPCMS, PCS, EPCS and any stand alone control system shall be delivered as separate documents.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2217

BLK02-TITLE OF DATA ITEM: Systems Operational Manuals

BLK04-AUTHORITY:  
format.

DID Number: Contractor

DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

60 DPBT

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The information for MPCMS, PCS, EPCS and any stand alone control system shall be delivered as separate documents.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 202-03-2218

BLK02-TITLE OF DATA ITEM: Machinery Control Development Environment Report

BLK04-AUTHORITY: DID Number: DI-IPSC-81432  
DID Title: System/Subsystem Design Description (SSDD)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAOE

BLK13-DATE OF SUBS SUBM: 45 DPICDR, 45 DPFCDR

BLK16-REMARKS:

Update the Phase I report and provide data to reflect the integration of additional hardware and systems.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 233-03-2019

BLK02-TITLE OF DATA ITEM: Certification of Power Limiting Controls for Propulsion Diesel Engine

BLK04-AUTHORITY: DID Number: DI-MISC-80678  
DID Title: Certification/Data Report

BLK08-APP CODE: I

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: SEE BLK 16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: The Certification of Power Limiting Controls for Propulsion Diesel Engine shall be a Certificate of Completion.  
BLK 12: Certification shall be submitted 30 days after receipt of VFI or no later than 120 days prior to FCDR, whichever comes first.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 233-03-2020

BLK02-TITLE OF DATA ITEM: Propulsion Diesel Engine Drawings and  
ParticularsBLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports -  
Preparation, Presentation, and  
Preservation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: BLK 16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 12: Drawings shall be submitted 30 days after receipt of VFI or no later than 120 days prior to FCDR, whichever comes first.

BLK 16: In addition to the NVR 2-1-1A11 information, the VFI shall include:

Design, construction and other technical documentation for installation, operation and maintenance of the propulsion diesel engines.

All diesel engine performance data and performance curves.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 241-03-1434

BLK02-TITLE OF DATA ITEM: Reduction Gear Drawings and Particulars

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports -  
Preparation, Presentation, and  
Preservation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: BLK 16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 12: Drawings shall be submitted 30 days after receipt of VFI or no later than 120 days prior to FCDR, whichever comes first.

BLK 16: In addition to the NVR 2-4-2/1.3 information, the VFI shall include:

The following as described in NVR 2-4-2A6:

Marking identification drawing

Lifting Arrangement drawing

Main pinion and gear tooth data and stresses summary

Security provisions drawing

Thrust meter drawing

Alignment and erection drawing

Drawing list

Packaging drawing

The Technical Information Reports as described in NVR 2-4-2A7.

Design, construction and other technical documentation for installation, operation and maintenance of the propulsion reduction gears.

The maintenance requirements manual for storage.

Demonstration that the bearing and seal maintenance and repair without disassembly of gearbox.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 242-03-1436

BLK02-TITLE OF DATA ITEM: Propulsion Clutches and Flexible Couplings  
Design Data and Calculations

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and  
Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 242-03-2233

BLK02-TITLE OF DATA ITEM: Propulsion Clutches and Flexible Couplings Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and Associated Lists

BLK08 APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The drawings for the clutches shall be in accordance with MIL-C-18087.  
The drawings of the flexible couplings shall be accordance with ISO 4863.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 243-03-1437

BLK02-TITLE OF DATA ITEM: Main Propulsion Shafting Arrangement and  
Details Drawing

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 75 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 243-03-2088

BLK02-TITLE OF DATA ITEM: Stern Tube Shaft Seals, Bulkhead Seals, and  
Shaft Locking Device DrawingsBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

In addition the drawings shall include:

Design, construction and other technical documentation for installation, operation and maintenance of the stern tube seals, bulkhead seals, and shaft locking device.

Arrangement and detailed procedures for installation, handling, assembling, and disassembling the shaft locking device.

The Shaft Locking Device Drawings, if not integrated into the reduction gear design, including the following:

Elevation and plan views of the completely assembled shaft locking device.

Detailed drawings of the shaft locking device assembly and individual components with general notes and dimensions necessary for manufacture and/or installation and maintenance.

Subject drawings shall also include the following information:

Unit weights with location of center of gravity.

Operating temperature range and speeds.

Torque values for all seal assembly fasteners (in tabular form).

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 243-03-2089

BLK02-TITLE OF DATA ITEM: Stern Tube Shaft Seals, Bulkhead Seals, and  
Shaft Locking Device AnalysisBLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and Calculations

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

In addition the analysis shall include the following for the Stern Tube  
Shaft Seals:

Material selection

Seal / Seal Housing alignment to shaft

In addition the analysis shall include the following for the Bulkhead  
Seals:

Material selection

Seal / Seal Housing alignment to shaft

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 243-03-2232

BLK02-TITLE OF DATA ITEM: Propulsion Shafting Alignment Analysis and  
Propulsion Shafting Stress Analysis

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 244-03-2091

BLK02-TITLE OF DATA ITEM: Line Shaft Bearing Drawings, Stern Tube and  
Strut Bearing Drawings, and Thrust Bearing  
Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 244-03-2092

BLK02-TITLE OF DATA ITEM: Line Shaft Bearing Location and Radial Loads Calculations, Stern Tube and Strut Bearing Location and Radial Loads Calculations, and Thrust Bearing Location and Thrust and Radial Loads Calculations

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 245-03-1449

BLK02-TITLE OF DATA ITEM: Propeller Technical Development Program Plan

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports -  
Preparation, Presentation, and  
Preservation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 245-03-1450

BLK02-TITLE OF DATA ITEM: Propeller Design and Analysis Report

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports -  
Preparation, Presentation, and  
Preservation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 270 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 245-03-1454

BLK02-TITLE OF DATA ITEM: Propeller and Gage Manufacture Drawing

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPFCDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 245-03-2093

BLK02-TITLE OF DATA ITEM: Propeller Design Requirements Report

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and  
Technical Reports - Preparation,  
Presentation, and Preservation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 259-03-1465

BLK02-TITLE OF DATA ITEM: Combustion Air Intake and Exhaust Analysis Report

BLK04-AUTHORITY: Calculations  
DID Number: DI-GDRQ-80650  
DID Title: Design Data and

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1472

BLK02-TITLE OF DATA ITEM: Electric Plant Design Report

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific And  
Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DAOE

BLK13-DATE OF SUBS SUBM: 60DPICDR, 150 DPFCDR, 60  
DPFCDR

BLK16-REMARKS:

Each submittal shall reflect the state of the design.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1473

BLK02-TITLE OF DATA ITEM: Electrical One Line Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DAOE

BLK13-DATE OF SUBS SUBM: 60DPICDR, 150 DPFCDR, 60  
DPFCDR

BLK16-REMARKS:

The basic function of the one line diagram is to convey information concerning the power system, including the overall scheme as well as details of each element of the plant supply and distribution system. Each subsequent submittal shall include more detail than the previous submittal. Comments, suggestions and design changes from the previous submittal review shall be incorporated into subsequent submittals. All design phases shall include, at a minimum, the following in the Electric Plant One Line Diagram or Single Line Diagram.

1. The Electrical One Line Diagram shall be prepared in accordance with OPC System specifications and NVR 3-1-4/1.1.1. The Electrical One Line Diagram shall also follow the recommendations of IEEE-STD-141 and shall substitute "should" or "recommend" with "shall".
2. The Electrical One Line Diagram shall be supported by engineering analysis.
3. Each drawing shall reference every related drawing. The Electrical One Line Diagram shall correspond to items on other system drawings such as the EPLA (Electric Plant Load Analysis), Master Equipment list, Circuit Breaker Coordination Study etc.
4. Graphic symbols for electrical and electronics diagrams shall be in accordance with IEEE-STD-315 or MIL-HDBK-290 and shall indicate type of equipment and fixtures. A table shall be provided on the drawings, which lists and provides descriptive identification for each symbol used.
5. The Electrical One Line Diagram shall show each major component in the electric plant including, generators, bus ties, switchboards, load centers, power panels, motor controller centers, LVPs and LVRs, ABTs/MBTs, Ship service transformers, and disconnect switches. The diagrammatic drawings shall present an overall view of the system including all cables that interface with other systems. The diagram shall be a continuous line with each cable represented by a single line. Identification of individual terminals of a connector or terminal board may be omitted. Cable designation and cable types

## EXHIBIT XX - DETAIL DESIGN

- shall be shown for each cable. The diagrammatic drawings shall identify the compartment where each unit in the system is located.
6. Shall present sufficient data to plan and evaluate the electric power system.
  7. Power sources: kW rating, voltage, rated current, frequency, number of phases, power factor, and characteristic impedance.
  8. Source, supply and distribution voltages.
  9. Protective devices, switches, circuit breakers, fuses etc. The normal operating mode for these devices shall be indicated.
  10. Indicate each protective device's continuous-current rating, symmetrical interrupting current and asymmetrical momentary or closing-and-latching current rating, manufacturer, type, and model identification. Indicate tap settings on all primary transformers.
  11. Nominal continuous-current ratings, interrupting or momentary closing and latching short-circuit current ratings.
  12. Types of relays, circuit breakers or circuit protection, ANSI identification, location, and calibration settings for all protective devices.
  13. Protective devices: rating and trip settings, emergency tripping and preferential tripping features.
  14. Indicate normal operation mode of all switching, isolation, and protective devices.
  15. Primary switching, fusing, other protective devices, transformer connections, ratings, system grounding, nominal loading (kilovoltamperes and amperes), and protective-device arrangement for plant and load centers.
  16. Indicate bus ratings in amperes.
  17. Manufacturer(s), type, model, current rating, megavoltamperes class, symmetrical interrupting current rating, and asymmetrical momentary/closing-and-latching current rating for main, tie, and feeder devices.
  18. Identify major load centers and indicate general electrical configuration.
  19. Identify nominal loads in kilovoltamperes and amperes on ship's service switchboards, transformers, load centers, distribution panels etc.
  20. Ratings of protective devices with coordination settings.
  21. Identify and show all major loads and motors, including associated transformers and all other major, significant and identifiable loads, such as motor loads on motor control centers, large press and other motor or drive loads, dedicated lighting loads, arc furnaces, induction furnaces, special purpose loads, such as data processing and computer applications, welding

## EXHIBIT XX - DETAIL DESIGN

- loads, powerhouse loads, including waste treatment, air compressor loads, etc.
22. All loads, motors including horsepower/kilowatt, revolutions per minute, and type (induction, synchronous). Include chillers, compressors, etc. Indicate all solid-state/SCR-controlled variable-speed ac/dc-converter motor drives.
  23. Motors: kW or hp rating, voltage and current rating.
  24. Motor controllers: type (across-the-line, star-delta, vsd, etc.), disconnect devices, type of protection (LVR, LVP), and remote manual stops, as applicable.
  25. Primary feeder cables and number of feeders.
  26. Cable insulation and type.
  27. Cable installation design (conduit, Interlocked Armored Cable [IAC] in tray, size of tray, number of cables in tray, etc.).
  28. Cable nominal maximum current rating and basis.
  29. Cable size and number of cables per phase.
  30. Circuits: designations, type and size of cables, ampacity or each circuit, type of load (pulsed, continuous, intermittent).
  31. Transformers: kVA rating, rated voltage and current, winding connection, temperature rise, taps (percent steps), In-line regulator (if separate), impedance base, kVA base, Grounding scheme (ohmic value & connections), Surge arrestors and capacitors (show switching if switched) and characteristic impedance.
  32. Batteries: type, voltage, rated capacity, conductor protection.
  33. Converters: type, kVA rating, input/output voltage, input/output frequency, characteristic impedances.
  34. Harmonic Filters or capacitor banks: type, kVA rating, rated voltage, rated current.
  35. Bus transfer Switches: type, voltage, rated current.
  36. Future space considerations. Primary main switchgear. Indicate space for expansion of primary feeder overcurrent devices in switch house or available cubicles for such expansion.
  37. Acronyms defined.

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The following subsystems shall be submitted in accordance with the information above, at a minimum.

1. General lighting, normal and alternate one-line diagrams.
2. Navigation lights , arrangements, and details.

EXHIBIT XX - DETAIL DESIGN

3. Interior communications systems power one-line diagrams (also see NVR 4-4-1/8).
  4. General emergency alarm system.
  5. Generator starting system.
  6. Steering gear system.
  7. Fire detection and alarm system.
  8. Surveillance and monitoring systems.
  9. Control, Automation, and Navigation systems.
- 041.19

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1474

BLK02-TITLE OF DATA ITEM: Electric Plant Load Analysis (EPLA)

BLK04-AUTHORITY: DID Number: DI-SESS-81002  
DID Title: Developmental Design  
Drawings/ Models And Associated  
Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DAOE

BLK13-DATE OF SUBS SUBM: 60DPICDR, 150 DPFCDR, 60  
DPFCDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1476

BLK02-TITLE OF DATA ITEM: Electric Plant Control System (EPCS) Report

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific And Technical Reports  
DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagram

BLK08-APP CODE:

BLK12-DATE OF 1ST SUBM: 180DAOE

BLK13-DATE OF SUBS SUBM: 365DAOE, 180DPCDR, 60DPCDR

BLK16-REMARKS:

The report shall include, at a minimum, detailed information about the EPCS (Electric Plant Control System) including the Power Management and Load Shedding System, such as:

1. Theory of operation.
2. Sequence of operation.
3. Overall detailed description of EPCS with 60Hz and 400Hz power management system.
4. Detailed description of the EPCS with control and monitoring of the 60Hz and 400Hz power management system.
5. Detailed description of manual and automatic operation.
6. Network and control topology between major components of the electric plant such as generators, switchboards, load centers, motor control centers, distribution panels, lighting panels, speed governors, voltage regulators, EPCS controllers, ABTs, etc.
7. If electric loiter propulsion is provided, how will loiter propulsion loads be incorporated into the power management system.
8. List of parameters to be monitored and/or controlled by EPCS and the power management system.
9. Detailed description of manual sequencing, automatic sequencing and bringing generators on-line to prevent overload of the electrical system.
10. How the power management system will provide protection from other power sources.
11. Detailed logic and logic flow diagrams with decision values and criteria for the EPCS and the power management system, including load shedding.
12. Load shedding arrangements. Identification of electric loads that will be sheddable or non-sheddable. The levels or shedding sequence number shall be described for sheddable loads.
13. Description of the automatic control features specified in NVR 3-2-2/7, 3-2-6/7, and 3-2-6/8 and how it is applied to this design.
14. Local manual, local automatic HMI and remote HMI control scheme.
15. Description of how the EPCS and power management system will be utilizing the Woodward AtlasII or equal

## EXHIBIT XX - DETAIL DESIGN

- controller to automatically control the sequencing and operation of on-line and standby generators.
16. Description of how the EPCS and power management system will incorporate operational scenarios based on the specific ships mission and operational requirements.
  17. The operation description for the Electric Plant Control System shall include the logic of operation for each possible bus tie connection scenario for the switchboard/generator sets.
    1. Description of how the ship's electric load will be compared with on-line generating capacity.
    2. Description of starting standby generators and placing them on-line when system power exceeds a set percentage of on-line capacity and how the percentage shall be adjustable at the EPCC or remotely.
    3. The actuation of a status alert to indicate that ship's electric load is less than the percentage of online capacity.
    4. Description of the ability to select an emergency start or a normal start and to change from a normal start to an emergency start if the circumstances dictate the need.
    5. How a selection of generators for starting or shutdown based on a pre-selected sequence and capability of modifying the sequence will be set up.
    6. How and what Alarms shall be provided for sequence failures.
    7. How load shedding will automatically take place when available power is insufficient to meet current loading.
    8. Description of auto-start and load of standby SSDGs, soft loading and unloading. The number of automatic consecutive attempts which fail to produce a start shall be limited in order to safeguard sufficient starting capability for manual starting.
    9. Description of the operation and logic of the sequential restart of essential loads after electrical blackout. List essential loads to be restarted.
    10. What large electrical loads will utilize start blocking.
    11. The interfaces to each generator set's local and remote controls and how control is determined at each location.
    12. The network interfaces including redundancy and Machinery Plant Control And Monitoring System interfaces (as applicable).
    13. A description of the EPCS and power management system and the logic behind its operation including load shedding.
    14. List and description of normal and alternate power source arrangements.
    15. Description of shore power connection configurations. Will there be a shore power switchboard? Is shore connection dedicated to one switchboard or can it be configured to any switchboard?
    16. Description of how to transfer from ship to shore power and vice.
    17. Description of ABT (Automatic Bus Transfer) devices functions.
    18. Description of Load Centers roles and limitations.
    19. Description of Power Distribution Panels.
    20. Description of Batteries and UPS in the systems.

## EXHIBIT XX - DETAIL DESIGN

21. List of circuit breakers equipped with UVTs (Under Voltage Trip) or UVRs (Under Voltage Release) and why.
22. Description of Network(s) redundancy.
23. Functional flow diagram(s) of the EPCS and Power management systems.
24. Functional flow diagram(s) of the EPCS Control and HMI software.
25. Description of test modes and diagnostics designed into the EPCC to allow testing, troubleshooting and commissioning of the EPCS functions.

The report shall be in accordance with DI-MISC-80711A, Scientific And Technical Reports. The functional flow daigram shall be in accordance with DI-GDRQ-81224, Functional Flow Diagram.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1478

BLK02-TITLE OF DATA ITEM: Short Circuit Study

BLK04-AUTHORITY: DID Number: DI-SESS-81002  
DID Title: Developmental Design  
Drawings/ Models And Associated  
Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DAOE

BLK13-DATE OF SUBS SUBM: 60DPICDR, 150 DPFCDR, 60  
DPFCDR

BLK16-REMARKS:

The short circuit study shall be prepared in accordance with the OPC System Specification, using commercial off the shelf (COTS) software compatible with EasyPower® software. For each submission, the updated analysis and the Easypower application input file(s) shall be delivered with the report.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1479

BLK02-TITLE OF DATA ITEM: Steady-State Voltage-Dip and Transient Voltage Calculations

BLK04-AUTHORITY: DID Number: DI-SESS-81002  
DID Title: Developmental Design Drawings Models And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

1. These studies/analyses shall be prepared using commercial off the shelf (COTS) software compatible with EasyPower® software. The electrical system shall be mathematically modeled using software compatible with EasyPower® software. For each submission, the input files shall be delivered with the report.

2. Voltage Dip Calculations shall meet the requirements of IEEE-STD-45-2002, Section 11 "Control application". Calculations shall be performed by software compatible with EasyPower® software. DDS 311-2, "Voltage Regulation of AC Ship Service Electrical Power Systems" may be used as guidance. This is performed to calculate the maximum voltage dip expected throughout the distribution system.

3. In addition to the requirements, the Electric Cable Voltage Dip Calculations shall comply with OPC Systems Specification (NVR 3-1-4/1.5.1). This analysis shall be prepared to the level of the design for the components of the electric plant and distribution system. The calculations shall reference all related drawings.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1480

BLK02-TITLE OF DATA ITEM: Basic Impulse Level Report

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and  
Technical Report

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90DPICDR

BLK13-DATE OF SUBS SUBM: 90DPFCDR

BLK16-REMARKS:

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1481

BLK02-TITLE OF DATA ITEM: Grounding Details Report

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific And  
Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DAOE

BLK13-DATE OF SUBS SUBM: 60DPICDR, 150 DPFCDR, 60  
DPFCDR

BLK16-REMARKS:

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1484

BLK02-TITLE OF DATA ITEM: System Control, Power Block, and Schematic  
DiagramsBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models And  
Associated Lists  
DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagrams

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DPICDR

BLK13-DATE OF SUBS SUBM: 45DPICDR, 180DPFCDR, 60  
DPFCDR

BLK16-REMARKS:

1. The top down design shall begin as a very high level block diagram, becoming more and more detailed block diagrams as the design progresses, finally ending in block diagrams detailed enough that each individual block can be easily implemented (at which point the block diagram will become a schematic diagram).
2. The final submittal shall be schematic diagram.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1485

BLK02-TITLE OF DATA ITEM: Electrical System Survivability Analysis

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific And  
Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1486

BLK02-TITLE OF DATA ITEM: Arrangements of Electrical Equipment

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

Arrangement drawings shall be in accordance with the requirements of  
OPC System Specification (NVR 3-1-4/2.3).

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1487

BLK02-TITLE OF DATA ITEM: Booklet of Standard Wiring Practice

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

This booklet shall be in accordance with the requirements of the OPC Systems Specification ( NVR 3-1-4/2.1). and also include:

- Wireways.
- Cable supports.
- Testing.
- Typical mounting methods.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1489

BLK02-TITLE OF DATA ITEM: Motor Control Centers Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

1. The detailed drawing for each motor control center shall include the following information:

- a. System or nomenclature for each motor being controlled
- b. Rating or size of each motor controller included
- c. Dimensions of each motor controller included
- d. Arrangement of motor controllers
- e. Location of each motor control center

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1490

BLK02-TITLE OF DATA ITEM: Nameplate/Identification Plate Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

The drawing shall show for each type of nameplate:

- a. Nameplate dimensions
- b. Nameplate material
- c. Number of lines
- d. Line spacing
- e. Character size
- f. Character spacing
- g. Background color
- h. Letter color
- i. Type of letter engraving
- j. Type of ink or filler for engraving

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-1495

BLK02-TITLE OF DATA ITEM: Harmonic Analysis

BLK04-AUTHORITY: DID Number: DI-SESS-81002  
DID Title: Developmental Design  
Drawings/ Models and Associated  
Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

1. The Electrical Harmonic Analysis shall comply with OPC System Specification (NVR 3-1-4/1.5.3). This analysis shall be prepared to a detailed level for the major components of the electric plant and distribution system
2. The Electrical Harmonic Analysis shall also detail the expected current harmonics and voltage harmonics. The analysis shall identify system ratings, analytical assumptions and present these values in a graphical representation of the waveform.
3. Tabulations of voltage harmonics shall be provided for viable combinations of numbers of main generators and main motors on-line at a given time. The report shall provide recommended ratings, based on the current and voltage harmonics, for major components of the central power plant and electric propulsion systems.

041.21

4. The analysis shall reference all related drawings. The analysis shall correspond to items on other systems.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-2270

BLK02-TITLE OF DATA ITEM: OEM Published Datasheets

BLK04-AUTHORITY: DID Number: DI-MISC-80678  
DID Title: Certification/Data Report

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-2271

BLK02-TITLE OF DATA ITEM: Programmable Electrical Equipment Parameters  
and Settings Drawing

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models And  
Associated Lists

BLK08-APP-CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 90 DAICDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 300-03-2277

BLK02-TITLE OF DATA ITEM: Cable Running Sheets Drawing and Database  
(COED)

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 90DAICDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 302-03-1468

BLK02-TITLE OF DATA ITEM: Motor Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 302-03-1502

BLK02-TITLE OF DATA ITEM: List of Motors

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

The listing of all motors installed on the OPC in tabular format including the following nameplate data:

Manufacturer's name  
Nomenclature  
Rated output (HP)  
Rated voltage  
Rated current  
Rated speed  
Rated frequency  
Type of winding connections  
Degree of enclosure protection  
Number of phases  
Class of insulation  
Rated power factor

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 303-03-1511

BLK02-TITLE OF DATA ITEM: Protective Device Coordination Study

BLK04-AUTHORITY: DID Number: DI-SESS-81002  
DID Title: Developmental Design  
Drawings/ Models And Associated  
Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DAOE

BLK13-DATE OF SUBS SUBM: 60DPICDR, 150 DPFCDR, 60  
DPFCDR

BLK16-REMARKS:

The following calculations, analyses, and studies shall be prepared to verify the OPC's electrical power generation and distribution system design: The studies/analyses shall be prepared using commercial off the shelf (COTS) software compatible with EasyPower® software. The electrical system shall be mathematically modeled using software compatible with EasyPower® software. For each analysis, the input files shall be delivered.

Protective Device Coordination Study shall graphically verify that protective devices being considered for use provide, over the full potential range of faults, the selectivity required. Format in accordance with IEEE-STD-242, "IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems, Buff Book". Coordination study shall be performed using software compatible with EasyPower® software.

In addition to the requirements and recommendation above, the Protective Device Coordination Study shall comply with the OPC Systems Specification (NVR 3-1-4/1.3). This analysis shall be prepared to a detailed level for components of the electric plant and distribution system. The following shall be included in the Protective Device Coordination Study:

A list of selected protective devices with identifying type and rating.

Calculations showing how circuit breaker trip parameters were determined for each circuit breaker setting.

The study shall reference related drawings. The calculations shall correspond to items on other system drawings.

The study shall be supported by engineering analysis.

Parts lists shall be integral with the drawing. The Parts List or Bill of Material shall include Item Number, Quantity, Description of Part,

## EXHIBIT XX - DETAIL DESIGN

Part Number, National Stock Number, Material or Manufacturer and Specification Grade. If the equipment is Government furnished, the manufacturer's column shall indicate "GFE and the Part Number column shall indicate the appropriate Joint Army Navy (JAN) nomenclature, if applicable. When the equipment is included in the Navy Standard Electrical Symbol List, that number shall also be included.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 304-03-1512

BLK02-TITLE OF DATA ITEM: Voltage Drop and Cable Sizing Calculations

BLK04-AUTHORITY:

DID Number: DI-GDRQ-80650

DID Title: Design Data and

Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

60DPICDR

BLK13-DATE OF SUBS SUBM:

60DPFCDR

BLK16-REMARKS:

1. Calculations, analyses, and studies shall be prepared using commercial off the shelf (COTS) software compatible with EasyPower® software. The electrical system shall be mathematically modeled using software compatible with EasyPower® software. For each analysis, the application input files shall be delivered.

2. Electric Cable Voltage Drop Calculations shall meet the requirements of IEEE-STD-45-2002, Section 5 "Power System Design". Calculations shall be determined by software compatible with EasyPower® software. MIL-HDBK-299 may be used for guidance.

3. In addition to the requirements and recommendation above, the Voltage Drop Calculations shall comply with OPC System Specification (NVR 3-1-4/1.5.1). This analysis shall be prepared to a level that reflects the state of the design for all components of the electric plant and distribution system. The calculations shall reference related drawings. The calculations shall correspond to items on other system drawings.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 304-03-1514

BLK02-TITLE OF DATA ITEM: Cable Installation Drawing including Cableway Locations

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

A drawing shall be provided in accordance with the requirements of the OPC Systems Specification (NVR 3-1-4/2.2).

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 304-03-1517

BLK02-TITLE OF DATA ITEM: Published Data Sheets for the Cable Used

BLK04-AUTHORITY: DID Number: DI-MISC-80678  
DID Title: Certification/Data  
Report

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

1. Published data sheets for all non-standard cables used (these are cables that do not meet the requirements of MIL-DTL-24643 or MIL-DTL-24640).
2. Type of data that shall be included:
  - a. International standards that the cables meet
  - b. Quantity and stranding of conductors
  - c. Type of insulation
  - d. Details about any shielding
  - e. Halogen content
  - f. Cross-sectional area (MCM)
  - g. Flame propagation test results
  - h. Insulation resistance tests
  - i. Other test results

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 310-03-1519

BLK02-TITLE OF DATA ITEM: Generator Prime Mover Remote Control Systems  
(Schematic Diagram & Description)BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DAOE

BLK13-DATE OF SUBS SUBM: 60DPICDR, 150 DPFCDR, 60  
DPFCDR

BLK16-REMARKS:

1. The schematic diagram shall include switchboard mounted controls including those in the Electric Plant Control Console (EPCC) and Electric Plant Control Panel (EPCP).
3. The schematic diagram shall also include any Machinery Plant Control and Monitoring System (MPCMS) controls.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 310-03-1521

BLK02-TITLE OF DATA ITEM: Generator Reactance Calculations

BLK04-AUTHORITY:

DID Number: DI-GDRQ-80650

DID Title: Design Data and

Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

60DPICDR

BLK13-DATE OF SUBS SUBM:

60DPFCDR

BLK16-REMARKS:

- b. The calculations shall be supported by engineering analysis.
3. NAVSEA S9AAO-AA-SPN-010/GEN-SPEC, Section 313 may be used for guidance.
4. The following calculations shall be included:
  - a. Compute the starting battery capacity for auxiliary & main engines to be sufficient for 6 total starts (1 cold and 5 normal) without recharge. Cold starts shall be at  $-25^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$ ). Engine manufacturer's data at  $-25^{\circ}\text{C}$  ( $-13^{\circ}\text{F}$ ) shall be used.
  - b. Compute the amp-hour capacity required for the sizing of the battery banks based upon IEEE-STD-485 and the EPLA.
  - c. Show calculations or manufacturer's data showing adequate ventilation.
  - d. Calculations showing that discharged batteries are fully charged within 8 hours without exceeding a safe charging rate. Prepare calculations and graphical chart showing battery charge acceptance during the 3 stages of charging.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 310-03-1522

BLK02-TITLE OF DATA ITEM: Generator Torsional Vibration Calculations

BLK04-AUTHORITY:

DID Number: DI-GDRQ-80650

DID Title: Design Data and

Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

60DPICDR

BLK13-DATE OF SUBS SUBM:

60DPFCDR

BLK16-REMARKS:

Calculations shall prove that each generator set meets torsional vibration requirements in accordance with the OPC System Specification for both the normal operating condition and the single cylinder misfire conditions.

b. The calculations shall be supported by engineering analysis.

3. NAVSEA S9AAO-AA-SPN-010/GEN-SPEC, Section 313 may be used for guidance.

4. The following calculations shall be included:

a. Compute the starting battery capacity for auxiliary & main engines to be sufficient for 6 total starts (1 cold and 5 normal) without recharge. Cold starts shall be at  $-25^{\circ}$  C ( $-13^{\circ}$  F). Engine manufacturer's data at  $-25^{\circ}$  C ( $-13^{\circ}$  F) shall be used.

b. Compute the amp-hour capacity required for the sizing of the battery banks based upon IEEE-STD-485 and the EPLA.

c. Show calculations or manufacturer's data showing adequate ventilation.

d. Calculations showing that discharged batteries are fully charged within 8 hours without exceeding a safe charging rate. Prepare calculations and graphical chart showing battery charge acceptance during the 3 stages of charging.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 313-03-1530

BLK02-TITLE OF DATA ITEM: Battery Calculations

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and  
Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

1. The battery calculations shall be prepared in accordance with the OPC System Specification.
2. The calculations shall be supported by engineering analysis.
3. The following calculations shall be included:
  - a. Compute the starting battery capacity for auxiliary and main engines.
  - b. The amp-hour capacity required for the sizing of the battery banks.
  - c. Show calculations or manufacturer's data showing adequate ventilation.
  - d. Calculations showing that discharged batteries are fully charged within 8 hours without exceeding a safe charging rate. Prepare calculations and graphical chart showing battery charge acceptance during the 3 stages of charging.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 313-03-1531

BLK02-TITLE OF DATA ITEM: Battery Capacity Calculations

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and  
Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

Calculations for each battery bank shall show that the required quantity and size of each battery is arranged in series, with the correct ampere-hour rating to meet voltage and capacity requirements of the respective system.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 313-03-1532

BLK02-TITLE OF DATA ITEM: De-Rating Curves

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and  
Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

1. Battery De-rating curves for each type and rating of battery shall show amp-hour de-rating factors that specify reductions in total battery capacity at different levels of current and/or temperature.
2. Each plot shall be clearly labeled with Title, X-axis and Y-axis labels as well as labels for each de-rating curve.
3. Each plot shall show clearly labeled and graduated X-axis and Y-axis.
4. Each plot shall show manufacturer and battery part number for each set of curves.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 314-03-1482

BLK02-TITLE OF DATA ITEM: UPS Characteristics

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 314-03-1516

BLK02-TITLE OF DATA ITEM: Transformer Sizing Calculations

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and  
Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

1. Calculations shall show that the transformer has been properly sized in compliance with the OPC System Specification (NVR 3-2-2/3.2.1) for determinant loads.
2. Calculations shall show that the transformer has been properly sized in compliance with the OPC System Specification (NVR 3-2-2/3.2.2) for non-determinant loads.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 314-03-1535

BLK02-TITLE OF DATA ITEM: Calculations of UPS Battery Size

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and  
Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

Calculations shall verify the proper sizing of the UPS battery for each location where a UPS is required.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 320-03-1510

BLK02-TITLE OF DATA ITEM: Power Quality Report

BLK04-AUTHORITY: DID Number: DI-SESS-81002  
DID Title: Developmental Design  
Drawings/ Models And Associated  
Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

The Power Quality report shall provide data or analysis that verifies that the power is in compliance with the OPC Systems Specification (NVR Part 3-2-2/1.4). The report shall indicate if a segregated bus, filtering, active front end or other methods are required in order to isolate non-linear loads from ship service loads due to harmonics or power quality issues.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 320-03-1537

BLK02-TITLE OF DATA ITEM: Export Power Design Report

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and  
Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 90 DPFCDR

BLK16-REMARKS:

The updated report shall include descriptions of the theory of operations, the design, construction, and functional and safety features.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 320-03-1542

BLK02-TITLE OF DATA ITEM: Electrical Power System Deck Plan

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DAOE

BLK13-DATE OF SUBS SUBM: 60DPICDR, 150 DPFCDR, 60  
DPFCDR

BLK16-REMARKS:

1. The Electrical Power Distribution Deck Plans shall show each major component in the electric plant. The drawings shall present an overall view of the system including all cables that interface with other systems. Cable designation and cable types shall be shown for each cable. The diagrammatic drawings shall identify the compartment where each unit in the system is located.

2. Drawings showing both runs of wiring and structural work shall have the wiring runs shown in thick lines and structural work (such as outlines of decks and bulkheads) in thin lines.

3. The Electrical Power Distribution Deck Plan shall show:

a. Generators: kW rating, voltage, rated current, frequency, number of phases, power factor.

b. Motors: kW or hp rating, voltage and current rating.

c. Motor controllers: type (direct-on-line, star-delta, etc.), disconnect devices, remote controls, as applicable.

d. Transformers: kVA rating, rated voltage.

e. Feeder cable: phase, length, cable designation and cable type.

f. Distribution cables: phase, length, cable designation and cable type.

g. Switchgear, switchboards, panelboards, MCCs, ABTs/MBTs and UPS.

h. Batteries: type, voltage, rated capacity, charging and discharging panel.

i. Shore Power (incoming) voltage, ampacity and shore tie connections.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 320-03-2253

BLK02-TITLE OF DATA ITEM: List of Essential Service Loads

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

Update the list of essential service loads in accordance with the OPC System Specification (NVR 3-2-3/2.1.1).

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 320-03-2255

BLK02-TITLE OF DATA ITEM: DC System One Line Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DAOE

BLK13-DATE OF SUBS SUBM: 60DPICDR, 150 DPFCDR, 60  
DPFCDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 320-03-2258

BLK02-TITLE OF DATA ITEM: Electrical Stability Study

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 320-03-2272

BLK02-TITLE OF DATA ITEM: Power Load Flow Analysis

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and  
Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK13-DATE OF SUBS SUBM: 30DPICDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 320-03-2276

BLK02-TITLE OF DATA ITEM: Wireway Key Plan

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 90DAICDR

BLK16-REMARKS:

The drawing shall give main wireway checkpoint locations. The drawing shall be by deck level with major wireway numbering at key points with compartment entrance/exit points, penetrations, and main wireway intersections.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 320-03-2278

BLK02-TITLE OF DATA ITEM: List of Feeders and Mains (Power)

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models And  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK 13-DATE OF SUBS SUBM: 90DAICDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 324-03-1554

BLK02-TITLE OF DATA ITEM: Operation Description for Electric Plant  
Control SystemBLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific And  
Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DAOE

BLK13-DATE OF SUBS SUBM: 60DPICDR, 150 DPFCDR, 60  
DPFCDR

BLK16-REMARKS:

The report shall also include detailed information describing the systems:

18. Theory of operation.
19. Sequence of operation.
20. General description of the EPCS.
21. General description of the control and monitoring of the EPCS.
22. Logic of operation.
23. Power management and load shedding
24. List of parameters to be monitored and/or controlled by the power management system.
25. The updated operation description for the Electric Plant Control System shall include the logic of operation for each possible bus tie connection scenario for the switchboard/generator sets.
26. The power management system and the logic behind its operation including load shedding.
27. The interfaces to each generator set's local and remote controls and how control is determined at each location.
28. The network interfaces including redundancy and Machinery Plant Control And Monitoring System interfaces (as applicable)
29. Normal and alternate power source arrangements
30. Shore power connections
31. Automatic Bus Transfer devices function
32. Load Centers role
33. Power Distribution Panels
34. Batteries and UPS
35. Circuit breakers equipped with UVT's.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 324-03-1562

BLK02-TITLE OF DATA ITEM: Arc Flash Hazard Analysis

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific And  
Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

The Arc Flash Hazard Analysis shall be in accordance with requirements of OPC System Specification (NVR 3-2-6/9.1 ).

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 324-03-1569

BLK02-TITLE OF DATA ITEM: Switchboards and Load Centers Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

Switchboard and Load Centers drawings shall be provided in accordance with OPC System Specification (NVR 3-1-4/3.3).

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 331-03-1627

BLK02-TITLE OF DATA ITEM: General lighting, normal and alternate one-line diagrams

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

The Lighting System One-Line Diagram shall be prepared in accordance with OPC Systems Specification (NVR 3-1-4/1.2). Normal and alternate lighting systems shall be included.

The Lighting System One-Line Diagram shall show:

Main and alternate lighting circuits: Cable type and circuit designation, load, voltage, load name and location for receptacles and lighting circuits

Isolation transformers: kVA rating, rated voltage, current, winding connection, voltage ratio

Lighting feeder cable: Cable type and circuit designation.

Trip setting and rating of lighting circuit protective devices, rated load of each branch circuit.

Lighting Load Centers, Switchboard connections, Panelboards: voltage and current rating, enclosure type, location

Other equipment connected to lighting circuits, voltage rating, load, and location

Each diagram shall reference all related drawings, including wireway installation drawings.

Electrical cable designations (Cable numbers) shall be identified in accordance with OPC System Specification.

Graphic symbols for electrical diagrams shall be in accordance with IEEE-STD-315 or MIL-HDBK-290 and shall indicate type of equipment and fixtures. A table shall be provided on the drawings, which lists and provides descriptive identification for each symbol used.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 331-03-1628

BLK02-TITLE OF DATA ITEM: Lighting System Deck Plan

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

The Lighting System Deck Plan shall show each lighting load center, lighting power panel, light fixture, receptacle and other equipment connected to lighting circuits including Low level lighting and Emergency lighting circuits.

Electrical Lighting Control Wiring Details shall be included, providing the typical wiring arrangements for three-way switches, light switches, low level lighting switches, etc.

The drawings shall present an overall view of the lighting system including all cables that interface with other systems.

Cable designation and cable size and type shall be shown for each lighting cable.

The deck plan shall identify the compartment where each component in the system is located.

Deck wiring or schematic plans of lighting systems, including symbol lists, with manufacturer's name and identification of each item of electric equipment, shall show:

Location of cables

Wiring deck plans shall be drawn to a scale of 1/4, 1/2, 3/4, or 1 inch to the foot.

Wiring deck plans shall show the type for all lighting equipment.

Wiring deck plans and general arrangement drawings showing electrical wiring shall also show structures which may affect the run of lighting cables. The plans shall show cable runs as thick lines and structures as thin lines. Doors, hatches, scuttles, manholes, patches, and removable plates shall be shown.

## EXHIBIT XX - DETAIL DESIGN

Each lighting deck plan shall have a reference drawing table referring to all other drawings of the system including wireway installation drawings.

The Lighting Deck Plan shall contain Material Lists.

Deck plans shall correspond to items on other system drawings such as the EPLA (Electric Plant Load Analysis) and Master Equipment list.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 331-03-1629

BLK02-TITLE OF DATA ITEM: Lighting Calculations (Illumination)

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and  
Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

Except for NVIS friendly illumination systems, the lighting calculations shall demonstrate design to the illumination requirements of OPC System Specification (NVR 3-2-8/3.1). The lighting calculations shall be prepared using DOD-HDBK-289 calculation methods, requirements and past practices in general use.

Where NVIS friendly illumination is required, the lighting calculations shall demonstrate design to the requirements of OPC System Specification.

In addition to the requirements and recommendation above, the following shall be included in the lighting calculations:

Lighting calculations shall reference lighting equipment used on all related lighting drawings.

Equipment shall be identified on all calculations by their assigned nomenclature and model or type number designations.

Lighting fixture manufacturer's datasheets shall also be submitted with calculations.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 331-03-2245

BLK02-TITLE OF DATA ITEM: Lighting and Receptacle Load Calculations

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 30DAICDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 331-03-2279

BLK02-TITLE OF DATA ITEM: List of Feeders and Mains (Lighting)

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated List

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 90 DAICDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 400-03-2061

BLK02-TITLE OF DATA ITEM: Interface Design Description

BLK04-AUTHORITY: DID Number: DI-MGMT-81453  
2DID Title: Interface Design Description

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK 13-DATE OF SUBS SUBM: 30DPFCDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 400-03-2321

BLK02-TITLE OF DATA ITEM: Installation Control Drawings (ICDs)

BLK04-AUTHORITY: DID Number: DI-DRPR-82142  
DID Title: Installation Control Drawings (ICDs)

BLK08-APP CODE:

BLK10-FREQUENCY: See Block 16

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK 13-DATE OF SUBS SUBM: 30DPFCDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 400-03-2324

BLK02-TITLE OF DATA ITEM: C4ISR System Design Report

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and Technical  
Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK 13-DATE OF SUBS SUBM: 30DPFCDR

BLK16-REMARKS:

The contractor shall provide a C4ISR System Design Report. The C4ISR design report shall contain a design history and summary of each functional area of the OPC C4ISR Design. A description of technical issues and risk reduction shall be addressed for each functional area. This report shall include the following technical areas:

1. Command and Control System.
2. LAN (Unclassified and Classified) Architecture.
3. CDDS System.
4. NDDS System.
5. Navigation Systems.
6. Integrated Bridge System.
7. IC Voice Systems.
8. Ship's Video Distribution System.
9. IC Alarm and Indicator Systems.
10. External Communications.
11. Radar and IFF Systems.
12. EW and Decoy Systems.
13. Weapon Systems.
14. C4ISR Training Systems.
15. C4ISR Systems Software development.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 400-03-2327

BLK02-TITLE OF DATA ITEM: Functional Block Diagrams

BLK04-AUTHORITY: DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagrams

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPPDR

BLK 13-DATE OF SUBS SUBM: 45DPKDR

BLK16-REMARKS:

The following C4ISR Functional Diagrams shall be developed as separate drawings:

16. LAN (Unclassified and Classified) Architecture Block Diagram.
17. Radio, AF/RF Switching System Block Diagram.
18. IC Voice System Block Diagram.
19. Ships Video Distribution System Block Diagram.
20. IC Alarm Systems Block Diagram.
21. Indicator Systems Block Diagram.
22. Command and Control System Block Diagram.
23. Radar and IFF System Block Diagram.
24. EW System Block Diagram.
25. Weapon Systems Block Diagram.
26. CDDS System Block Diagram.
27. NDDS System Block Diagram.
28. Electrical Navigation Aids Block Diagram.
29. Electronic Navigation Systems Block Diagram.
30. Integrated Bridge System Block Diagram.

The C4ISR Functional Diagrams shall include, at a minimum:

1. Show the interconnections between system components
2. Diagram shall be organized to indicate compartment/location
3. Each Component block shall contain:
  - a. Identification labels that correspond to the List of Equipment
  - b. Noun Name
  - c. Nomenclature
  - d. Indication of SWAP (unique line font)
4. Signal flow with arrows indicating signal direction
5. Power source and designation (type, phase, frequency)
6. A List of Equipment that contains, at a minimum, the following columns:
  - Item Number
  - Quantity
  - Type Number/nomenclature
  - Item Name
  - Drawing or Spec Number
  - Remarks

## EXHIBIT XX - DETAIL DESIGN

- GFE, CFE, or SWAP

## 7. References

BLK 04-01:

1. The C4ISR Functional Diagrams shall be developed to the Second-Level detail as per paragraph 10.4.b.
2. The following are portions of Paragraph 10.2 are not required:
  - "maintenance or check out aspects of the proposed design"
  - "As system definition progresses, the schematic diagrams shall be updated to incorporate new requirements such as maintainability features, self-test capability, read-out indications, monitoring capability, critical pressures voltages, and other quantitative expressions of system performance."

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 400-03-2335

BLK02-TITLE OF DATA ITEM: Electronic System Elementary Wiring Diagrams

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings,  
Models, and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK13-DATE OF SUBS SUBM: 30DPFCDR

BLK16-REMARKS:

The Contractor shall develop Electronic System Elementary Wiring Diagrams at the subsystem level and to the following level of detail:

1. Show the interconnections for each wire between system components
2. Show and label each jack and connector
2. Show cable designations for each interconnection
3. Show signal designations for each interconnection
4. Show arrows indicating signal direction
5. The C4ISR Elementary Wiring Diagrams shall be organized to indicate compartment/location
6. Each Component block shall contain:
  - a. Identification labels that correspond to the List of Equipment
  - b. Noun Name
  - c. Nomenclature
7. Power source and designation (type, phase, frequency)
8. Space and Weight blocks shall be shown in a unique line font
9. A List of Equipment that contains the following columns:
  - Item Number
  - Quantity
  - Type Number/nomenclature
  - Item Name
  - Drawing or Spec Number
  - GFE, CFE, or Space and Weight
  - Weight
  - Remarks
10. References
11. Remarks

The following subsystems shall be broken down to individual drawings:

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 402-03-2344

BLK02-TITLE OF DATA ITEM: Information Assurance (IA) Plan

BLK04-AUTHORITY: DID Number: DI-IPSC-81427  
DID Title: Software Development Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DAOE

BLK13-DATE OF SUBS SUBM: 30DPICDR

BLK16-REMARKS

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 402-03-2345

BLK02-TITLE OF DATA ITEM: IA Design Review Information Package (DRIP)

BLK04-AUTHORITY: DID Number: DI-SESS-81757  
DID Title: Design Review  
Information Package (DRIP)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK13-DATE OF SUBS SUBM: 30DPFCDR

BLK16-REMARKS:

The DRIP shall contain the following:

- Network Topology including data flows, data classifications, IP addresses and IA defense points
- Interconnection diagrams listing of all systems, interconnected outsourced IT-based processes, and interconnected IT platforms
- Shipboard installation and deployment planning, coordination and the exchange of connection rules and requirements
- Ports, Protocols and Service (PPS) assignments and their use for systems inside and interfaced external to the accreditation boundary
- Documentation describing the implementation of approved cryptography
- List of all Virtual Local Area Networks (VLANs) and equipment with IPs that will be included
- List of all Virtual Private Networks (VPNs), if applicable
- Description of Network System User Roles and Responsibilities
- Accounts and Group Listing Summary document
- Hardware list to include all equipment to include manufacturer, type, model, physical location
- Initial Vulnerability Scan Compliance (VSC) document from system vulnerability scans detailing the IA vulnerabilities found during DoD IAVM and DISA STIG scans
- Open for Functionality (OFF) document detailing the vulnerabilities which will be left open and migrating controls that will be put into place to reduce the risk without effecting system functionality

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 404-03-1641

BLK02-TITLE OF DATA ITEM: Waveguide Routing Drawing

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Production Drawings, Models, and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPPRR

BLK 13-DATE OF SUBS SUBM: See BLK16

BLK16-REMARKS:

Modify BLK 13 as follows:  
Second submission 21MPTD  
Final submission 30DAD

First Submission:

Final drawings depicting the routing of waveguides between antennas and associated equipment in C4I spaces. Routing shall show the physical routing of the waveguides in reference to the rest of the cutter. Drawings shall also include details of mounting, location of waveguides within the cutter, bulkhead and watertight penetrations, and electrical interfaces at each terminus of each waveguide.

Final Submission:

Update as required to reflect as-built at delivery.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 405-03-1090

BLK02-TITLE OF DATA ITEM: Topside Antenna Systems Arrangement Drawing

BLK04-AUTHORITY: DID Number: DI-SESS-81002  
DID Title: Developmental Design Drawings /  
Models

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45DPICDR

BLK 13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

Additional detail shall be added to the Antenna Systems Arrangement Drawing, further defining the topside design.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 407-03-1638

BLK02-TITLE OF DATA ITEM: Telecommunications Electronics Material  
Protected  
from Emanating Spurious Transmissions  
(TEMPEST) Control Plan

BLK04-AUTHORITY: DID Number: DI-EMCS-81687  
DID Title: TEMPEST Control Plan

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45DPICDR

BLK 13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

The TEMPEST Control Plan will document the TEMPEST control design techniques and practices being used in the design, and identify the spaces designated to be under TEMPEST design constraints. The plan will also include planning and scheduling information for meeting TEMPEST certification and inspections requirements.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 407-03-1657

BLK02-TITLE OF DATA ITEM: Electromagnetic Environmental Effects (E3)  
Compatibility PlanBLK04-AUTHORITY: DID Number: DI-EMCS-81528  
DID Title: Electromagnetic  
Compatibility Program Procedures

BLK08-APP CODE:

BLK10-FREQUENCY: See BLK 16

BLK12-DATE OF 1ST SUBM: 15DAKOM

BLK13-DATE OF SUBS SUBM: See BLK 16

BLK16-REMARKS:

BLK 13: Updates shall be provided 30DPICDR, 30DPFCDR and  
every 6 months until the completion of the  
Contract.

BLK16:

1. The E3 Compatibility Plan shall document the Contractor's Plan for meeting the Electromagnetic Compatibility (EMC) requirements as defined in OPC Systems Specification.
2. This plan shall document Contractor support for the Electromagnetic Compatibility Advisory Board (EMCAB) for resolving EMC issues that arise in the course of design and construction of the OPC.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 407-03-2127

BLK02-TITLE OF DATA ITEM: EMC Integration and Analysis Report

BLK04-AUTHORITY: DID Number: DI-EMCS-81540  
DID Title: Electromagnetic  
Environmental Effects (E3)  
Integration and Analysis Report  
(E3IAR)

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 15DPPAC

BLK13-DATE OF SUBS SUBM: See Block 16

BLK16-REMARKS:

BLK 13:

Updates shall be provided 30DPICDR, 30DPFCDR and every 6 months thereafter until the completion of the Contract.

The Contractor shall document the EMC integration effort and the analysis of ship's equipment and systems to meet Electromagnetic Compatibility (EMC) requirements as defined in the OPC Systems Specification.

This analysis shall include:

The physical arrangement of equipment on the ship to reduce Electromagnetic Interference (EMI) susceptibility from other equipment.

An EMC interaction matrix, which lists the C4ISR topside equipment to identify potential problems pairs, and the resolution used to mitigate the identified problems. The application and effectiveness of EMI mitigation techniques such as EMI shields, EMI filters, EMI-hardened enclosures, signal blanking etc. used to minimize or eliminate EMI.

Outlining other measures taken to prevent electromagnetic radiation hazards to electrical equipment, electronics, personnel, fuel and ordnance, both internal and external to the ship.

The analysis report will include results, findings, and recommendations of the OPC Electromagnetic Compatibility Advisory Board (EMCAB).

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 415-03-2333

BLK02-TITLE OF DATA ITEM: C4ISR Network Architecture Report

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK 13-DATE OF SUBS SUBM: 30DPFCDR

BLK16-REMARKS:

The updated report shall include revisions as needed to the following topics:

- Cable Infrastructure
- Network Topology
- Testing and Verification
- Network Fault Tolerances
- Network Operational Requirements
- Environmental Requirements
- Fail-Safe/Fail-Over Processes
- Network Monitoring
- Network Disaster Recovery
- Logistics Supportability

The updated report shall include the following:

- Schematic Interface Diagram placed above the headings for Major Subsystems
- Information Assurance defense points including Firewalls and Routers
- Reference Application Programming Interface (API) specification
- LAN Technology
- IP of the Data Source device transmitting data
- Subnet Mask
- Default Gateway
- Hostname of the Data Source device transmitting data
- Classification of the Data Source device transmitting the data
- Classification of the actual data being transmitted
- Network Data Transfer Protocol used to transmit the data
- Data Delivery Type: Bi-Directional, Uni-Directional or Multicast
- IANA Port Number assigned to transmit the data
- Service daemon transmitting the data
- Is Port, Protocol and Service approved by DISA (Yes or No)
- Data encryption standard used
- Is Data Source device inside the IA C&A Boundary (Yes or No)
- IP of the Data Sink/Destination device receiving transmitted data
- Hostname of the Data Sink/Destination device receiving data
- Classification of the Data Sink/Destination device receiving data

EXHIBIT XX - DETAIL DESIGN

- Is Data Sink/Destination device within IA C&A Boundary (Yes or No)

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 420-03-1662

BLK02-TITLE OF DATA ITEM: Electronic Navigation Systems Diagrams

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK13-DATE OF SUBS SUBM: 90 DAICDR

BLK16-REMARKS:

The Electronic Navigation Systems Diagrams shall provide a wire list and elementary wiring diagram, displaying the location and wiring for electronic navigation systems. The schematic diagram shall have a level of detail that will allow the crew to trace the power or control signal from the source to the load via any switch or control devices and back to the source.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 420-03-2122

BLK02-TITLE OF DATA ITEM: Navigation Systems Report

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and Technical  
Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK 13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

The Navigation Systems Report shall include the Navigation Systems/Subsystems, including the Integrated Bridge. The Navigation Systems Report shall include the following additional information:

- Operational description
- Index of Application software and status/issues
- Index of Interface software and status/issues

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 421-03-2257

BLK02-TITLE OF DATA ITEM: List of Non-Electrical/Electronic Navigation Aids Drawing

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 150DPFCDR

BLK13-DATE OF SUBS SUBM: 60 DPFCDR

BLK16-REMARKS:

List shall include: make, model/part number, manufacturer and location

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 422-03-1660

BLK02-TITLE OF DATA ITEM: Electrical Navigation Aids Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK13-DATE OF SUBS SUBM: 30DAICDR

BLK16-REMARKS:

The Electrical Navigation Aids Diagram shall consist of a Block Wiring Diagram and schematic of all navigation, anchor, task and or searchlights. The schematic diagram shall have a level of detail that will allow the crew to trace the power or control signal from the source to the load via any switch or control devices and back to the source.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 422-03-1661

BLK02-TITLE OF DATA ITEM: Navigation Lights Controls and Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DAOE

BLK13-DATE OF SUBS SUBM: 240 DAOE

BLK16-REMARKS:

The Navigation Lights Arrangements and Details Diagram shall be in accordance with OPC Systems Specification (NVR 3-1-4/2.3.2). The arrangements shall define the locations of the required navigation lights including the establishment of the necessary lines of sight. Normal and alternate backup power sources shall be identified in the drawings.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 422-03-2280

BLK02-TITLE OF DATA ITEM: Navigation Lights, Signal Lights, and  
Searchlights Arrangements Drawing

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DAOE

BLK13-DATE OF SUBS SUBM: 90DAICDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 422-03-2304

BLK02-TITLE OF DATA ITEM: Navigation Lights, Signal Lights, and  
Searchlights Calculations

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and  
Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DAOE

BLK13-DATE OF SUBS SUBM: 90DAICDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 428-03-1664

BLK02-TITLE OF DATA ITEM: Operational Description of the Relevant  
Navigation Monitoring SystemsBLK04-AUTHORITY; DID Number: DI-SESS-81000  
DID Title: Product Drawings Models and  
Associated Lists

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 14DPKOM

BLK 13-DATE OF SUBS SUBM: 30DPICDR and 30DPFCDR

BLK16-REMARKS:

The operational description of the Navigation Monitoring Systems, shall include alarms and displays, as specified in ABS NVR 4-3-31.6.2.

The Operational Description of the Relevant Navigation Monitoring Systems shall include all Navigation Systems/Subsystems, including the Integrated Bridge.

The Navigation Systems Report shall include the following:

- Top level description of the design and design status
- A complete Operational Description of the Relevant Navigation Monitoring Systems Including a List of Alarms and Displays.
- Operational and user interface design description for primary system components
- Index of Application software and status/issues
- Index of Interface software and status/issues

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 428-03-1665

BLK02-TITLE OF DATA ITEM: Arrangement Drawing and Equipment List for the  
IBS

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DAOE

BLK13-DATE OF SUBS SUBM: 90DAICDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 430-03-1673

BLK02-TITLE OF DATA ITEM: Internal Communication (IC) Systems Report

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and  
Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DAOE

BLK13-DATE OF SUBS SUBM: 30DPFCDR

BLK16-REMARKS:

The Contractor shall include the component certifications for the Interior Communication Systems.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 432-03-2260

BLK02-TITLE OF DATA ITEM: Sound Powered Telephone System Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 30 DAICDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 432-03-2261

BLK02-TITLE OF DATA ITEM: Sound Powered Telephone System Isometric and Elementary Wiring Diagrams

BLK04-AUTHORITY: DID Title: DID Number: DI-SESS-81000  
Product Drawings/Models And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 30 DAICDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 433-03-1701

BLK02-TITLE OF DATA ITEM: General Announcing System (1MC) Isometric  
Wiring DiagramBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 45 DPFCDR

BLK16-REMARKS:

Announcing System drawings shall show the system and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable.

The drawings shall depict all announcing systems (general, ship-to-ship, etc.) and manually activated alarms (general, aircraft crash, etc.) distributed via the announcing systems.

Power supply source and signal destination shall be indicated.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 433-03-1706

BLK02-TITLE OF DATA ITEM: Captain Command Announcing System (21MC)  
Isometric Wiring DiagramBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 45 DPFCDR

BLK16-REMARKS:

Announcing System drawings shall show the system and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable.

The drawings shall depict all announcing systems (general, ship-to-ship, etc.) and manually activated alarms (general, aircraft crash, etc.) distributed via the announcing systems.

Power supply source and signal destination shall be indicated.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-1688

BLK02-TITLE OF DATA ITEM: Electrical Alarm, Safety, and Warning System Schematic/Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow  
Diagram

DID Number: DI-GDRQ-81223  
DID Title: Schematic Block  
Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-1690

BLK02-TITLE OF DATA ITEM: Fire Detection and Alarm System Isometric and  
Elementary Wiring DiagramsBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

System drawings shall show the system and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable.

The drawings shall depict all systems, including controls, and manually activated alarms (general, aircraft crash, etc.) distributed via the announcing systems.

Power supply source and signal destination shall be indicated.

Elementary wiring diagrams shall depict point to point wiring connections to trace power, communication and control signals. Elementary wiring diagrams shall depict wires requiring shielding and grounding, and quantity of spare conductors shall be identified for each cable.

Elementary wiring diagrams shall depict individual wires at identified terminals within equipment, including terminal boxes.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-1691

BLK02-TITLE OF DATA ITEM: Fire Detection and Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagram

DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-1692

BLK02-TITLE OF DATA ITEM: General Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagram

DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-1700

BLK02-TITLE OF DATA ITEM: General Alarm System Isometric and Elementary  
Wiring DiagramsBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

Announcing System drawings shall show the system and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable.

The drawings shall depict all announcing systems (general, ship-to-ship, etc.) and manually activated alarms (general, aircraft crash, etc.) distributed via the announcing systems.

Power supply source and signal destination shall be indicated.

Elementary wiring diagrams shall depict point to point wiring connections to trace power, communication and control signals.

Elementary wiring diagrams shall depict wires requiring shielding and grounding, and quantity of spare conductors shall be identified for each cable.

Elementary wiring diagrams shall depict individual wires at identified terminals within equipment, including terminal boxes.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2162

BLK02-TITLE OF DATA ITEM: Emergency Wash Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagram

DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 45 DPKDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2163

BLK02-TITLE OF DATA ITEM: Emergency Wash Alarm System Elementary Wiring  
DiagramBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 60 DPKDR

BLK16-REMARKS:

System drawings shall show the system in diagrammatic format and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable. The drawings shall depict point to point wiring connections to trace power, communication and control signals. Individual wires shall be terminated at identified terminals within equipment, including terminal boxes. Power supply source and signal destination shall be indicated. Individual wires shall be terminated at identified terminals within equipment, including terminal boxes. Power supply source and signal destination shall be indicated.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2164

BLK02-TITLE OF DATA ITEM: Washdown Countermeasure Actuation Alarm System  
Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagram

DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2165

BLK02-TITLE OF DATA ITEM: Washdown Countermeasure Actuation Alarm System  
Elementary Wiring DiagramBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

System drawings shall show the system in diagrammatic format and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable. The drawings shall depict point to point wiring connections to trace power, communication and control signals. Individual wires shall be terminated at identified terminals within equipment, including terminal boxes. Power supply source and signal destination shall be indicated.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2166

BLK02-TITLE OF DATA ITEM: Hazardous Gas Detection System Functional  
Diagram and Block DiagramBLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow DiagramDID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 60 DPKDR

BLK16-REMARKS:

System drawings shall show the system in diagrammatic format and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable. The drawings shall depict point to point wiring connections to trace power, communication and control signals. Individual wires shall be terminated at identified terminals within equipment, including terminal boxes. Power supply source and signal destination shall be indicated.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2167

BLK02-TITLE OF DATA ITEM: Hazardous Space Airflow Alarm System Functional Diagram and Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagram

DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 45 DPICDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2168

BLK02-TITLE OF DATA ITEM: High Temperature Alarm System Functional  
Diagram and Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagram

DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK 13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2169

BLK02-TITLE OF DATA ITEM: Security Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagram

DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2170

BLK02-TITLE OF DATA ITEM: Security Alarm System Elementary Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

System drawings shall show the system in diagrammatic format and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable. The drawings shall depict point to point wiring connections to trace power, communication and control signals. Individual wires shall be terminated at identified terminals within equipment, including terminal boxes. Power supply source and signal destination shall be indicated.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2173

BLK02-TITLE OF DATA ITEM: Engineer's Assistance-Needed Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagram

DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 45 DPKDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2174

BLK02-TITLE OF DATA ITEM: Engineer's Assistance-Needed Alarm System  
Elementary Wiring DiagramBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product  
Drawings/Models and Associated  
Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

System drawings shall show the system in diagrammatic format and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable. The drawings shall depict point to point wiring connections to trace power, communication and control signals. Individual wires shall be terminated at identified terminals within equipment, including terminal boxes. Power supply source and signal destination shall be indicated.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2175

BLK02-TITLE OF DATA ITEM: Steering Gear Power Failure Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagram

DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 60 DPKDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2176

BLK02-TITLE OF DATA ITEM: Steering Gear Power Failure Alarm System  
Elementary Wiring DiagramBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

System drawings shall show the system in diagrammatic format and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable. The drawings shall depict point to point wiring connections to trace power, communication and control signals. Individual wires shall be terminated at identified terminals within equipment, including terminal boxes. Power supply source and signal destination shall be indicated.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2177

BLK02-TITLE OF DATA ITEM: Gyrocompass Failure Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81224  
DID Title: Functional Flow Diagram

DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 45 DPKDR

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2178

BLK02-TITLE OF DATA ITEM: Gyrocompass Failure Alarm System Elementary  
Wiring DiagramBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models And  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 150DAOE

BLK13-DATE OF SUBS SUBM: 270DAOE

BLK16-REMARKS:

The Gyrocompass Failure Alarm System Wiring Diagram shall be provided in accordance with the requirements of the Alarm, Safety, and Warning System diagrams.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2179

BLK02-TITLE OF DATA ITEM: Cable Insulation Resistance Monitoring Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 60 DPKDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2180

BLK02-TITLE OF DATA ITEM: Cable Insulation Resistance Monitoring Alarm System Elementary Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models And Associated Lists

BLK08-APP CODE: A

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2181

BLK02-TITLE OF DATA ITEM: MOBI System Block Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 60 DPKDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2182

BLK02-TITLE OF DATA ITEM: MOBI System Elementary Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 60 DPKDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2183

BLK02-TITLE OF DATA ITEM: Navigation Horn Operating System Block Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 45 DPKDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2184

BLK02-TITLE OF DATA ITEM: Navigation Horn Operating System Elementary  
Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DAOE

BLK13-DATE OF SUBS SUBM: 60 DPKDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2186

BLK02-TITLE OF DATA ITEM: Fire Suppression Release Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2187

BLK02-TITLE OF DATA ITEM: Fire Suppression Release Alarm System Isometric  
and Elementary Wiring Diagrams

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2188

BLK02-TITLE OF DATA ITEM: APC Release and Low Pressure Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2189

BLK02-TITLE OF DATA ITEM: APC Release and Low Pressure Alarm System  
Elementary Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2190

BLK02-TITLE OF DATA ITEM: AFFF Actuation Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2191

BLK02-TITLE OF DATA ITEM: AFFF Actuation Alarm System Elementary Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2192

BLK02-TITLE OF DATA ITEM: Sprinkling System Alarm System Block Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2193

BLK02-TITLE OF DATA ITEM: Sprinkling System Alarm System Elementary  
Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2247

BLK02-TITLE OF DATA ITEM: Electrical Alarm, Safety, and Warning System  
Elementary Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2248

BLK02-TITLE OF DATA ITEM: Hazardous Gas Detection System Elementary  
Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2249

BLK02-TITLE OF DATA ITEM: Hazardous Space Airflow Alarm System Elementary  
Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 436-03-2328

BLK02-TITLE OF DATA ITEM: High Temperature Alarm System Elementary Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK 13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 437-03-2195

BLK02-TITLE OF DATA ITEM: Underwater Speed Log System Elementary Wiring  
Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 437-03-2196

BLK02-TITLE OF DATA ITEM: Depth Sounder System Functional Diagram and Block Diagram

BLK04-AUTHORITY: DID Number: DI-GDRQ-81223  
DID Title: Schematic Block Diagram

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 437-03-2197

BLK02-TITLE OF DATA ITEM: Depth Sounder System Elementary Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 437-03-2199

BLK02-TITLE OF DATA ITEM: Wind Speed and Direction System Elementary  
Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 437-03-2201

BLK02-TITLE OF DATA ITEM: Steering System and Autopilot Isometric and  
Elementary Wiring DiagramsBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

System drawings shall show the system and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable.

The drawings shall depict all a systems and manually activated alarms distributed via the announcing systems.

Power supply source and signal destination shall be indicated.

Elementary wiring diagrams shall depict point to point wiring connections to trace power, communication and control signals. Elementary wiring diagrams shall depict wires requiring shielding and grounding, and quantity of spare conductors shall be identified for each cable.

Elementary wiring diagrams shall depict individual wires at identified terminals within equipment, including terminal boxes.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 437-03-2259

BLK02-TITLE OF DATA ITEM: Engine Order Telegraph System Isometric and  
Elementary Wiring DiagramsBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 360 DAOE

BLK16-REMARKS:

System drawings shall show the system and include information relative to vendor make and model number, cable types and sizes, material list, location of hardware on the ship, referenced to the technical manuals, where applicable.

Power supply source and signal destination shall be indicated.

Elementary wiring diagrams shall depict point to point wiring connections to trace power, communication and control signals. Elementary wiring diagrams shall depict wires requiring shielding and grounding, and quantity of spare conductors shall be identified for each cable.

Elementary wiring diagrams shall depict individual wires at identified terminals within equipment, including terminal boxes.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 443-03-2172

BLK02-TITLE OF DATA ITEM: Whistle Operating System Elementary Wiring Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: 90DAICDR

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 501-03-2028

BLK02-TITLE OF DATA ITEM: Machinery Arrangement Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DAOE

BLK 13-DATE OF SUBS SUBM: BLK16

BLK16-REMARKS:

BLK04: Machinery Arrangement Drawings shall be drawn to scales of not less than 1/4 inch to the foot.

BLK 13: QTRLY through PPR, updated to As-built condition 90DAD

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 501-03-2029

BLK02-TITLE OF DATA ITEM: Auxiliary Systems Diagrams

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY: See BLK 16

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: All diagrams shall be of sufficient clarity that reduced size prints (11" x 17") shall be fully legible.

The HVAC System Diagram shall depict summer and winter operating conditions concurrently.

The Hydraulic System Diagram shall be in accordance with SAE J1790, Hydraulic System Diagrams and Associated Tables for Marine Vehicles.

BLK10: One submittal per diagram, with revisions.

BLK12: The following diagrams shall be submitted 120 DPICDR: Machinery Seawater Cooling, Combustion Air and Exhaust, HVAC, Firemain, Magazine Sprinkling, Washdown Countermeasures, Ballast, Bilge, Fresh Water, Fuel, and Fixed Fire Extinguishing.

The following diagrams shall be submitted 60 DPICDR: Lube Oil, Refrigeration System, Exterior Deck Drain, Gray Water, JP-5, Compressed Air, Hydraulic, Oily Waste, Waste Oil, Sewage, and any other system diagrams.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 501-03-2030

BLK02-TITLE OF DATA ITEM: Auxiliary Systems Arrangement and Detail Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY: See BLK 16

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: Auxiliary systems arrangement and detail drawings shall be drawn to scales of not less than 1/4 inch to the foot

BLK10: Drawings shall be submitted once for each system, with revisions.

BLK12: The following Arrangement Drawings shall be submitted 180 DPFCDR: Machinery Seawater Cooling, Combustion Air and Exhaust, HVAC, Firemain, Magazine Sprinkling, Ballast, Bilge, Fresh Water, Fuel, and Fixed Fire Extinguishing.

The following Arrangement Drawings shall be submitted 120 DPFCDR: Lube Oil, Refrigeration System, Washdown Countermeasures, Exterior Deck Drain, Gray Water, JP-5, Compressed Air, Hydraulic, Oily Waste, Waste Oil, Sewage, and any additional systems.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 501-03-2031

BLK02-TITLE OF DATA ITEM: Hose Log

BLK04-AUTHORITY: DID Number: DI-MISC-80508  
DID Title: Technical Report - Study/Services

BLK08-APP-CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPD

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: 1. Format - USCG Automated Flexible Hose Program (Microsoft Office™ Access) Database in accordance with COMDTINST M9000.6E. The Program will be supplied by SFLC-ESD-NAME-AMS.

2. Content - The Hose Log shall include the following information for each hose:

- Normally Fixed Information

- (1) Hose Serial number/Tag Number
- (2) System and Associated Assembly
- (3) Compartment number
- (4) Hose Length
- (5) Hose Size
- (6) Ship Division responsible for item
- (7) Maintenance Procedure Card (MPC) number
- (8) MPC inspection periodicity
- (9) Part Number
- (10) NSN
- (11) Construction Type
- (12) Design Pressure
- (13) Hydrostatic Test Pressure
- (14) Periodicity of Replacement (see COMDTINST M9000.6E Chapter 505).
- (15) ESWBS
- (16) Drawing Reference number
- (17) Tech Pub Reference number
- (18) Remarks
- (19) Special Notes or Instruction

- Variable information:

- (20) Source of Supply
- (21) Hose Manufacturer
- (22) Hose Fabricated by
- (23) Inlet Fitting Description & Part Number
- (24) Outlet Fitting Description & Part Number
- (25) Fabrication Date
- (26) Hydro Test Date
- (27) Installation Date
- (28) Inspection Date (when last MPC inspection occurred)

EXHIBIT XX - DETAIL DESIGN

3. The Contractor shall not be required to submit data for the following fields: Ship Division responsible for item, Maintenance Procedure Card (MPC) number, MPC inspection periodicity, and Inspection Date (when last MPC inspection occurred).

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 501-03-2032

BLK02-TITLE OF DATA ITEM: Miscellaneous Tanks Drawing

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 501-03-2034

BLK02-TITLE OF DATA ITEM: Auxiliary Systems Calculations

BLK04-AUTHORITY: DID Number: CGDI-GDRQ-90001  
DID Title: Calculations and Stress Diagrams

BLK08-APP CODE:

BLK10-FREQUENCY: See BLK 16

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: Modify Calculations and Stress Diagrams DID as follows:

Add:

10.3.12 Component data/manufacturers cutsheets shall be included.

10.3.13 Calculations supporting individual equipment/component sizing, such as component process rates, performance curves, tank and sump capacities, etc, shall be clearly identified and demonstrated.

Modify:

10.2 Format: Delete and replace with "Electronic versions of the calculations shall be prepared and submitted in MS Excel™ compatible format. Copies of the parent calculation computer input and output files shall be submitted. Calculations shall be complete enough so a reviewer can follow through the work, step by step, without difficulty."

10.3.7 All calculations shall be submitted.

BLK10: Calculations shall be submitted once for each system, with revisions.

BLK12: The following calculations shall be submitted 120 DPICDR: Machinery Seawater Cooling, Combustion Air and Exhaust, HVAC, Firemain, Magazine Sprinkling, Washdown Countermeasures, Ballast, Bilge, Fresh Water, Fuel, and Fixed Fire Extinguishing.

The following calculations shall be submitted 60 DPICDR: Lube Oil, Refrigeration System, Exterior Deck Drain, Gray Water, JP-5, Compressed Air, Hydraulic, Oily Waste, Waste Oil, Sewage, and any additional system calculations.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 502-03-2094

BLK02-TITLE OF DATA ITEM: Auxiliary Diesel Engine Drawings and Particulars

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports - Preparation, Presentation, and Preservation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: BLK 16

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 12: Drawings shall be submitted 30 days after receipt of VFI or no later than 120 days prior to FCDR, whichever comes first.

BLK 16: In addition to the NVR 2-1-1A11 information, the VFI shall include:

- Design, construction and other technical documentation for installation, operation and maintenance of the propulsion diesel engines.
- All diesel engine performance data and performance curves.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 507-03-2037

BLK02-TITLE OF DATA ITEM: Machinery and Piping Label Plates Drawing

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: BLK 16

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 12: Submit 60 days prior to generating the labels.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 512-03-1718

BLK02-TITLE OF DATA ITEM: HVAC Equipment List

BLK04-AUTHORITY: DID Number: DI-SESS-81003  
DID Title: Commercial Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: The standard HVAC Equipment List format shall be modified as follows;

Add an additional column to the at the to right side of the equipment list for list types 1.a through 1.h. Indicate the Navy Standard Equipment Size if not previously required. Where non-Navy standard size/commercial components are supplied, commercial manufacturer names and equipment part numbers shall be provided.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 512-03-1719

BLK02-TITLE OF DATA ITEM: HVAC Heating and Cooling Load Calculations

BLK04-AUTHORITY: DID Number: CGDI-GDRQ-90001  
DID Title: Calculations and Stress Diagrams

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DPICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK 04: Modify Calculations and Stress Diagrams DID as follows:

## Add:

10.3.12 Component data/manufacturers cutsheets shall be included.

10.3.13 Calculations supporting individual equipment/component sizing, such as component process rates, performance curves, tank and sump capacities, etc, shall be clearly identified and demonstrated.

10.3.14: Where non-Navy standard size/commercial components are supplied, commercial manufacturer names and equipment part numbers shall be provided.

## Modify:

10.2 Format: Delete and replace with "Electronic versions of the calculations shall be prepared and submitted in MS Excel™ compatible format. Calculations shall be complete enough so a reviewer can follow through the work, step by step, without difficulty."

10.3.7 Delete and replace with "All calculations shall be submitted."

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 512-03-1725

BLK02-TITLE OF DATA ITEM: HVAC Duct Pressure Loss Calculations

BLK04-AUTHORITY: DID Number: CGDI-GDRQ-90001  
DID Title: Calculations and Stress Diagrams

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DPFCDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: Modify Calculations and Stress Diagrams DID as follows:

## Add:

10.3.12 Where standard duct fittings (fittings of standard geometry) are used, they shall be clearly identified. When non-standard components are used, data sheets/manufacturers cut sheets used in the preparation of duct pressure loss calculations, such as component loss coefficients, fan performance curves, etc, shall be provided.

## Modify:

10.2 Format: Delete and replace with "Electronic versions of the calculations shall be prepared and submitted in MS Excel™ compatible format. Copies of the parent calculation computer file shall be submitted. Calculations shall be complete enough so a reviewer can follow through the work, step by step, without difficulty."

10.3.7 Delete and replace with "All calculations shall be submitted."

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 514-03-1730

BLK02-TITLE OF DATA ITEM: A/C Unit Arrangement and Detail Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models And  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPFCDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: A/C Unit Arrangement and Detail Drawing(s) shall be in  
accordance with OPC System Specification (NVR 5-3-5/3).

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 516-03-1732

BLK02-TITLE OF DATA ITEM: Refrigeration System Sizing Calculations

BLK04-AUTHORITY: DID Number: CGDI-GDRQ-90001  
DID Title: Calculations and Stress Diagrams

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 516-03-2038

BLK02-TITLE OF DATA ITEM: Refrigeration System Arrangement and Detail Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPFCDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: The Refrigeration System Arrangement and Detail Drawings shall be in accordance with the OPC system Specification (NVR 5-3-5/3.1 through NVR 5-3-5/3.3).

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 516-03-2039

BLK02-TITLE OF DATA ITEM: Reefer Box Arrangement and Detail Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPFCDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 516-03-2275

BLK02-TITLE OF DATA ITEM: Refrigeration System Design Report

BLK04-AUTHORITY: DID Number: DI-MISC-80652  
DID Title: Technical Information Report

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 549-03-1788

BLK02-TITLE OF DATA ITEM: Lubricants Database Report, Charts and Diagrams

BLK04-AUTHORITY: DID Number: Contractor Format  
DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DPAT

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: The deliverable shall be a Microsoft Access™ database file, with at least two preformatted report tables, and technical appendices. The database shall be unique to each hull. One report table shall have the lubricants and hydraulic fluids listed alphanumerically and second report table have equipment listed by equipment SWBS identifier with the equipment compartment number frame serial locator number. The database shall contain hyperlinks to technical information on each lubricant or hydraulic fluid in the appendices.

The database shall contain the following data:

- Lubricant (oil / grease) name
- Equipment Name (e.g., Diesel Generator, Motor, Pump)
- Applicable standard (e.g., SAE/ISO Viscosity Grade / MIL-SPEC/OEM Specifications)
- Equipment SWBS identifier (e.g., 320)
- Equipment / reservoir / HAZMINCEN / operating space nomenclature (name and hull designating number, e.g., SSDG No. 3, AMR 1.)
- Quantity required to be stowed on board shall be the greater to support maintenance actions of six (6) or less months periodicity (time based maintenance), or two back to back patrol periods (hour based maintenance).
- The lubricants required for annual replacement, or estimated annual consumption (of consumables).
- The lubricants required for overhauls (only) and Condition Based Maintenance reservoir changes (intervals greater the annual)
- Lubricant and hydraulic fluid volumes in sumps or working reservoirs; lubricant and hydraulic fluid volumes in bulk reservoir stowage; lubricant and hydraulic fluid volumes Hazardous Stores; subtotal of fluids for each lubricant or hydraulic fluid; and subtotals by equipment.

Lubrication Charts shall be provided for each piece of installed equipment requiring lubrication.

Lubrication Charts shall be provided for portable equipment except where commercial technical publication literature supplied with the equipment addresses the lubrication requirements.

The Contractor shall provide a copy of the literature to be stowed in the HAZMINCTR for reference.

## EXHIBIT XX - DETAIL DESIGN

The Contractor shall provide lubricant data on the applicable maintenance procedures, and in the Master Lubricant Database. Lubrication Diagrams shall be provided for installed equipment, except that complete internal diagrams are not required for diesel engines. Lubrication Diagrams shall provide lubrication system drawings that identify total flow and minimum pressure requirements for diesel engines.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 555-03-2040

BLK02-TITLE OF DATA ITEM: Type Approved and Packaged Fixed Fire Fighting System Calculations

BLK04-AUTHORITY: DID Number: CGDI-GDRQ-90001  
DID Title: Calculations and Stress Diagrams

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 561-03-1810

BLK02-TITLE OF DATA ITEM: Steering Gear Sizing Calculations

BLK04-AUTHORITY: DID Number: CGDI-GDRQ-90001  
DID Title: Calculations and Stress Diagrams

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: Modify Calculations and Stress Diagrams DID as follows:

Add:

10.3.12 Component data/manufacturers cutsheets shall be included.

10.3.13 Calculations supporting individual equipment/component sizing, such as component process rates, performance curves, tank and sump capacities, etc, shall be clearly identified and demonstrated.

Modify:

10.3.7 delete and replace with "All calculations shall be submitted."

Electronic versions of the calculations shall be prepared and submitted in MS Excel.

Electronic versions of the report shall be prepared and submitted in MS Word. Copies of the parent calculation computer input and output files shall be submitted.

BLK16: Steering Gear Sizing Calculations shall be in accordance with the OPC System Specification (NVR 5-5-5/8 through NVR 5-5-5/11).

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 561-03-1812

BLK02-TITLE OF DATA ITEM: Steering Gear Equipment Arrangement and Detail Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK04: Steering Gear Equipment Arrangement and Detail Drawings shall be drawn to scales of not less than 1/4 inch to the foot

BLK16: The Steering Gear Equipment Arrangement and Detail Drawings shall be in accordance with the OPC System Specification (NVR 5-5-5/5).

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 562-03-1820

BLK02-TITLE OF DATA ITEM: Rudder and Rudder Stock Design Calculations

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports -  
Preparation, Presentation, and  
Preservation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: BLK16

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

BLK12- NLT 120 days prior to start of fabrication

Design calculations shall be in accordance with the Specification and  
DDS 562-2 and include at least the following:  
Rudder Size, Shape and Arrangement sketches  
Shear and Bending Moment Diagrams, and Bearing Reactions  
Stock size

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 562-03-1822

BLK02-TITLE OF DATA ITEM: Rudder and Support Structure Arrangement and  
Detail DrawingsBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DAPAC

BLK 13-DATE OF SUBS SUBM: 60 PICDR

BLK16-REMARKS:

Drawings shall completely depict the design of the rudders (including internal structure thickness and spacing, and access panels), the rudder stock and stock trunk, rudder stool (if applicable), torque and retainer keys, palm bolts, pintles (if applicable), bearings, seals and any other detail of the rudder system. They shall depict center of pressure on the rudders. Drawings shall depict intersection with the ship's shell and deck(s), and tiller interface. An arrangement drawing of the rudder system as a whole and an outline of the installation and removal procedures shall be included.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 568-03-1827

BLK02-TITLE OF DATA ITEM: Thruster Arrangement Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 568-03-1828

BLK02-TITLE OF DATA ITEM: Thruster Design Calculations and Analysis

BLK04-AUTHORITY: DID Number: DI-GDRQ-80650  
DID Title: Design Data and Calculations

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 571-03-1843

BLK02-TITLE OF DATA ITEM: Replenishment at Sea (RAS) Arrangements and  
Details DrawingsBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings /  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK13-DATE OF SUBS SUBM: ASREQ

BLK16-REMARKS:

The drawing shall include the detailed arrangements and components required to fabricate, install, and operate the stations including, but limited to, fittings, reels, lines, hoses, padeyes, probe receiver, quick disconnect hose devices, personnel work/handling areas, and other equipment required the RAS systems. The drawings shall show the locations on the cutter and the interface requirements and testing requirements for installation of the RAS systems.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 572-03-1852

BLK02-TITLE OF DATA ITEM: Stores Elevator Design Calculations

BLK04-AUTHORITY:

DID Number: DI-MISC-80711

DID Title: Scientific and

Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

60DPICDR

BLK13-DATE OF SUBS SUBM:

ASREQ

BLK16-REMARKS:

Design calculations and analyses, including stress, shall be provided for the Stores Elevator system and components in accordance with OPC Systems Specification (NVR 5.5.6). Calculations shall demonstrate that the components are suitable for the intended service. The calculations shall show the dynamic interface accelerations and the testing requirements have been incorporated into the design.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 572-03-1854

BLK02-TITLE OF DATA ITEM: Stores Elevator Arrangements and Detail Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings /  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 270 DAOE

BLK13-DATE OF SUBS SUBM: ASREQ

BLK16-REMARKS:

The drawings shall depict the hoisting machinery, car, trunk, rails, sheaves, padeyes, controls, doors, safety devices, etc. The drawings shall depict sufficient details for fabrication and installation of a fully functional elevator. The drawing shall meet the requirements of ASME A17.1, Section 2.28 for Layout Drawings. The drawing shall demonstrate that the elevator systems arrangements meet the OPC System Specification.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 573-03-1860

BLK02-TITLE OF DATA ITEM: Stick Boom Calculations

BLK04-AUTHORITY:

DID Number: DI-MISC-80711

DID Title: Scientific and

Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

180DAOE

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Design calculations/analyses, including stresses, for the stick booms and their components (i.e., overall size and weight, structures, hydraulic systems and components, electrical controls and components, seals, bearings, shafts, etc.) shall demonstrate that the components meet the intended service and outreach.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 573-03-2157

BLK02-TITLE OF DATA ITEM: Trolley Hoist Boom Systems Arrangements and  
Details Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings,  
Models and Associated lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The drawing shall include the boom beams, trolleys, topping lift wire, rotation devices, swivels, motors, control systems and diagrams, cradles, rigging fittings, etc.. The drawing shall include sufficient details for the fabrication and installation. The drawings shall show the locations on the ship and the interface requirements required for installation.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 573-03-2158

BLK02-TITLE OF DATA ITEM: Trolley Hoist Boom Systems Calculations

BLK04-AUTHORITY:

DID Number: DI-MISC-80711

DID Title: Scientific and

Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

180DAOE

BLK13-DATE OF SUBS SUBM:

ASREQ

BLK16-REMARKS:

Design calculations/analyses, including stresses, for the Trolley Hoist Booms and their components (i.e., overall size and weight, structures, hydraulic systems and components, electrical controls and components, seals, bearings, shafts, etc.) shall demonstrate that the components meet the OPC System Specifications.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 580-03-1868

BLK02-TITLE OF DATA ITEM: Registry of Lifting Appliances

BLK04-AUTHORITY

DID Number: SEE BLK 16

DID Title: SEE BLK 16

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

30DPD

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The registry shall consist of an electronic database or file directory system and be editable by the USCG. The Registry shall be unique to each ship.

- The contractor shall provide a printed copy of the title page ([REGISTRY OF LIFTING APPLIANCES] and text identifying the cutter class and hull number, contract number, contractor name), the table of contents, and a statement of when it was last updated. The table of contents shall list all of the lifting appliances and weight handling systems on the cutter (bow to stern, top down). Each lifting appliance shall have its own subdirectory or file space.
  - o Each equipment unique subdirectory shall have a title page identifying the equipment and the location on the ship. The title page(s) shall include, but not be limited to: Working Load Limit or rating, a list of related drawings, technical publications, APLs and AELs, MPCs, and testing schedules.
  - o The subdirectory for each piece of equipment shall contain electronic (pdf file, WORD or EXCEL) copies of the following, with tests filed by date (latest test first) :
    - Systems Isometric diagrams.
    - Test and Inspection reports:
      - Weight handling inspection reports
      - Weight handling test reports and certificates
      - Documentation of equipment/system repair and modification
- The Contractor shall include data for the following weight handling systems, :
  - o Boats Handling and Stowage including Davits and Sea Painter booms;
  - o Rescue Swimmer Recovery Systems include winch and booms or J-Davits
  - o Replenishment at-Sea (Alongside and Astern)
  - o Stores Handling including Stores Elevators, Dumbwaiters, and Material Hoists (if provided);
  - o Store's Crane(s);
  - o Booms, both Trolley Hoist and Stick (if provided);

EXHIBIT XX - DETAIL DESIGN

- o Trolley Hoist and Rail System (if provided);
- o Aviation Maintenance Hoists and Padeyes;
- o Portable Hoists and loose cargo gear; and
- o Accommodation Ladders and Portable Brows Handling systems.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 580-03-1871

BLK02-TITLE OF DATA ITEM: Securing and Lifting Fittings Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings /  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPD

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

1. The drawing shall be an exploded isometric diagram showing the locations of the following:
  - a. Pads,
  - b. Padeyes, except the towing padeye,
  - c. Staples,
  - d. Cleats,
  - e. J-Davits,
  - f. Booms,
  - g. Sea Painter Booms,
  - h. Rescue Swimmer Winch Securing Fittings, and
  - i. Tie-downs (including Flight Deck and Hangar).
2. The drawing shall identify each of these fittings by a location based serial number (i.e., deck, frame, and side using standard Navy numbering convention) and shall include the following data for each fitting:
  - a. The fitting name and purpose of system;
  - b. Type of fitting (e.g., fixed, portable, reversible);
  - c. Location (deck, frame, and distance from centerline, port or starboard);
  - d. Working load and breaking strength;
  - e. Initial test data (date, testing activity, test load(s));
  - f. Static Test load requirements;
  - g. Rigging configuration(s) showing the test angle(s);
  - h. Fitting key characteristics (e.g., dimensions, and weight, hole size for shackle pins, and block size(s)); and
  - i. Number of attachments that can be connected to a fitting (e.g., flight and hangar deck fittings).

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 580-03-1876

BLK02-TITLE OF DATA ITEM: Anchoring, Mooring, and Towing Equipment  
Systems Arrangements and Details Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/ Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY: SEMI-ANNUAL

BLK12-DATE OF 1ST SUBM: 120DAOE

BLK13-DATE OF SUBS SUBM: 30 Days after SEMI-ANNUAL  
Period

BLK16-REMARKS:

The Contractor shall submit a final submission of the drawing showing the "As-Built" configuration at first ship delivery.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 581-03-1877

BLK02-TITLE OF DATA ITEM: Anchoring Nomograph

BLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPBT

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 581-03-1879

BLK02-TITLE OF DATA ITEM: 3-D Kinematic Model of Anchoring System and Surrounding Structure and Simulation

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 581-03-1883

BLK02-TITLE OF DATA ITEM: Anchor Windlass/Mooring Capstan Machinery  
CalculationsBLK04-AUTHORITY: DID Number: DI-MISC-80711  
DID Title: Scientific and  
Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120DAOE

BLK13-DATE OF SUBS SUBM: ASREQ

BLK16-REMARKS:

The report shall show the design calculations and analysis, including stress, for all anchor windlasses and capstans components and mooring and towing capstan components (structures, motors, controls, seals, bearings, shafts, etc.). The report shall show that capstan heads and related shafting and structure will take the breaking strength of the line or hawser bitt (dead) load. Calculations shall demonstrate that all the components are suitable for the intended service.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 581-03-2160

BLK02-TITLE OF DATA ITEM: Anchor Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings /  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180DPAT

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 582-03-1888

BLK02-TITLE OF DATA ITEM: Mooring and Towing Systems Calculations Report

BLK04-AUTHORITY:

DID Number: DI-MISC-80711

DID Title: Scientific and

Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

30DAICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The report shall show the design calculations and analysis, including stress, for all anchor windlasses and capstans components and mooring and towing capstan components (structures, motors, controls, seals, bearings, shafts, etc.). Capstan heads and related shafting and structure shall take the breaking strength of the line or hawser bitt (dead) load. Calculations shall demonstrate that the components are suitable for the intended service.

Calculations for mooring and towing systems shall be in accordance with OPC System Specification.

The report shall show the results of the calculations for the mooring system line loads under the various mooring conditions and the resultant selection of mooring lines.

The report shall show the structural ratings for all mooring bitts, chocks and associated fittings and the structural test loads to be applied.

The report shall show the results of the calculations for the towing system line [Being towed, USN towed, and adjustable] loads and the resultant selection of towing lines/chains.

The report shall show the structural ratings for all towing bitts, chocks, padeyes, and associated fittings and the structural test loads to be applied.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 582-03-2264

BLK02-TITLE OF DATA ITEM: Towing Capability Chart

BLK04-AUTHORITY:

DID Number: DI-MISC-80711

DID Title: Scientific and

Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

90DPBT

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 583-03-1895

BLK02-TITLE OF DATA ITEM: Boat Stowage and Handling General Arrangement  
and Detail DrawingsBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPICDR

BLK 13-DATE OF SUBS SUBM: 60 DPFCDR

BLK16-REMARKS:

The drawing shall show boat launching/retrieval handling equipment, boat stowage equipment, and supporting systems (e.g., rigging fittings, cleats, safety lines, sea painter boom systems, electrical outlets, cooling water supply, boat refueling system, etc.). The drawings shall depict launch and retrieval of both the maximum size boat that the davits can accommodate and the 7m OTH boat. The drawing shall show obstacles within 10 feet of the boat handling/stowage systems shall be shown. The drawing shall show where personnel will be positioned to efficiently launch, retrieve, and stow the boats. The drawing shall depict how personnel and equipment will be loaded on to the boats and offloaded from the boats, with the boats at the rail and in their cradles. The drawings shall show the locations on the cutter and the interface requirements required for installation.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 583-03-1896

BLK02-TITLE OF DATA ITEM: Life Raft Stowage Arrangement and Detail Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings / Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 270 DAOE

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The drawing shall show the locations of the liferafts in their stowage cradles and how each liferaft will be launched, both manually and automatically. The drawing shall list the type(s) of liferafts and their capacity. The drawing shall show all support structure for the liferaft stowage cradles. The drawing shall show rigging components (i.e., sea painters, tag lines, cleats, padeyes, ladders, etc.) required for launching and loading for the deployed liferafts. The drawing shall show the access routes to the abandon ship stations and the location of abandon ship ladders. The drawing shall show how the liferafts will be loaded into and unloaded from their cradles for maintenance, identifying necessary weight handling systems. The drawings shall show the locations on the ship and the interface requirements required for installation.

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 583-03-1899

BLK02-TITLE OF DATA ITEM: Boat Davit Design Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 180 DAOE

BLK13-DATE OF SUBS SUBM: ASREQ

BLK16-REMARKS:

The drawing shall show the components and systems on the davits including hydraulics, electrical, controls, pumps and motors, winches, fairleads, brakes, foundations, structure, cradles, lighting fixtures, fittings, etc. The drawings shall show the diagrams and schematics required for the davit systems. The drawings shall show the interface requirements required for installation.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 583-03-1901

BLK02-TITLE OF DATA ITEM: Davit Design Calculations

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports -  
Preparation, Presentation, and  
Preservation

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DPICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The report shall include the following:

- 1) Motion data for the structural interface for the operating sea state and the survival sea state including:
  - a) Displacements
  - b) Velocities
  - c) Accelerations
- 2) Verification of the strength of the davit structure and the structural interface for the operating sea state and the survival sea state, including:
  - a) Major component weight
  - b) Centers of gravity
  - c) Overturning moments under load
  - d) Finite element results.
- 3) Verification of the strength of the power train (lift, luff, slew, deploy) for the operating sea state and the survival sea state, including:
  - a) Hydraulic and electrical load
  - b) Rigging strength
  - c) Power train strength

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 588-03-1911

BLK02-TITLE OF DATA ITEM: Aircraft Stowage, Handling and Launching  
General ArrangementBLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings / Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 90 DPICDR

BLK 13-DATE OF SUBS SUBM: 90 DPFCDR

BLK16-REMARKS:

The drawing shall show the following arrangements and details:

1. Hangar including deck tie-down fittings, deck drains, hangar doors, all other accesses into the hangar, overhead Padeyes/hoist, and a depiction of the required USCG helicopter and maintenance envelopes, and Future System Space and Weight;
2. Flight Deck including Talon grid, Deck tie-down fittings, deck drains, and safety nets);
3. Helicopter Control Station including all equipment, controls, instruments, and furniture;
4. Helicopter Refueling/Defueling and HIFR System Arrangement and Locations;
5. Water Washdown System;
6. Nitrogen Compressed Gas Systems;
7. Aviation Shop/Office showing all furniture, equipment and stowage aids;
8. Aviation Storeroom(s) showing all stowage aids and the access routes to and from hangar;
9. Flight Deck Gear Storeroom showing all stowage aids;
10. Helicopter Securing (Tie-downs) Equipment Stowage Drawing;
11. Helicopter Crash/Rescue Locker;
12. Flight Deck and Hangar Deck Drainage, Containment, and Sealing;
13. Flight Deck Markings and Lighting including all VLA and OLA systems (i.e., glide slope indicator (GSI), Line-up line lights, obstruction lights, perimeter deck marker lights, hangar wash lights, HFIR lights, and deck status lights); and
14. Support systems (i.e. Fire stations, HVAC systems, electrical controls/outlets, air connections, etc.) in and around the aviation facility.
15. A stowage plan depicting stowage locations and arrangements for items in the Pack Up Kit (PUK), support equipment, Individual Material Requirements List, Removable Mission Equipment, servicing materials and items required by AEL 2-830024025.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 588-03-1914

BLK02-TITLE OF DATA ITEM: Hangar Door Design Calculations and Analysis Report

BLK04-AUTHORITY: Technical Reports  
DID Number: DI-MISC-80711  
DID Title: Scientific and

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45DPPRR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The calculations and analysis for the hangar door shall demonstrate meeting the OPC System Specification.

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 588-03-1929

BLK02-TITLE OF DATA ITEM: Talon Grid Design Calculations and Analysis Report

BLK04-AUTHORITY: Technical Reports  
DID Number: DI-MISC-80711  
DID Title: Scientific and

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The calculations/analysis shall demonstrate that the installed Talon grid can meet the requirements of the OPC System Specification.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 589-03-1872

BLK02-TITLE OF DATA ITEM: Trolley Hoist and Rail Systems Calculations

BLK04-AUTHORITY:

DID Number: DI-MISC-80711

DID Title: Scientific and

Technical Reports

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

30 DAICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The calculations shall include calculations for the Trolley Hoist and Rail System and components overall size and weight, structures, motors, controls, seals, bearings, shafts, etc. Calculations shall demonstrate that all the components are suitable for the intended service and design and construction standards. Stresses on each component shall be shown.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 589-03-1932

BLK02-TITLE OF DATA ITEM: Trolley Hoist and Rail General Arrangement  
and Detailed Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAICDR

BLK13-DATE OF SUBS SUBM: ASREQ

BLK16-REMARKS:

Drawings shall include trolleys, rails, batch bridges, switches, controls, stowage arrangement, rigging fittings locations, rigging arrangements, etc. The drawing shall depict the details and diagrams required for fabrication and installation as required to meet the specification requirements. In addition the drawings shall show the locations on the cutter and the interface requirements required for installation. Parts information on the drawing shall relate to technical publications and provision technical documentation (PTD).

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 589-03-1933

BLK02-TITLE OF DATA ITEM: Stores Crane(s) Design Calculations

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports -  
Preparation, Presentation, and  
Preservation

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 120 DPICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The report shall include the following results:

- 4) Motion data for the structural interface for the operating sea state and the survival sea state including:
  - a) Displacements
  - b) Velocities
  - c) Accelerations
- 5) Verification of the strength of the crane structure and structural interface for 1) operating at the pier, 2) restricted operations in the operating sea state and 3) the survival sea state, including:
  - a) Major component weight
  - b) Centers of gravity
  - c) Overturning moments under load
  - d) Finite element results.
- 6) Verification of the strength of the power train (lift, luff, slew, deploy) for the operating sea state and the survival sea state, including:
  - a) Hydraulic and electrical load
  - b) Rigging strength
  - c) Power train strength

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 589-03-1934

BLK02-TITLE OF DATA ITEM: Assembly and Detailed Drawings for Stores  
Crane(s)BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and  
Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30 DAICDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The drawing shall show the assembly and details of the Stores Crane System (e.g., pedestals, foundations, hydraulic systems components, electrical controls/ components, booms, hoist whips, topping systems, boom reaches, locations, stowage arrangements, clearances, etc.). The drawings shall provide the interface requirements and testing requirement for installation and testing of the crane(s).

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 593-03-1938

BLK02-TITLE OF DATA ITEM: Environmental Pollution Control Systems Design Report

BLK04-AUTHORITY:

DID Number: DI-MISC-80652  
DID Title: Technical Information

Report

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

DRAFT

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 602-03-1257

BLK02-TITLE OF DATA ITEM: Labels, Label Plate, and Plaque Drawings

BLK04-AUTHORITY: DID Number: DI-SSES-81000  
DID Title: Product Drawings

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: See BLK 16

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Drawings shall include the Markings, Labels and Placards indentified in the OPC System Specification.

BLK12: Submit 60 days prior to generating the labels, label plates or plaques.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 604-03-1976

BLK02-TITLE OF DATA ITEM: Key Tag Index

BLK04-AUTHORITY:

DID Number: CGDI-MISC-90020

DID Title: Key tag Index

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM:

30 DPPRR

BLK13-DATE OF SUBS SUBM:

30DPD

BLK16-REMARKS:

The Initial Key Tag Index shall provide a complete listing of the types of locks, for spaces and equipments on board the ship.

The Final Key Tag Index shall provide a complete listing of the locks, keys, and combinations for spaces and equipments on board the ship.

The Keys Tag Index shall be:

A three section, cross referenced, Key Tag Index identifying the key tag number, the key serial number, and the compartment or item secured by the key.

Each of the three sections shall be cross referenced to the other two sections.

A table of access closures and associated lock requirements, shall be included, specifying the location, quantity, type, number of keys, and known requirements (example: DCID or OPNAVINST) and other pertinent information required.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 605-03-1977

BLK02-TITLE OF DATA ITEM: Booklet of Standard Details for Ratproofing

BLK04-AUTHORITY: DID Number: DI-MISC-80678  
DID Title: Certification Data  
Report

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPFCDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The Booklet of Standard Details for Ratproofing shall detail compliance with consistent design and construction practices delineated in USPHS 393 - Handbook on Sanitation of Vessel Construction.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 624-03-1980

BLK02-TITLE OF DATA ITEM: Doors, Manholes, Hatches, Scuttles and Hardware Schedule

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models And Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPCFDR

BLK 13-DATE OF SUBS SUBM: 30DPTD

BLK16-REMARKS:

The door schedule shall include, where applicable, the door number, compartment location (to and from), size, type, left-handedright-handed, corner radius, fixed light, louvers, kick-out panels, door closers, hold back devices, lockspadlocks, and hasp and staples. The types of l door can include, but is not limited to, weather tight, fume tight, fire zone, and air tight.

DRAFT

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 630-03-1981

BLK02-TITLE OF DATA ITEM: Corrosion Prevention and Control Plan

BLK04-AUTHORITY: format. DID Number: Contractor

DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPFCDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The Corrosion Prevention Plan shall be in accordance with the OPC System Specification (COMDTINST M10360.3 and ABS NVR 8-4-2/1).

The Tunnel Erosion Report for the thruster shall be in accordance with the OPC System Specification. Include data on design measures to minimize and protect the tunnel from erosion. Such data shall include identification of the propeller tip speed, design details for a wear ring in-way of propeller blade tips, and other methods as appropriate. ASTM F841 shall be used as guidance.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 631-03-2243

BLK02-TITLE OF DATA ITEM: Paint Schedule

BLK04-AUTHORITY:

DID Number: DI-SESS-81000  
DID Title: Product Drawings Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPFCDR

BLK13-DATE OF SUBS SUBM: 30 DPAT

BLK16-REMARKS:

The Paint Schedule shall indicate paint systems to be applied to specific locations. It includes surface preparation, application and humidity criteria to execute or postpone painting, as well as inspection and monitoring procedures to document painting conditions. The schedule shall be prepared in accordance with the OPC System Specification (COMDTINST M10360.3).

Coating Application Instruction Manual shall conform to the OPC System Specification (ABS NVR 8-4-7 and COMDTINST M10360.3).

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 634-03-2244

BLK02-TITLE OF DATA ITEM: Deck Covering Schedule

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings Models  
and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPCDR

BLK13-DATE OF SUBS SUBM: 30 DPAT

BLK16-REMARKS:

The Deck Covering Schedule shall be in accordance with ABS NVR 6-2-2/9.5 and COMDTINST M10360.3C. The Deck Covering Schedule shall include surface preparation requirements, type of deck covering, underlayment and sealant used, as well as inspection and monitoring procedures.

Schedule shall be resubmitted within 30 days after completion of reviews.

Final report shall be to the As-Built configuration of the cutter.



## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 637-03-2300

BLK02-TITLE OF DATA ITEM: Sheathing Schedule

BLK04-AUTHORITY: DID Number: ANSI-Z39.18

DID Title: Scientific and Technical Reports -  
Preparation, Presentation, and  
Preservation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPFCDR

BLK 13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The schedule shall identify materials, specifications, thickness, compartment, location, and approximate quantities used in the applications. The most severe service temperature, applicable noise levels, and required fire rating on which the sheathing is applied shall also be indicated for each application. Standard practices for installing sheathing which is being used shall also be referenced.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 640-03-1987

BLK02-TITLE OF DATA ITEM: Space Arrangements Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings  
Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 45 DPICDR

BLK 13-DATE OF SUBS SUBM: 30DPD

BLK16-REMARKS:

The following shall be include in the set of Space Arrangement Drawings:

- Berthing and Sanitary Spaces
  - Office Spaces
  - Food Service Spaces
  - Physical Fitness Space
  - Medical Space
  - Ship's Store
  - Laundry Facilities
  - Law Enforcement Locker Room
  - Armories
  - Solid Waste and Hazardous Material Spaces  
Drawings for sorting and processing of waste shall indicate arrangement of equipment, storage, and daily handling and identify proximity to access for disposal.
  - Engineering Control Center
  - Pilot House
  - Workshops, laboratories and tool issue rooms (665)
- C4ISR Space Arrangement Drawings and include the following arrangements:
- Radio and Top Secret Room Arrangement Drawing.
  - SCIF Arrangement Drawing.
  - Operations Center Arrangement Drawing.
  - Sensor Compartment Arrangement Drawing.
  - Network Room Arrangement Drawing.

Damage control spaces.

The Contractor shall provide detailed space arrangement drawings that show the arrangement of DC tools and equipment, including DC lockers, spaces, stations and passageway stowage, and decontamination spaces and stowage.

CBR detection system drawings.

Stowage drawings for detection systems, IPE, and decontamination equipment.

Stowage spaces

Special stowage.

Stowage for portable furniture.

Lockers and special stowage.

## EXHIBIT XX - DETAIL DESIGN

Storerooms and stores issue rooms. (672)

Stowage Plan - present in tabular form the following information for each storeroom.

Compartment number.

Compartment name.

Compartment deck area.

Storeroom gross volume.

Stowage capacity of the storeroom.

Type and quantity of stowage aids.

Stowage capacity of each stowage aid.

Cargo Stowage.

Compartments shall be designated by compartment number and by name. The following, where applicable, shall be labeled:

- Important structural components
- Subdivisions
- Machinery
- Equipment
- Access openings and closures
- False Decks
- Outfitting
- Ventilation trunks and major ducts
- Furniture, built-in and portable
- Fire Stations

Section and profile views shall be included as necessary.

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## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 640-03-1988

BLK02-TITLE OF DATA ITEM: Color Coordination Manual

BLK04-AUTHORITY: DID Number: DI-MISC-81123  
DID Title: Color Coordination  
Manuals for Habitability Spaces

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 days prior to procurement  
of materials

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Color Coordination Manual shall consist of swatchboards of actual samples of material and color schemes proposed for each interior space, as well as color photographic reproductions of the swatchboards. Swatchboards shall accurately represent percentages of each space conforming to specific materials and colors.

The manual shall list for each color scheme, habitability materials applications, including finishes and coverings on decks, bulkheads, overheads, partitions, furniture, and equipment, and accessory furnishings such as curtains, table lamps, and bedspreads

BLK 4: References to "NAVSEA 0929-002-7010" shall be substituted with "COMDTINST M10360.3."

## EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 702-03-2013

BLK02-TITLE OF DATA ITEM: Weapons and Magazine Locations and Arrangement Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60DPICDR

BLK 13-DATE OF SUBS SUBM: 60DPFCDR

BLK16-REMARKS:

The Weapons and Magazine Location Arrangement Drawings shall include:

The locations of the Weapons, decoy systems, and magazines

The Weapons system pointing, firing, blast zones

The arrangement of the all the magazines showing the stowage aids and accesses.

1. The arrangement of the Small Arms Armory, the Law Enforcement/Web Gear Locker Room, and the Law Enforcement Armory.
2. The locations of ready service lockers
3. The locations of the pyrotechnics and grenades lockers
4. The locations and details of rails, stanchions, rigging, and other safety devices/systems related to weapons systems.

EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 702-03-2015

BLK02-TITLE OF DATA ITEM: Weapons and Ammunition Handling Analysis and Flow Diagram

BLK04-AUTHORITY: DID Number: DI-SESS-81000  
DID Title: Product Drawings/Models and Associated Lists

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 30DPICDR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

The Ammunition Flow Path Diagram shall demonstrate compliance with the OPC System Specification.

The diagram shall show the locations and types of all handling equipment.

The drawing shall show all ammunition flow paths on one sheet.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 702-03-2301

BLK02-TITLE OF DATA ITEM: Consolidated Operatability Test (COT) Plan and Report

BLK04-AUTHORITY: DID Number: ANSI-Z39.18  
DID Title: Scientific and Technical Reports - Preparation, Presentation, and Preservation

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DPAT

BLK 13-DATE OF SUBS SUBM: SEMI-ANNL

BLK16-REMARKS:

The final COT plan shall be submitted 90 days prior to the plan start of the COT.

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 702-03-2302

BLK02-TITLE OF DATA ITEM: Consolidated Operatability Test (COT)  
Discrepancy List

BLK04-AUTHORITY: DID Number: Contractor format.  
DID Title:

BLK08-APP CODE:

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 360 DPAT

BLK 13-DATE OF SUBS SUBM: SEMI-ANNLY

BLK16-REMARKS:

The report shall be in tabular format to include the following:

- Item Number
- Date
- Discrepancy
- Recommended Plan of Action

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EXHIBIT XX - DETAIL DESIGN

BLK01-SEQUENCE NO.: 995-03-1099

BLK02-TITLE OF DATA ITEM: Jigs and Fixtures Drawings

BLK04-AUTHORITY: DID Number: DI-SESS-81002  
DID Title: Developmental Design  
Drawings/ Models and Associated  
Lists

BLK08-APP CODE: I

BLK10-FREQUENCY:

BLK12-DATE OF 1ST SUBM: 60 DPPRR

BLK13-DATE OF SUBS SUBM:

BLK16-REMARKS:

Drawings shall be of sufficient detail that all jigs, fixtures, and any other specialty construction fitting for the OPC can be reproduced by the Government.

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